ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Friday, March 01, 2013 3:24 PM
To: Snyder, Amy
Cc: Hearn, Peter; DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); WILLS Tiffany (AREVA); KOWALSKI David (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, Supplement 15
Attachments: RAI 406 Supplement 15 Response US EPR DC.pdf

Importance: High

Amy,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically correct and complete response to three of the remaining four questions. Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11, Supplement 12 and Supplement 13 responses to RAI No. 406 were sent on October 26, 2010, November 23, 2010, January 6, 2011, February 9, 2011, March 2, 2011, April 7, 2011 and May 4, 2011, respectively, to provide a revised schedule. Supplement 14 response to RAI No. 406 was sent on June 9, 2011 to provide a technically correct and complete response to the remaining question (Question 09.04.01-2).

The attached file, "RAI 406 Supplement 15 Response US EPR DC.pdf" provides a revised final response to Question 09.02.02-114. This response supersedes the prior response to Question 09.02.02-114 provided in RAI 406, Supplement 6 in its entirety. Additional U.S. EPR Final Safety Analysis Report (FSAR) change pages were identified that needed to be included in the response to this question.

Appended to this file are affected pages of the U.S. EPR FSAR in redline-strikeout format which support the final response to Question 09.02.02-114.

The following table indicates the respective pages in the response document, "RAI 406 Supplement 15 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 406 — 09.02.02-114	2	6

This concludes the formal AREVA NP response to RAI 406, 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

From: WILLIFORD Dennis (RS/NB)
Sent: Thursday, June 09, 2011 1:24 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, Supplement 14

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically correct and complete response to three of the remaining four questions. Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11, Supplement 12 and Supplement 13 responses to RAI No. 406 were sent on October 26, 2010, November 23, 2010, January 6, 2011, February 9, 2011, March 2, 2011, April 7, 2011 and May 4, 2011, respectively, to provide a revised schedule.

The attached file, “RAI 406 Supplement 14 Response US EPR DC.pdf” provides a technically correct and complete FINAL response to Question 09.04.01-2.

The following table indicates the respective pages in the response document, “RAI 406 Supplement 14 Response US EPR DC.pdf,” that contain AREVA NP’s response to the subject question.

Question #	Start Page	End Page
RAI 406 — 09.04.01-2	2	3

This concludes the formal AREVA NP response to RAI 406, 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

From: WELLS Russell (RS/NB)
Sent: Wednesday, May 04, 2011 6:46 AM
To: 'Tesfaye, Getachew'
Cc: KOWALSKI David (RS/NB); 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.406, FSAR Ch. 9, supplement 13

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically correct and complete response to three of the remaining four questions. Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11 and Supplement 12 responses to RAI No. 406 were sent on October 26, 2010, November 23, 2010, January 6, 2011, February 9, 2011, March 2, 2011 and April 7, 2011, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule for the remaining question is provided in this e-mail.

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

Question #	Response Date
RAI 406 — 09.04.01-2	June 10, 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

From: WELLS Russell (RS/NB)
Sent: Thursday, April 07, 2011 7:39 AM
To: 'Tesfaye, Getachew'
Cc: KOWALSKI David (RS/NB); 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.406, FSAR Ch. 9, supplement 12

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically

correct and complete response to three of the remaining four questions. Supplement 7, Supplement 8, Supplement 9, Supplement 10 and Supplement 11 responses to RAI No. 406 were sent on October 26, 2010, November 23, 2010, January 6, 2011, February 9, 2011 and March 2, 2011, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule for the remaining question is provided in this e-mail.

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

Question #	Response Date
RAI 406 — 09.04.01-2	May 6, 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

From: WELLS Russell (RS/NB)
Sent: Wednesday, March 02, 2011 1:00 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 11

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically correct and complete response to three of the remaining four questions. Supplement 7, Supplement 8, Supplement 9 and Supplement 10 responses to RAI No. 406 were sent on October 26, 2010, November 23, 2010, January 6, 2011 and February 9, 2011, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule for the remaining question is provided in this e-mail.

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

Question #	Response Date
RAI 406 — 09.04.01-2	April 7, 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

From: BRYAN Martin (External RS/NB)
Sent: Wednesday, February 09, 2011 4:17 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 10

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically correct and complete response to three of the remaining four questions. Supplement 7, Supplement 8 and Supplement 9 responses to RAI No. 406 were sent on October 26, 2010, November 23, 2010 and January 6, 2011, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule for the remaining question is provided in this e-mail.

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

Question #	Response Date
RAI 406 — 09.04.01-2	March 9, 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

From: BRYAN Martin (External RS/NB)
Sent: Thursday, January 06, 2011 10:22 AM
To: Tesfaye, Getachew
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 9

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically correct and complete response to three of the remaining four questions. Supplement 7 and Supplement 8 responses to RAI No. 406 were sent on October 26, 2010 and November 23, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule for the remaining question is provided in this e-mail.

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

Question #	Response Date
RAI 406 — 09.04.01-2	February 10, 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

From: BRYAN Martin (External RS/NB)
Sent: Tuesday, November 23, 2010 10:04 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 8

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to

provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically correct and complete response to three of the remaining four questions. Supplement 7 response to RAI No. 406 was sent on October 26, 2010 to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule for the remaining question is provided in this e-mail.

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

Question #	Response Date
RAI 406 — 09.04.01-2	January 6, 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

From: BRYAN Martin (External RS/NB)
Sent: Tuesday, October 26, 2010 1:55 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 7

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule. Supplement 6 response to RAI No. 406 was sent on October 13, 2010 to provide a technically correct and complete response to three of the remaining four questions.

To allow additional time to interact with the NRC, the schedule for the remaining question is being revised.

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

Question #	Response Date
RAI 406 — 09.04.01-2	November 23, 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

From: BRYAN Martin (External RS/NB)
Sent: Wednesday, October 13, 2010 11:41 AM
To: Tesfaye, Getachew
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 6

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a technically correct and complete response to one question and a technically correct and partial response to one question. Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 406 were sent on September 23, 2010, September 29, 2010 and October 1, 2010, respectively, to provide a revised schedule.

The attached file, "RAI 406 Supplement 6 Response US EPR DC.pdf" provides technically correct and complete responses to three of the remaining four questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 406 Question 09.02.02-109, 09.02.02-110 and 09.02.02-114.

The following table indicates the respective pages in the response document, "RAI 406 Supplement 6 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 406 — 09.02.02-109	2	6
RAI 406 — 09.02.02-110	7	12
RAI 406 — 09.02.02-114	13	17

The schedule for a technically correct and complete response to the remaining question remains the same and is provided below.

Question #	Response Date
RAI 406 — 09.04.01-2	October 29, 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

From: BRYAN Martin (External RS/NB)
Sent: Friday, October 01, 2010 2:21 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 5

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a complete response to one question and a technically correct and partial response to one question and a revised schedule for the remaining four questions. Supplement 3 and Supplement 4 response to RAI No. 406 was sent on September 23, 2010 and September 29, 2010 to provide a schedule for the four remaining responses.

Since the response to questions 09.02.02-109, 110, and 114 are being processed, a revised schedule is provided in this email. The response date to 09.04.01-2 remains unchanged.

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

Question #	Response Date
RAI 406 — 09.02.02-109	October 14, 2010
RAI 406 — 09.02.02-110	October 14, 2010
RAI 406 — 09.02.02-114	October 14, 2010
RAI 406 — 09.04.01-2	October 29, 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

From: BRYAN Martin (External RS/NB)
Sent: Wednesday, September 29, 2010 2:59 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 4

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a complete response to one question and a technically correct and partial response to one question and a revised schedule for the remaining four questions. Supplement 3 response to RAI No. 406 was sent on September 23, 2010 to provide a schedule for the four remaining responses.

To provide additional time for interaction and feedback from the staff, a revised schedule is provided in this email for the response to question 09.04.01-2. The response date to the other three questions remains unchanged.

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

Question #	Response Date
RAI 406 — 09.02.02-109	October 1, 2010
RAI 406 — 09.02.02-110	October 1, 2010
RAI 406 — 09.02.02-114	October 1, 2010
RAI 406 — 09.04.01-2	October 29, 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

From: BRYAN Martin (External RS/NB)
Sent: Thursday, September 23, 2010 6:06 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); RYAN Tom (RS/NB); BALLARD Bob (EP/PE); GARDNER Darrell (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 3

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 406 was sent on September 14, 2010 to provide a complete response to one question and a technically correct and partial response to one question and a revised schedule for the remaining four questions.

Since the responses to three of the remaining questions are being processed, a revised schedule is provided in this email. The other response date remains unchanged.

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

Question #	Response Date
RAI 406 — 09.02.02-109	October 1, 2010

RAI 406 — 09.02.02-110	October 1, 2010
RAI 406 — 09.02.02-114	October 1, 2010
RAI 406 — 09.04.01-2	September 29, 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

From: BRYAN Martin (External RS/NB)
Sent: Tuesday, September 14, 2010 6:03 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 2

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Supplement 1 response to RAI No. 406 was sent on August 31, 2010 to provide a revised schedule.

The attached file, "RAI 406 Supplement 2 Response US EPR DC.pdf" provides a technically correct and complete response to one question and a technically correct and partial response to one question.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 406 Question 09.02.02-112.

The following table indicates the respective pages in the response document, "RAI 406 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 406 — 09.02.02-112	2	9
RAI 406 — 09.02.02-113 (Part a)	10	10

Since the remaining responses are being processed, a revised schedule is provided in this e-mail.

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

Question #	Response Date
RAI 406 — 09.02.02-109	September 23, 2010
RAI 406 — 09.02.02-110	September 23, 2010
RAI 406 — 09.02.02-114	September 23, 2010
RAI 406 — 09.04.01-2	September 29, 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

From: BRYAN Martin (External RS/NB)
Sent: Tuesday, August 31, 2010 10:52 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9, supplement 1

Getachew,

AREVA NP Inc. provided a technically correct and complete response to two of the eight questions in RAI No. 406, a technically correct and partial response to one question in RAI No. 406, and a schedule for the remaining questions, on July 16, 2010. Since responses to the remaining questions are being processed, a revised schedule is provided in this email.

On July 19, 2010, a DRAFT response to Question 09.04.01-2 was submitted to the NRC for review and comment. As of today, AREVA NP has not received any feedback from the NRC staff on this question. The remaining five questions are being processed as final responses based on previous interactions with the staff.

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

Question #	Response Date
RAI 406 — 09.02.02-109	September 14, 2010
RAI 406 — 09.02.02-110	September 14, 2010
RAI 406 — 09.02.02-112	September 14, 2010
RAI 406 — 09.02.02-113 (Part a)	September 14, 2010
RAI 406 — 09.02.02-114	September 14, 2010
RAI 406 — 09.04.01-2	September 29, 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

From: BRYAN Martin (EXT)
Sent: Friday, July 16, 2010 3:01 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No.406, FSAR Ch. 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 406 Response US EPR DC.pdf" provides a technically correct and complete response to two of the eight questions and a technically correct and partial response to one question.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 406 Questions 09.02.02-111, 09.02.02-113 (Part d) and 09.05.01-77.

The following table indicates the respective pages in the response document, "RAI 406 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 406 — 09.02.02-109	2	4
RAI 406 — 09.02.02-110	5	5
RAI 406 — 09.02.02-111	6	6
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RAI 406 — 09.02.02-113	9	9
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RAI 406 — 09.04.01-2	11	11
RAI 406 — 09.05.01-77	12	13

A complete answer is not provided for six of the questions. The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 406 — 09.02.02-109	August 31, 2010
RAI 406 — 09.02.02-110	August 31, 2010
RAI 406 — 09.02.02-112	August 31, 2010
RAI 406 — 09.02.02-113 (Part a)	August 31, 2010
RAI 406 — 09.02.02-114	August 31, 2010
RAI 406 — 09.04.01-2	August 31, 2010

SincerelyMartin (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

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, June 16, 2010 8:27 AM
To: ZZ-DL-A-USEPR-DL
Cc: Wheeler, Larry; Segala, John; Lee, Samuel; Peng, Shie-Jeng; McKirgan, John; McCann, Edward; Dreisbach, Jason; Hearn, Peter; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No.406(4683,4664,4707), FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on May 14, 2010, and discussed with your staff on June 15, 2010. Drat RAI Question 09.04.01-2 was modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that

cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

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

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 4250

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From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:
"Hearn, Peter" <Peter.Hearn@nrc.gov>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"LEIGHLITER John (AREVA)" <John.Leighliter@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"WILLS Tiffany (AREVA)" <Tiffany.Wills@areva.com>
Tracking Status: None
"KOWALSKI David (AREVA)" <David.Kowalski@areva.com>
Tracking Status: None
"Snyder, Amy" <Amy.Snyder@nrc.gov>
Tracking Status: None

Post Office: FUSLYNCMX03.fdom.ad.corp

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Response to

Request for Additional Information No. 406, Supplement 15

6/16/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.02.02 - Reactor Auxiliary Cooling Water Systems
SRP Section: 09.04.01 - Control Room Area Ventilation System
SRP Section: 09.05.01 - Fire Protection Program

Application Section: FSAR Chapter 9

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)
QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)
QUESTIONS for Balance of Plant Branch 1 (SBPA)

Question 09.02.02-114:

Follow-up to RAI 334, Question 9.2.2-69 and RAI 174, Question 9.2.2-20

In follow-up RAI 9.2.2-69 the staff concluded that the response and markup of FSAR Tier 2 Section 9.2.2 provided by the applicant for RAI 9.2.2-20 did not specifically demonstrate satisfying the guidance of SRP 9.2.2 Section II 4.G ii. In follow-up RAI 9.2.2-69 the staff noted examples of information needed in the FSAR markup to more completely identify the CCWS thermal barrier cooling design including; (1) Specifically state the CCWS associated with the RCPs can withstand a single, active failure or a moderate-energy crack as defined in Branch Technical Position ASB 3-1, (2) Also credit Seismic Category I, Quality Group C, and ASME Section III Class 3 requirements and (3) to identify that future RCP seal SBO testing would be performed.

The applicant's response to RAI 9.2.2-69 included a detailed explanation and revised markup of FSAR Tier 2 Section 9.2.2. However, the staff's review of this response identified the follow-up questions listed below:

a. In regard to the discussion in the response about mid position failure of a thermal barrier containment isolation valve (CIV) upon attempting transfer of thermal barrier cooling to the other common header:

    1. Describe the type of actions (and priority) that would be needed if the failure occurred with the valve nearly closed resulting in insufficient cooling to all thermal barriers while still preventing transfer to the other common header, that is, permissive not satisfied. Describe if this is considered a common mode loss of thermal barrier cooling.
    2. Describe in the FSAR the acceptability of taking credit for CVCS seal injection in this scenario when the CVCS is only considered an operational system that may not be present in post accident conditions.
    3. Describe in the FSAR if the plant design basis requires CCWS thermal barrier cooling to be functional in post accident conditions (besides during all plant operating modes when the RCPs are running).
    4. The applicant's response stated that failure of a CCWS CIV to fully close does not place the plant in a four hour TS action statement to close the other CIV in that flowpath but TS 3.6.3 Containment Isolation does apply. The applicant should provide the basis for these conclusions and explain the aspect of TS 3.6.3 that does apply including the applicable LCO duration.
    5. Describe in the FSAR if the RCP standstill seal (discussed in the original response) is credited as a safety-related design basis accident mitigation feature or is it intended only for conditions that are beyond the normal design basis.

b. Provide an explanation in the RAI response that demonstrates that the guidance of SRP 9.2.2, Section II 4.G is satisfied by testing that the RCPs can withstand a complete loss of cooling water for 20 minutes without operator action or state that in lieu of testing the CCWS meets Section ii.4.G, item ii. This was not addressed as requested by RAI 9.2.2-69.

Response to Question 09.02.02-114:

This response supersedes in its entirety the response to Question 09.02.02-114 provided in RAI 406, Supplement 6.

a.1 The reactor coolant pump (RCP) thermal barrier cooling transfer is a non-safety-related manual function. The non-safety-related designation results from single failure criteria and technical specification (TS) requirements to have two operable component cooling water system (CCWS) trains aligned to thermal barrier cooling. Operators would not need to perform the function during an accident. This is an operational function to align the loads to a common header which is fully supported by two trains. The transfer of thermal barrier cooling from one common header to the other common header would be needed if one of the two available trains on the initial common header providing thermal barrier cooling is in maintenance. U.S. EPR FSAR Tier 2, Chapter 16, TS Section 3.7.7, Required Action A.1 states that the RCP thermal barrier cooling must be aligned to the common header with two operable CCWS trains within 72 hours if one component cooling water (CCW) train is inoperable. In this case, the transfer could occur during normal power operation or during a shutdown. The sequence of closing the first set of containment isolation valves (CIVs) and opening the second set of CIVs determines the time that flow will be interrupted to the RCP thermal barriers. From U.S. EPR FSAR Tier 2, Table 6.2.4-1, the closure time of the CIVs for RCP thermal barrier cooling is ≤15 seconds for each valve. Because of the valve interlock associated with the supply of cooling to the loads and the short duration desired to have cooling flow interrupted, a group command is provided. The group command will close the four CIVs of the off-going common header simultaneously and open the four CIVs of the on-coming header simultaneously. The 15 second closure time of the off-going header CIVs combined with a 15 second opening time of the on-coming header CIVs results in a flow disruption of approximately 30 seconds for the RCP thermal barriers.

The RCP thermal barrier cooling for each common header (1.B and 2.B) contains two motor operated CIVs on the supply and two motor operated CIVs on the return. Each of the four CIVs inside containment has an uninterruptible emergency power supply. The two outer CIVs on the common 1.B header are normally powered from IEEE Division 1. These two valves have a standby emergency power supply of diesel generator (DG) 1 with DG 2 as the alternate emergency power supply. The two outer CIVs on the common 2.B header are normally powered from IEEE Division 4. These two valves have a standby emergency power supply of DG 4 with DG 3 as the alternate emergency power supply. Refer to U.S. EPR FSAR Tier 2, Chapter 8 for a discussion of the normal and emergency power supplies.

The RCP thermal barrier cooling transfer consists of closing the open group of CIVs (KAB30 AA049/050/051/052 (common 1.b) or KAB30 AA053/054/055/056 (common 2.b)). When one of the two supply valves (KAB30 AA049/050 (common 1.b) KAB30 AA053/054 (common 2.b)) and one of the two return valves (KAB30 AA051/052 (common 1.b) or KAB30 AA055/056 (common 2.b)) indicate valve closure, the other group of CIVs (KAB30 AA049/050/051/052 (common 1.b) or KAB30 AA053/054/055/056 (common 2.b)) is automatically opened. In case a CIV fails to open on the final header, another transfer is automatically performed back to the initial configuration. This automatic feature to revert back to the initial configuration is built into the thermal barrier cooling transfer command. Refer to U.S. EPR FSAR Tier 2, Section 9.2.2.6.1.3 for a description of the RCP thermal barrier cooling transfer.

When the thermal barrier cooling transfer is initiated and there is a loss of offsite power (LOOP) within the 15 second valve closure with a mechanical single failure of one of the four valves to close, the transfer permissive requirement of one out of two of the initial supply valves to close and one out of two of the initial return valves to close would be satisfied and the thermal barrier transfer would be completed with the second set of CIVs valves opening.

When the thermal barrier cooling transfer is initiated and there is a LOOP with a single failure of the DG supplying the outer containment isolation valve, the one out of two permissive on the initial valves would be completed by the inside CIVs that have uninterruptible power supplies. The thermal barrier transfer would be completed with the second set of CIVs opening.

The CCWS CIVs for RCP thermal barrier cooling are not actuated upon receipt of SI, CI-1, or CI-2 signals, and they remain open during and after a design basis accident (DBA). The CIVs associated with each of the common headers providing this cooling flow to the thermal barriers would not be cycled to test containment isolation operability during normal power operation because of the potential impact on operating RCPs.

The RCP shaft seal system is composed of a series of three seals and a standstill seal. During normal plant operation, water from the chemical and volume control system (CVCS) provides normal seal cooling. The CCWS is continuously aligned to the thermal barrier coolers as the safety-related backup to CVCS. The CVCS injects directly into the number 1 seal cavity and splits, with a portion of the flow flowing up through the shaft seal and the remainder of the flow flowing down past the thermal barrier and into the reactor coolant system (RCS). If seal injection is lost, then reactor coolant flows up through the thermal barrier and into the seal. When the CVCS is not available to provide normal RCP seal cooling, reactor coolant (cooled by the thermal barrier) provides cooling to the seal. The standstill seal is not credited as a safety-related design basis accident mitigation feature. It intended only for conditions that are beyond DBA.

The RCP shaft seal system is designed to withstand, without damage, the following three operating conditions so that additional margins are provided to recover service water in efforts to minimize plant down time:

- Loss of CVCS water injection to the number 1 shaft during continuous operation or pump shutdown with seal cooling provided by the thermal barrier.
- Loss of CCWS cooling water to the thermal barrier heat exchanger (HX) during continuous operation or with the pump shutdown, with seal cooling provided by CVCS seal injection.
- Concurrent loss of number 1 shaft seal injection from CVCS and thermal barrier cooling from CCWS if one of the two functions is recovered in two minutes or less.

A reduction or loss of CCWS flow to any of the RCP thermal barriers is recognized in the control room by individual flow indication devices in the return piping from each thermal barrier (refer to U.S. EPR FSAR Tier 2, Figure 9.2.2-2, sheets 3 and 4 and Figure 9.2.2-3, sheets 3 and 4). A reduction or loss of CVCS seal injection flow to the RCPs is recognized in the control room by a totaling flow indication device outside containment, and individual flow indication devices for each RCP seal (refer to U.S. EPR FSAR Tier 2, Figure 9.3.4-1).

Refer to the Response to RAI 53, Question 19-206 for a discussion of simultaneous loss of thermal barrier cooling and seal injection flow. If CCWS flow to the thermal barriers is not recovered after two minutes, the seals will heat up, resulting in increased seal leakage and the standstill seal closure would be in effect. Refer to U.S. EPR FSAR Tier 2, Section 15.6 for the U.S. EPR loss of coolant accident (LOCA) analysis. In the absence of RCP seal injection via CVCS and RCP thermal barrier cooling via CCWS, the RCP shaft seal average leakage is assumed to be ≤ 25 gpm until the standstill seal system closes (Refer to the Response to RAI 174, Question 09.02.02-20).

a.2 In accordance with U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, Section B 3.7.7, Action Item A.1 requires that if one CCW train is inoperable, action must be taken to align the RCP thermal barrier cooling common loop to a common header capable of being supplied by two operable CCW trains within 72 hours. In this condition, the CCWS can perform the RCP thermal barrier cooling function given a single failure. The 72 hour completion time is reasonable, based on the low probability of a postulated accident occurring during this period.

In accordance with U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, Section B 3.7.7, Action Item B.1, if two CCW trains are inoperable, action must be taken to restore one train to operable status within 72 hours. In accordance with U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, Section B 3.7.7, Action Item C.1 and C.2, if a CCW train cannot be restored to operable status within the associated completion time, the unit must be placed in at least Mode 3 within six hours and in Mode 5 within 36 hours.

Prior to an accident, it is expected that CCWS cooling to the RCPs is available. This is verified by U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, Section 3.7.7. Credit is not taken for the CVCS to verify cooling to the RCP shaft seals. During a LOOP, the operator is not required to transfer cooling to another CCWS train. Power to the previously running CCWS train will be restored based on emergency diesel generator (EDG) load sequencing. Because the CIVs for thermal barrier cooling remain open during and after a DBA, there is no need for the operator to transfer thermal barrier cooling.

Based on this response, a loss of CCW cooling to the RCP thermal barriers will not create a loss of CVCS seal injection to the RCPs. If the CCWS flow is restored within the specified limiting conditions for operation (LCO) action times, it is unnecessary to assume a DBA in combination with a loss of CCW cooling to the RCP thermal barriers.

a.3 Thermal barrier cooling is required for the modes of operation, including DBA, where the RCS is pressurized and relies on RCP seal integrity to maintain the reactor coolant pressure boundary. This is an initial condition in the accident analysis and is verified by U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, Section 3.7.7. The CCWS is the only safety-related cooling to the RCP thermal barriers. Technical Specifications require thermal barrier cooling to be supplied to the RCPs to verify this initial condition (i.e., thermal barrier cooling is active) prior to an accident. U.S. EPR FSAR Tier 2, Section 9.2.2 will be revised to include this information.

a.4 Refer to the Response to Part a.1 above for a discussion of the RCP thermal barrier transfer.

Related to U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, Section 3.6.3, the containment isolation function on the RCP thermal barrier supply side is maintained by one

of the two motor operated CIVs if one of the two fails to close. The containment isolation function is maintained on the RCP thermal barrier return piping by one of the two motor operated CIVs if one of the two fails to close.

a.5 The RCP standstill seal is not credited as a safety-related design basis accident mitigation feature. It intended only for conditions that are beyond DBA.

b. As stated in the Response to RAI 174, Question 09.02.02-20, the RCP shaft seal will be station blackout (SBO) tested to determine the average leakage prior to closure of the standstill seal system. An SBO test on the standstill seal will be done separately. Refer to U.S. EPR FSAR Tier 2, Section 5.4.1.2.1 for information regarding the RCP seal design as it relates to a loss of seal cooling and the conditions under which the standstill seal is normally used.

The CCWS meets the guidance of SRP 9.2.2 as being designed for single failure and built to ASME III Class 3. Refer to U.S. EPR FSAR Tier 2, Sections 9.2.2.1 and 9.2.2.2.1 for more information. The CCWS piping, valves, and components supplying the RCP thermal barriers is Seismic Category I, Quality Group C, ASME III Class 3 with the exception of the CIVs and piping between the CIVs, which are Seismic Category I, Quality Group B, ASME III Class 2.

The following sections of the U.S. EPR FSAR will be revised to include this information:

- Tier 2, Table 3.10-1—List of Seismically and Dynamically Qualified Mechanical and Electrical Equipment.
- Tier 2, Table 3.11-1—List of Environmentally Qualified Electrical/I&C Equipment.

The following sections of the U.S. EPR FSAR were revised as part of Revision 3 to include this information:

- Tier 1, Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design.
- Tier 1, Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design.
- Tier 2, Table 3.9.6-2—Inservice Valve Testing Program Requirements.
- Tier 2, Table 6.2.4-1—Containment Penetration, Isolation Valve, and Actuator Data.
- Tier 2, Figure 9.2.2-2—Component Cooling Water System Common Loop 1.
- Tier 2, Sections 7.6.1.2.5, 9.2.2.2.1, 9.2.2.6.1.1, 9.2.2.6.1.3 and 14.2.12.5.5.

FSAR Impact:

U.S. EPR FSAR Tier 2, Tables 3.10-1 and 3.11-1 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR FSAR Tier 1, Section 2.7.1 and U.S. EPR FSAR Tier 2, Section 3.9.6, Section 6.2.4, Section 7.6.1, Section 9.2.2, and Section 14.2.12 were revised as part of Revision 3 as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 2.7.1-1—CCWS Equipment Mechanical Design
Sheet 3 of 5

Description	Tag Number(1)	Location	ASME Code Section III	Function	Seismic Category
CCWS to Low Head Safety Injection Pump Seal Fluid Cooler Downstream Check Valves	30KAA22AA014 30KAA32AA014	Safeguard Building 2 Safeguard Building 3	Yes	Prevent Backflow	I
Safety Chilled Water Chiller CCWS Flow Control Valves	30KAA22AA101 30KAA32AA101	Safeguard Building 2 Safeguard Building 3	Yes	Open/Close	I
Common Header 1.a Fuel Pool Cooling Heat Exchanger 1 Downstream Control Valve	30KAB10AA134	Fuel Building	Yes	Open/Close	I
Common Header 2.a Fuel Pool Cooling Heat Exchanger 2 Downstream Control Valve	30KAB20AA134	Fuel Building	Yes	Open/Close	I
Common Header 1.b RCP Thermal Barriers Containment Isolation Valves	30KAB30AA049 30KAB30AA050 30KAB30AA051 30KAB30AA052	Safeguard Building 1 Reactor Building Reactor Building Safeguard Building 1	Yes	Close (Manually Initiated)	I
Common Header 2.b RCP Thermal Barriers Containment Isolation Valves	30KAB30AA053 30KAB30AA054 30KAB30AA055 30KAB30AA056	Safeguard Building 4 Reactor Building Reactor Building Safeguard Building 4	Yes	Close (Manually Initiated)	I
Common Header 1.b Non-Safety Loads Containment Isolation Valves	30KAB40AA001 30KAB40AA006 30KAB40AA012	Safeguard Building 1 Reactor Building Safeguard Building 1	Yes	Close	I
Common Header 1.b Containment Supply Isolation Check Valve	30KAB40AA002	Reactor Building	Yes	Close	I
Common Header 2.b Auxiliary Building and Waste Building Isolation Valves	30KAB50AA001 30KAB50AA006 30KAB50AA004	Safeguard Building 4 Safeguard Building 4 Safeguard Building 4	Yes	Close	I

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 4 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Common Header 1.b Safety Related Loads Containment Isolation Valves	30KAB60AA013	Safeguard Building 1	1^N 2^A	Yes	Yes	Position / Position	Open-Close / Open-Close
	30KAB60AA018	Reactor Building	4^N 3^A				
	30KAB60AA019	Safeguard Building 1	1^N 2^A				
Common Header 2.b Safety Related Loads Containment Isolation Valves	30KAB70AA013	Safeguard Building 4	4^N 3^A	Yes	Yes	Position / Position	Open-Close / Open-Close
	30KAB70AA018	Reactor Building	1^N 2^A				
	30KAB70AA019	Safeguard Building 4	4^N 3^A				
Common Header 1.b RCP Thermal Barriers Containment Isolation Valves	30KAB30AA049	Safeguard Building 1	1^N 2^A	Yes	Yes	Position / Position	Open-Close / Open-Close
	30KAB30AA050	Reactor Building	4^N 3^A				
	30KAB30AA051	Reactor Building	4^N 3^A				
	30KAB30AA052	Safeguard Building 1	1^N 2^A				

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 5 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Common Header 2.b RCP Thermal Barriers Containment Isolation Valves	30KAB30AA053	Safeguard Building 4	42N 31A	Yes	Yes	Position / Position	Open-Close / Open-Close
	30KAB30AA054	Reactor Building	13N 24A				
	30KAB30AA055	Reactor Building	13N 24A				
	30KAB30AA056	Safeguard Building 4	42N 32A				
Surge Tank Demin. Water Makeup Isolation Valves	30KAA10AA027	Safeguard Building 1	1N 2A	N/A	Yes	Position / Position	Open-Close / Open-Close
	30KAA20AA027	Safeguard Building 2	2N 1A				
	30KAA30AA027	Safeguard Building 3	3N 4A				
	30KAA40AA027	Safeguard Building 4	4N 3A				
Common Header 1.a Fuel Pool Cooling Heat Exchanger 1 Downstream Control Valve	30KAB10AA134	Fuel Building	1N 2A	N/A	Yes	NA / NA	NA / NA

Table 3.9.6-2—Inservice Valve Testing Program Requirements
Sheet 53 of 114

Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10,11]	Test Frequency[9]	Comments
30KAB30AA050	Supply Thermal Barrier 1 and 2 Inside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30KAB30AA051	RCP Thermal Barrier 1 and 2 Return Inside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30KAB30AA052	RCP Thermal Barrier 1 and 2 Return Outside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30KAB30AA191	RV Downstream Thermal Barrier 1 and 2	RV	SA	3	A/C	A	O/C	ET LT PI	10Y 10Y 2Y	
30KAB40AA001	Supply KLA / KT Users Outside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30KAB40AA002	Supply Common 1B Inside CIV	CK	SA	2	A/C	A	C	ET LT PI	CS RF 2Y	LT per 10 CFR 50, Appendix J
30KAB40AA006	Return KLA / KT Users Outside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J

Table 3.9.6-2—Inservice Valve Testing Program Requirements
Sheet 55 of 114

Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8,10,11]	Test Frequency[9]	Comments
30KAB10AA193	RV Downstream FPCS HX1	RV	SA	3	A/C	A	O/C	ET LT PI	10Y 10Y 2Y	
30KAB20AA192	RV Downstream Common 2B	RV	SA	3	A/C	A	O/C	ET LT PI	10Y 10Y 2Y	
30KAB30AA054	Supply Thermal Barrier 3 and 4 Inside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30KAB30AA055	RCP Thermal Barrier 3 and 4 Return Inside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30KAB30AA056	RCP Thermal Barrier 3 and 4 Return Outside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30KAB30AA053	RCP Thermal Barrier 3 and 4 supply Outside CIV	GT	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30KAB30AA192	RV Downstream TH BARR 3 and 4	RV	SA	3	A/C	A	O/C	ET LT PI	10Y 10Y 2Y	

Table 3.10-1—List of Seismically and Dynamically Qualified Mechanical and Electrical Equipment
Sheet 80 of 200

Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)		Safety Class (Note 4)		EQ Program Designation (Note 5)		
F Dnstr NSS HL3	30KAB20CF566	30UFA06086	M	H		SI	S	C/NM	Y (3)		Y (5)
F Dnstr KLL64AC002-3	30KAB20CF567	30UFA06074	M	H		SI	S	C/NM	Y (3)		Y (5)
P Test Dnr QUC13 AC001	30KAB20CP252	30UFA06083	M	H		SI	S	C/NM	Y (3)		Y (5)
P Test Dnr QUC14 AC001	30KAB20CP254	30UFA06083	M	H		SI	S	C/NM	Y (3)		Y (5)
P Test Dnr KUA10 AC001	30KAB20CP256	30UFA06082	M	H		SI	S	C/NM	Y (3)		Y (5)
P Test Dnr CVCS PP Oil 2	30KAB20CP260	30UFA06085	M	H		SI	S	C/NM	Y (3)		Y (5)
P Test Dnr CVCS PP M 2	30KAB20CP262	30UFA06085	M	H		SI	S	C/NM	Y (3)		Y (5)
P Test Upr Sampl Clrs	30KAB20CP279	30UFA06084	M	H		SI	S	C/NM	Y (3)		Y (5)
P Test Upstr KBA Clr	30KAB20CP280	30UFA06084	M	H		SI	S	C/NM	Y (3)		Y (5)
P Test Dnr CVCS PP SI 2	30KAB20CP292	30UFA06085	M	H		SI	S	C/NM	Y (3)		Y (5)
T Upstr FPCS HX2	30KAB20CT267	30UFA05076	M	H		SI	S	C/NM	Y (3)		Y (5)
T Dnstr FPCS HX2	30KAB20CT268	30UFA06075	M	H		SI	S	C/NM	Y (3)		Y (5)
T Test NSS SG3 SG4	30KAB20CT272	30UFA06083	M	H		SI	S	C/NM	Y (3)		Y (5)
T Test NSS CL3	30KAB20CT273	30UFA06082	M	H		SI	S	C/NM	Y (3)		Y (5)
T Dnstr FPCS HX2	30KAB20CT565	30UFA06075	M	H		SI	S	C/NM	Y (3)		Y (5)
T CVCS PP2	30KAB20CT578	30UFA06084	M	H		SI	S	C/NM	Y (3)		Y (5)
V Upstr Cooler RCP 1	30KAB30AA011	30UJA18013	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
V Dnstr Cooler RCP 1	30KAB30AA018	30UJA18013	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
V Upstr Cooler RCP 2	30KAB30AA021	30UJA18014	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
V Dnstr Cooler RCP 2	30KAB30AA028	30UJA18014	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
V Upstr Cooler RCP 3	30KAB30AA031	30UJA18015	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
V Dnstr Cooler RCP 3	30KAB30AA038	30UJA18015	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
V Upstr Cooler RCP 4	30KAB30AA041	30UJA18016	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
V Dnstr Cooler RCP 4	30KAB30AA048	30UJA18016	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
Civ Upstr Thbarr 1&2	30KAB30AA050	30UJA11014	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
Civ Upstr Thbarr 1&2	30KAB30AA049	31UJH10004	M	H	ES	SI	S	C/NM	Y (3)		Y (5)
Civ Dnstr Thbarr 1&2	30KAB30AA051	30UJA11013	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
Civ Dnstr Thbarr 1&2	30KAB30AA052	31UJH10004	M	H	ES	SI	S	C/NM	Y (3)		Y (5)
Civ Upstr Thbarr 3&4	30KAB30AA053	34UJH10004	M	H	ES	SI	S	C/NM	Y (3)		Y (5)
Civ Dnstr Thbarr 3&4	30KAB30AA055	30UJA11015	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
Civ Dnstr Thbarr 3&4	30KAB30AA056	34UJH10004	M	H	ES	SI	S	C/NM	Y (3)		Y (5)
Civ Upstr Thbarr 3&4	30KAB30AA054	30UJA11015	H	H	ES	SI	S	C/NM		Y (4)	Y (5)
FAJ-V JEB10 AC001	30KAB30AA112	30UJA18002	H	H	ES	SI	S	C/NM		Y (4)	Y (5)

Table 3.11-1—List of Environmentally Qualified Electrical/I&C Equipment
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Name Tag (Equipment Description)	Tag Number	Local Area KKS ID (Room Location)	EQ Environment (Note 1)	Radiation Environment Zone (Note 2)	EQ Designated Function (Note 3)	Safety Class (Note 4)	EQ Program Designation (Note 5)
T M4 Air W Cl Outl A	30KAA40CT012	34UJH01026	M	H	SII	NS-AQ EMC	Y (2) Y (5) Y (6)
T M4 PP-E Brg A	30KAA40CT015A	34UJH01026	M	H	SII	NS-AQ EMC	Y (2) Y (5) Y (6)
T M4 PP-E Brg B	30KAA40CT015B	34UJH01026	M	H	SII	NS-AQ EMC	Y (2) Y (5) Y (6)
T M4 PP-E Brg A	30KAA40CT016A	34UJH01026	M	H	SII	NS-AQ EMC	Y (2) Y (5) Y (6)
T M4 N-PP-E Brg B	30KAA40CT016B	34UJH01026	M	H	SII	NS-AQ EMC	Y (2) Y (5) Y (6)
T Outl HX40 Meas	30KAA40CT090	34UJH10026	M	H	SI	S 1E EMC	Y (2) Y (5) Y (6)
T Inl HX40 Meas	30KAA40CT092	34UJH01026	M	H	SI	S 1E EMC	Y (2) Y (5) Y (6)
T Retn CCWS PP Cl4	30KAA40CT288	34UJH01026	M	H	SI	S 1E EMC	Y (2) Y (5) Y (6)
T1 CW Users Trn40	30KAA40CT893	34UJH10026	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
T2 CW Users Trn40	30KAA40CT894	34UJH10026	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
T3 CW Users Trn40	30KAA40CT895	34UJH10026	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
F LHSI HX4 Meas	30KAA42CF062	34UJH05025	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
F MHSI PP4	30KAA42CF066	34UJH01001	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
F Test MHSI PP3	30KAA42CF264	34UJH01001	M	H	SI	S 1E EMC	Y (2) Y (5) Y (6)
G Opng *42AA005*	30KAA42CG005A	34UJH10004	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
G Cls *42AA005*	30KAA42CG005B	34UJH10004	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
T Dnstr MHSI PP4	30KAA42CT258	34UJH01001	M	H	SI	S 1E EMC	Y (2) Y (5) Y (6)
T Dnstr LHSI HX4	30KAA42CT555	34UJH05005	M	H	SI	S 1E EMC	Y (2) Y (5) Y (6)
FAJ-V FAK10 AC001 - Act	30KAB10AA134	30UFA06023	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
FAJ-V FAK20 AC001 - Act	30KAB20AA134	30UFA06074	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
Civ Upstr Thbarr 1&2 - Act	30KAB30AA049	31UJH10004	M	H	ES PAM SI	S 1E EMC	Y (2) Y (5) Y (6)
Civ Dnstr Thbarr 1&2 - Act	30KAB30AA051	30UJA11013	H	H	ES PAM SI	S 1E EMC	Y (1) Y (5)
Civ Dnstr Thbarr 1&2 - Act	30KAB30AA052	31UJH10004	M	H	ES PAM SI	S 1E EMC	Y (2) Y (5) Y (6)
Civ Upstr Thbarr 1&2 - Act	30KAB30AA050	30UJA11014	H	H	ES PAM SI	S 1E EMC	Y(1) Y(5)
Civ Upstr Thbarr 3&4 - Act	30KAB30AA054	30UJA11015	H	H	ES PAM SI	S 1E EMC	Y(1) Y(5)
Civ Upstr Thbarr 3&4 - Act	30KAB30AA053	34UJH10004	M	H	ES PAM SI	S 1E EMC	Y (2) Y (5) Y (6)
Civ Dnstr Thbarr 3&4 - Act	30KAB30AA055	30UJA11015	H	H	ES PAM SI	S 1E EMC	Y (1) Y (5)
Civ Dnstr Thbarr 3&4 - Act	30KAB30AA056	34UJH10004	M	H	ES PAM SI	S 1E EMC	Y (2) Y (5) Y (6)
Civ *KLA/KT* Users - Act	30KAB40AA001	31UJH10004	M	H	ES PAM SI	S 1E EMC	Y (2) Y (5) Y (6)
Civ *KLA/KT* Users - Act	30KAB40AA006	31UJH10004	M	H	ES PAM SI	S 1E EMC	Y (2) Y (5) Y (6)
Civ *KLA/KT* Users - Act	30KAB40AA012	30UJA11014	H	H	ES PAM SI	S 1E EMC	Y (1) Y (5)
V 1 Upstr *UKA/UKS* - Act	30KAB50AA001	34UJH10004	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)
V Dnstr *UKA/UKS* - Act	30KAB50AA004	34UJH10004	M	H	ES SI	S 1E EMC	Y (2) Y (5) Y (6)

Table 6.2.4-1—Containment Penetration, Isolation Valve, and Actuator Data
Sheet 9 of 23

Penetration No.	GDC Req.	System Name	Fluid	Line Size (in)	Essent System	Potent Bypass Path	Valve Number	Valve Location	LLRT	Valve Type and Operator	Primary Actuation	Secondary Actuation	Normal Position	Shutdown Position	Post Accident Position	Power Failure Position	Cont. Isolation Signal	Valve Closure Time		Power Source	Time Delay (Note 1)
																		T3	T4		
60BQ108	57	CCWS & CVCS to RCP	water	12.0	no	no	KAB60 AA018	inside	C	gate/ MOV	PS	RM	open	o/c	close	as-is	stage 2	≤ 0.5 sec	≤ 59.5 sec	34BRA	n/a
60BQ108	57	CCWS & CVCS to RCP	water	12.0	no	no	KAB60 AA019	outside	C	gate/ MOV	PS	RM	open	o/c	close	as-is	stage 2	≤ 0.5 sec	≤ 59.5 sec	31BNB03	n/a
60BQ113	57	CCWS to HVAC & PEH	water	10.0	no	no	KAB40 AA002	inside	C	swing check	self	self	open	o/c	close	n/a	n/a	n/a	n/a	n/a	n/a
60BQ113	57	CCWS to HVAC & PEH	water	10.0	no	no	KAB40 AA001	outside	C	gate/ MOV	PS	RM	open	o/c	close	as-is	stage 1	≤ 0.5 sec	≤ 49.5 sec	31BNB03	n/a
60BQ114	57	CCWS return HVAC & PEH	water	10.0	no	no	KAB40 AA012	inside	C	gate/ MOV	PS	RM	open	o/c	close	as-is	stage 1	≤ 0.5 sec	≤ 49.5 sec	34BRA	Group 1
60BQ114	57	CCWS return HVAC & PEH	water	10.0	no	no	KAB40 AA006	outside	C	gate/ MOV	PS	RM	open	o/c	close	as-is	stage 1	≤ 0.5 sec	≤ 49.5 sec	31BNB03	n/a
60BQ117	57	CCWS supply to RCP	water	4.0	yes	no	KAB30 AA050	inside	C	gate/MOV	RM	RM	open	open	open	as-is	no	≤ 0.5 sec	≤ 14.5 sec	34BRA	n/a
60BQ117	57	CCWS supply to RCP	water	4.0	yes	no	KAB30 AA049	outside	C	gate/ MOV	RM	RM	open	open	open	as-is	no	≤ 0.5 sec	≤ 14.5 sec	31BNB03	n/a
60BQ118	57	CCWS return RCP	water	4.0	yes	no	KAB30 AA052	outside	C	gate/ MOV	RM	RM	open	open	open	as-is	no	≤ 0.5 sec	≤ 14.5 sec	31BNB03	n/a
60BQ118	57	CCWS return RCP	water	4.0	yes	no	KAB30 AA051	inside	C	gate/ MOV	RM	RM	open	open	open	as-is	no	≤ 0.5 sec	≤ 14.5 sec	34BRA	n/a
60BQ407	57	CCWS & CVCS to RCP	water	12.0	no	no	KAB70 AA014	inside	C	swing check	self	self	open	o/c	close	n/a	n/a	n/a	n/a	n/a	n/a
60BQ407	57	CCWS & CVCS to RCP	water	12.0	no	no	KAB70 AA013	outside	C	gate/ MOV	PS	RM	open	o/c	close	as-is	stage 2	≤ 0.5 sec	≤ 59.5 sec	34BNB03	n/a

Table 6.2.4-1—Containment Penetration, Isolation Valve, and Actuator Data
Sheet 10 of 23

Penetration No.	GDC Req.	System Name	Fluid	Line Size (in)	Essent System	Potent Bypass Path	Valve Number	Valve Location	LLRT	Valve Type and Operator	Primary Actuation	Secondary Actuation	Normal Position	Shut-down Position	Post Accident Position	Power Failure Position	Cont. Isolation Signal	Valve Closure Time		Power Source	Time Delay (Note 1)
																		T3	T4		
60BQ408	57	CCWS & CVCS return RCP	water	12.0	no	no	KAB70 AA018	inside	C	gate/ MOV	PS	RM	open	o/c	close	as-is	stage 2	≤ 0.5 sec	≤ 59.5 sec	31BRA	n/a
60BQ408	57	CCWS & CVCS return RCP	water	12.0	no	no	KAB70 AA019	outside	C	gate/ MOV	PS	RM	open	o/c	close	as-is	stage 2	≤ 0.5 sec	≤ 59.5 sec	34BNB03	n/a
60BQ420	57	CCWS supply to RCP	water	4.0	yes	no	KAB30 AA054	inside	C	gate/ MOV	RM	RM	open	open	open	as-is	no	≤ 0.5 sec	≤ 14.5 sec	31BRA	n/a
60BQ420	57	CCWS supply to RCP	water	4.0	yes	no	KAB30 AA053	outside	C	gate/ MOV	RM	RM	open	open	open	as-is	no	≤ 0.5 sec	≤ 14.5 sec	24BNB03	n/a
60BQ421	57	CCWS return RCP	water	4.0	yes	no	KAB30 AA055	inside	C	gate/ MOV	RM	RM	open	open	open	as-is	no	≤ 0.5 sec	≤ 14.5 sec	31BRA	n/a
60BQ421	57	CCWS return RCP	water	4.0	yes	no	KAB30 AA056	outside	C	gate/ MOV	RM	RM	open	open	open	as-is	no	≤ 0.5 sec	≤ 14.5 sec	24BNB03	n/a
10BQ002	55	CVCS Charging	water	4.0	no	no	KBA34 AA003	inside	C	swing check	self	self	open	close	close	n/a	n/a	n/a	n/a	n/a	n/a
10BQ002	55	CVCS Charging	water	4.0	no	no	KBA34 AA002	outside	C	globe/ MOV	PS	RM	open	close	close	as-is	stage 2	≤ 0.5 sec	≤ 19.5 sec	31BNB03	n/a
10BQ003	55	CVCS Letdown	water	6.0	no	no	KBA14 AA002	inside	C	globe/ MOV	PS	RM	open	close	close	as-is	stage 1	≤ 0.5 sec	≤ 29.5 sec	31BRA	Group 2
10BQ003	55	CVCS Letdown	water	6.0	no	no	KBA14 AA003	outside	C	globe/ MOV	PS	RM	open	close	close	as-is	stage 1	≤ 0.5 sec	≤ 29.5 sec	34BNB03	n/a
30BQ044	56	CVS supply	air	39.0	no	no	KLA30 AA003	inside	C	special/air	PS	RM	close	o/c	close	close	stage 1	n/a	n/a	n/a	n/a
30BQ044	56	CVS supply	air	39.0	no	no	KLA30 AA002	outside	C	special/air	PS	RM	close	o/c	close	close	stage 1	n/a	n/a	n/a	n/a
40BQ045	56	CVS exhaust	air	39.0	no	no	KLA40 AA001	inside	C	special/air	PS	RM	close	o/c	close	close	stage 1	n/a	n/a	n/a	n/a

Section 7.6.1.2.5

The same valve arrangement and interlocks are provided relative to Common 1b to provide separation between Trains 1 and 2, and on Common 2a and 2b to provide separation between Trains 3 and 4. The functional logic for the switchover valve interlock is shown in Figure 7.6-1—CCWS Switchover Valves Interlock.

The interlock functions maintaining separation between redundant CCWS trains are performed by the SAS. Each switchover valve is assigned to a SAS division based on the CCWS train it belongs to (i.e., switchover valves on Train 1 are assigned to SAS Division 1). Each division of SAS acquires position information from the valves to which it is assigned, and controls those same valves. In any SAS division, the information about the position of valves in other trains that is needed to control a switchover valve is provided via network connection by the SAS division which acquires the information. For example, the positions of the Train 2 valves on the supply and return of Common 1a are acquired by SAS Division 2. This information is provided via a network connection to SAS Division 1 to perform the interlock function for the Train 1 valves on the supply and return of Common 1a.

RCP Thermal Barrier Containment Isolation Valves Interlock and RCP Thermal Barrier Containment Isolation Valves Opening Interlock

Another interlocking function is required concerning the cooling paths of the Common 1b and Common 2b headers for the reactor coolant pump (RCP) thermal barriers. Either the Common 1b or 2b header can provide cooling to the RCP thermal barriers. To maintain strict CCWS train separation, one of the supply containment isolation valves (CIV) and one of the return CIVs on the RCP thermal barriers cooling path must be closed on the header being removed from service (1b or 2b) prior to opening the CIVs on the header being placed in service (2b or 1b, respectively). The functional logic for the CIV interlock is shown in Figure 7.6-2—CCWS RCP Thermal Barrier Containment Isolation Valves Interlock. This safety-related interlock provides independence between redundant CCWS trains, such that if a failure occurs (e.g. pipe break) both redundant trains are not compromised.

An interlock function is required to open the CIVs on the common header removed from service (1b or 2b) when a CIV on the common header in service (2b or 1b, respectively) is closed. The functional logic for the CIV opening interlock is shown in Figure 7.6-12—CCWS RCP Thermal Barrier Containment Isolation Valves Opening Interlock. This safety-related interlock ensures that during a failure that causes the CIVs of the train in service to close, the redundant train's CIVs open to provide cooling to the RCP thermal barriers. During a manual switchover, if a CIV on the common header coming into service fails to open, then plant operating procedures require the CIVs to be realigned back to the initial configuration before switchover.

The interlock functions concerning the CIVs are also performed by the SAS~~, but are only performed in Divisions 1 and 4~~. The CIVs are assigned to SAS divisions for

cooling function, the thermal barrier load is required to be cooled by a CCWS common header, which is capable of being connected to two operable CCWS trains. If a CCWS train is out of service for maintenance or because of a single failure, the operators have 72 hours to align RCP thermal barrier cooling to the CCWS common header that has two CCWS supply trains available. If a single failure removes one of the two trains available for that common header, the operator does not have the option to align RCP thermal barrier cooling to a common header with two operable CCWS trains, but there are still two operable CCWS trains available (one for each common header) for thermal barrier cooling. In the event of an RCP thermal barrier fault such as a tube rupture, this single RCP thermal barrier is isolated via inlet and outlet isolation valves in the RCS. A fault of a single RCP thermal barrier does not isolate the entire common header supply to the remaining operable thermal barriers. To maintain strict CCWS train separation for thermal barrier cooling, an interlocking function is required. The containment isolation valves (CIVs) in the RCP thermal barrier cooling path on the supply and return side of CCWS common 1b cannot be opened unless one of the two CIVs on the supply side and one of the two CIVs on the return side are closed and vice-versa.

Thermal barrier cooling is required for each mode of operation, including DBA, where the RCS is pressurized and, therefore, relies on RCP seal integrity to maintain the reactor coolant pressure boundary. Credit is not taken for the CVCS to verify cooling to the RCP shaft seals. In the event that both CCWS flow to the RCP thermal barriers and CVCS seal injection are not available (i.e., if one of the two flows (CCWS or CVCS) is not restored within two minutes) the RCP seals are expected to degrade. Refer to Sections 5.4.1.2.1 and 8.4.2.6.2 for details related to the RCP seal design and standstill seal, and Section 15.6 for the U.S. EPR LOCA analysis.

The CCWS piping, valves and components supplying the RCP thermal barriers is Seismic Category I, Quality Group C, ASME III Class 3 with the exception of the CIVs and the piping between the CIVs, which are Seismic Category I, Quality Group B, ASME III Class 2.

The four inside motor operated CIVs in the RCP thermal barrier cooling path are provided with uninterruptible power.

The non-safety-related CCWS loads in the NAB and RWB can be quickly isolated from the rest of the CCWS by fast-closing hydraulic valves, as required. The non-safety-related common branches of the CCWS trains are shown in Figure 9.2.2-2—Component Cooling Water System Common Loop 1, and Figure 9.2.2-3—Component Cooling Water System Common Loop 2.

The design of the Component Cooling Water System (CCWS) minimizes and withstands adverse transients (i.e., water hammer) and meets functional performance requirements for all operating modes including postulated DBA consistent with the

~~Isolation valves at inlet (JEB10/20/30/40 AA021) and outlet (JEB10/20/30/40 AA003) of each RCP thermal barrier (as shown in Figure 5.1-4) are used to automatically isolate the faulted thermal barrier from the CCWS. High radiation in the CCWS does not initiate automatic isolation of CCWS cooling to the RCP thermal barriers. Isolation of faulted RCP thermal barrier only affects that RCP; it does not affect the CCWS cooling of the other three RCP thermal barriers or thermal barrier cross tie.~~

CCWS RCP Thermal Barrier Containment Isolation Valve Interlock

Either the common 1.b or 2.b headers can provide cooling to the RCP thermal barriers. To maintain strict train separation of the redundant CCWS division supplying either common header to confirm that a fault affects no more than one train, the CIVs (KAB30 AA049/050/051/052/053/054/055/056) are interlocked. One of the two common 1.b supply valves (KAB30 AA049/050) and one of the two common 1.b return valves (KAB30 AA051/052) must be closed prior to opening the CIVs from the common 2.b header (KAB30 AA053/054/055/056), and vice versa. The functional logic is shown on Figure 7.6-2.

To maintain cooling to the RCP thermal barriers an interlock function is required to open the CIVs on the common header removed from service (common 1.b or 2.b) when a CIV on the common header in service (common 2.b or 1b, respectively) is closed. The functional logic is shown on Figure 7.6-12.

9.2.2.6.1.2 CCWS Manual I&C Safety-Related Functions

CCWS Manual Control

Safety-related manual controls are provided for the operators in the MCR as a backup to the SR system automation. Manual control capabilities are provided in the MCR for the following CCWS components:

- CCWS pump (30KAA10/20/30/40 AP001).
- CCWS switchover valves (30KAA10/20/30/40 AA006/010/032/033).
- CCWS heat exchanger bypass valve (KAA10/20/30/40 AA112).
- Non-safety-related branch Isolation valves (KAB50 AA001/004/006, KAB80 AA015/016/019).
- CIVs.

CCWS Common 1.a (2.a) Manual Supply

When the common 1.b (2.b) header supply is automatically transferred to the common header associated CCWS train via the automatic switchover sequence, the common 1.a (2.a) header is also isolated and no automation is foreseen to switchover the common

- When the surge tank water level lowers to the MIN1 level, the DWDS supply isolation valve (KAA10/20/30/40 AA027) is automatically opened.

- When the surge tank water level reaches the MAX1 level, the DWDS supply isolation valve is automatically closed.

RCP Thermal Barrier Cooling Transfer

Either the common 1.b or 2.b headers can provide cooling to the RCP thermal barriers. Because of the valve interlock associated with the supply of cooling to these loads and the short duration desired to have cooling flow isolated, a group command is provided. The RCP thermal barrier cooling transfer consists of closing the open group of CIVs (KAB30 AA049/050/051/052, common 1.b or KAB30 AA053/054/055/056, common 2.b) and as soon as one of the two supply valves on the initial header and one of the two return valves on the initial header indicate closure, the other group of CIVs (KAB30 AA049/050/051/052, common 1.b or KAB30 AA053/054/055/056, common 2.b) are opened.

In case a CIV fails to open on the final header, another transfer is automatically performed back to the initial configuration.

In the event that one CCWS train is inoperable, RCP thermal barrier cooling is aligned to the CCWS common header that is supported by two operable CCWS trains within 72 hours per Chapter 16, Technical Specification 3.7.7.

RCP Thermal Barrier Isolation

A fault of an RCP thermal barrier is recognized by the following indications:

- A high flow above a threshold value measured with a flow element in the CCWS piping on the return from each RCP thermal barrier.

- A high pressure above a threshold value measured with a pressure sensor in the RCS piping on the return from each RCP thermal barrier.

Isolation valves at inlet (JEB10/20/30/40 AA021) and outlet (JEB10/20/30/40 AA003) of each RCP thermal barrier (as shown in Figure 5.1-4) are used to automatically isolate the faulted thermal barrier from the CCWS. High radiation in the CCWS does not initiate automatic isolation of CCWS cooling to the RCP thermal barriers. Isolation of faulted RCP thermal barrier only affects that RCP; it does not affect the CCWS cooling of the other three RCP thermal barriers or thermal barrier cross tie.

CCWS Temperature Control

Normally, the CCWS heat exchanger bypass control valve (KAA10/20/30/40 AA112) is manually positioned in order to maintain a CCWS normal temperature greater than 59°F and less than 100.4°F. This is a remote manual operation from the MCR. An

Figure 9.2.2-2—Component Cooling Water System Common Loop 1
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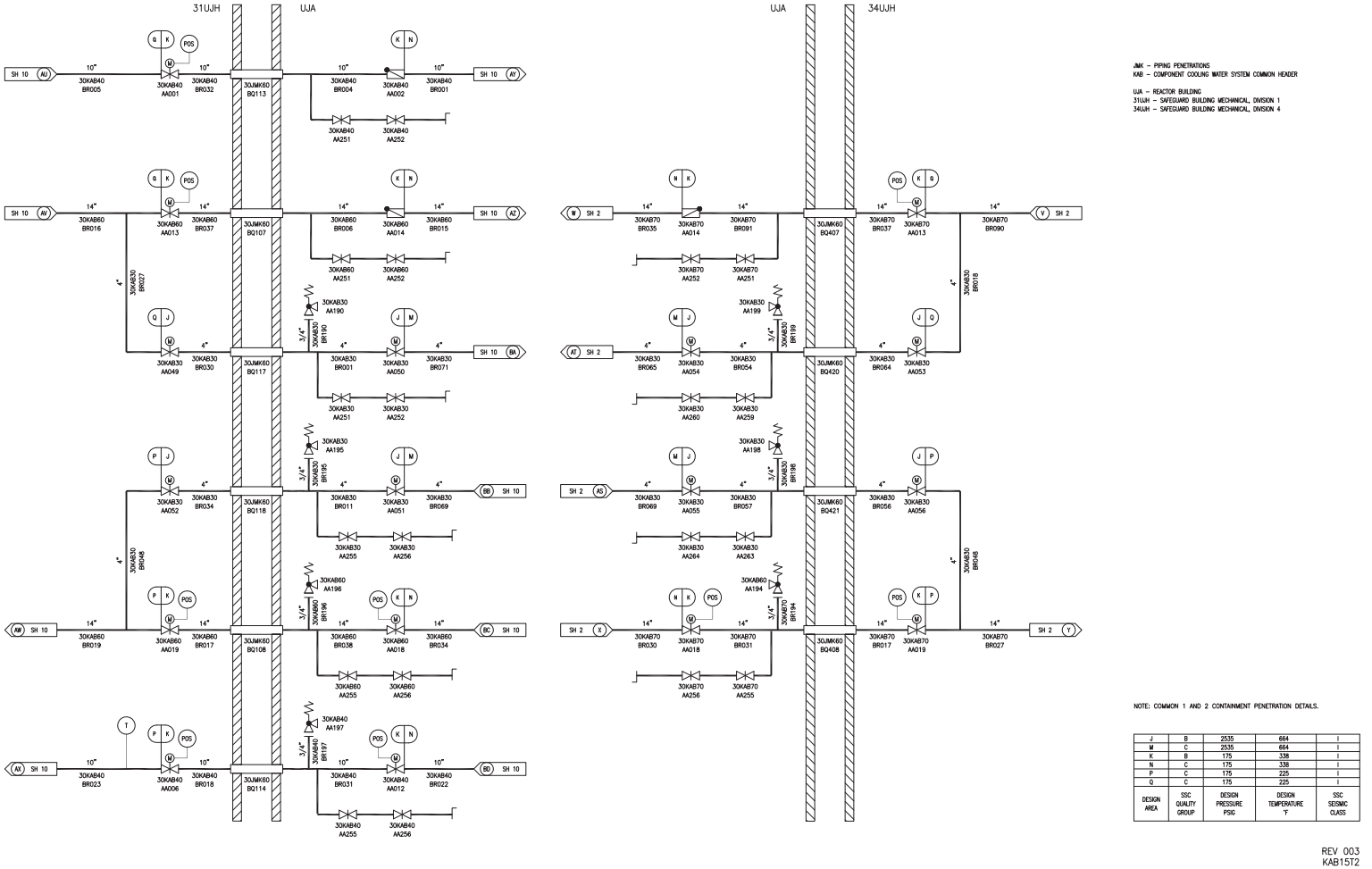

3.32 Perform step 3.31 for CCWS Trains 2, 3, and 4 to verify appropriate responses.

3.33 Verify that CCWS Train 1 is supplying the common 1.b header (main common user group), then perform test of CCWS Temperature Control function.

3.33.1 Simulate two of three CCWS Train 1 temperature sensors less than MIN1. Verify that the Train 1 heat exchanger bypass valve opens by 10 percent of its 0-100 percent range at 1 minute intervals until 2 of 3 temperature measurements are greater than MIN1, or the valve is fully open.

3.33.2 Simulate two out of three CCWS Train 1 temperature sensors greater than MAX1. Verify that the Train 1 heat exchanger bypass valve closes by 10 percent of its 0-100 percent range at 1 minute intervals until 2 of 3 temperature measurements are less than MAX1, or the valve is fully closed.

3.34 Perform step 3.33 for CCWS Trains 2, 3, and 4 to verify appropriate responses.

3.35 Verify that CCWS common 1.b header is supplying RCP thermal barrier cooling, then perform test of RCP thermal barrier isolation function.

3.35.1 Simulate high flow above threshold value on the return of RCP1 thermal barrier. Verify that RCP1 thermal barrier isolation valves close.

3.35.2 Simulate high pressure above threshold value on the return of RCP1 thermal barrier. Verify that RCP1 thermal barrier isolation valves close.

3.35.3 Perform steps 3.35.1 and 3.35.2 for RCP 2, 3, and 4 thermal barriers.

3.36 Perform step 3.35 for common 2.b header supplying RCP thermal barrier cooling to verify appropriate responses.

3.37 Verify that CCWS common 1.b header is supplying RCP thermal barrier cooling, then perform test of thermal barrier transfer revert back feature.

3.37.1 Simulate closure of common 1.b RCP thermal barrier CIVs and failure of one or more common 2.b RCP thermal barrier CIVs to open. Verify that RCP thermal barrier transfer reverts back to common 1.b supplying cooling flow to each of the four RCP thermal barriers.

3.38 Verify that CCWS common 2.b header is supplying RCP thermal barrier cooling, then perform test of thermal barrier transfer revert back feature.

3.38.1 Simulate closure of common 2.b RCP thermal barrier CIVs and failure of one or more common 1.b RCP thermal barrier CIVs to open. Verify that RCP thermal barrier transfer reverts back

to common 2.b supplying cooling flow to each of the four RCP thermal barriers.

3.39 Make sure that all available loads are placed on the safety-related cooling chain train that is to be tested.

3.40 Perform a cooldown test of the safety-related cooling chain by placing the RHR system into service at the upper limit of operation.

3.41 Perform a cooldown test while operating all four RCPs and minimizing steam generator cooling.

3.42 Make sure UHS makeup water flow and blowdown flows are isolated.

3.43 Collect the following cooldown data:

3.43.1 RHR heat exchanger.

- RHR flow through the heat exchanger.
- CCW flow through the heat exchanger.
- Inlet and outlet RHR temperature.
- Inlet and outlet CCW temperature on the RHR heat exchanger.
- RHR pressure.
- CCW pressure.

3.43.2 CCW heat exchanger.

- CCW flow through the heat exchanger.
- ESW flow through the heat exchanger.
- Inlet and outlet CCW temperature.
- Inlet and outlet ESW temperature on the CCW heat exchanger.
- CCW pressure.
- ESW pressure.

3.43.3 UHS performance data.

3.44 Analyze the cooldown data using the thermal-hydraulic model at multiple operating points.

3.45 Perform steps 3.39 through 3.44 for each cooling train.

3.46 Perform system testing of dedicated CCWS controls and interlocks.

Note: Response time of actuated components is to be determined from a single test using the check source specified in Table 11.5-1 that is specified for each radiation monitor until travel is completed for each actuated component impacted by the radiation monitor signal.

3.47 Verify operation of radiation monitors using check sources (refer to Table 11.5-1, Radiation Measuring Points R-35 through R-38, R-51 through R-54, R-64) and external test equipment, as necessary: