ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Wednesday, December 19, 2012 5:02 PM
To: Snyder, Amy
Cc: DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); TOLLEY Tracey (AREVA); VANCE Brian (AREVA); WELLS Russell (AREVA); WILLS Tiffany (AREVA); KOWALSKI David (AREVA); NOXON David (AREVA); BALLARD Bob (AREVA); Hearn, Peter
Subject: DRAFT Revised Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Question 09.02.01-41
Attachments: RAI 345 Q 09 02 01-41 Response US EPR DC-DRAFT .pdf

Amy,

To support a final response date of January 31, 2013, a DRAFT revised response for RAI No. 345, FSAR Ch. 9, Question 09.02.01-41 is provided in the attached file, "RAI 345 Q.09.02.01-41 Response US EPR DC – DRAFT.pdf". This revised draft response is provided to reflect changes to the U.S EPR Ultimate Heat Sink (UHS) design heat load, basin water volume, and wet bulb correction factor as discussed in the joint AREVA-UniStar public meeting with NRC staff on November 19, 2012.

To keep our commitment to send a final response to this question by the commitment date, we need to receive all NRC staff feedback and comments no later than **January 24, 2013.**

Let me know if the staff has questions or if this can be sent as a final response.

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 19, 2012 4:57 PM
To: Amy.Snyder@nrc.gov
Cc: DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); KOWALSKI David (RS/NB); NOXON David (RS/NB); peter.hearn@nrc.gov
Subject: Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Supplement 13

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Supplement 5 response to RAI No. 345 was sent on August 31, 2010 to provide a revised schedule. Supplement 6 response to RAI No. 345 was sent on September 14, 2010 to provide technically correct and complete responses to six

questions. Supplement 7 and Supplement 8 responses to RAI No. 345 were sent on September 29, 2010 and October 29, 2010, respectively, to provide a revised schedule. Supplement 9 response to RAI No. 345 was sent on November 4, 2010 to provide technically correct and complete responses to twelve questions and a technically correct and partial response to one question. Supplement 10 and Supplement 11 responses to RAI No. 345 were sent on January 12, 2011 and January 28, 2011, respectively, to provide a revised schedule. Supplement 12 response to RAI No. 345 was sent on February 15, 2011 to provide a technically correct and complete response to the remaining question - Question 09.02.01-39.

Based on the joint AREVA-UniStar public meeting with NRC staff on November 19, 2012 to discuss design changes to the Ultimate Heat Sink (UHS), the response to Question 09.02.01-41 is being revised. The schedule for a technically correct and complete revised response to this question is provided below.

Question #	Response Date
RAI 345 — 09.02.01-41	**January 31, 2013**

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: BRYAN Martin (External RS/NB)
Sent: Tuesday, February 15, 2011 3:56 PM
To: Getachew.Tesfaye@nrc.gov
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB); WILLIFORD Dennis (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Supplement 12

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Supplement 5 response to RAI No. 345 was sent on August 31, 2010 to provide a revised schedule. Supplement 6 response to RAI No. 345 was sent on September 14, 2010 to provide technically correct and complete responses to six questions. Supplement 7 and Supplement 8 responses to RAI No. 345 were sent on September 29, 2010 and October 29, 2010, respectively, to provide a revised schedule. Supplement 9 response to RAI No. 345 was sent on November 4, 2010 to provide technically correct and complete responses to twelve questions and a technically correct and partial response to one question. Supplement 10 and Supplement 11 responses to RAI No. 345 were sent on January 12, 2011 and January 28, 2011, respectively, to provide a revised schedule.

The attached file, “RAI 345 Supplement 12 Response US EPR DC.pdf” contains the response to Question 09.02.01-39 which was originally provided on November 4, 2010 and the committed affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to this question. No changes have been made to the response except for the FSAR impact section to provide an indication of the changes made to the FSAR and the markup of the U.S. EPR FSAR revised pages.

The following table indicates the respective pages in the response document, "RAI 345 Supplement 12 Response US EPR DC.pdf"," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 345 — 09.02.01-39	2	3

This concludes the formal AREVA NP response to RAI 345, and there are no questions from this RAI for which AREVA NP has not provided responses.

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, January 28, 2011 12:57 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. 345, FSAR Ch. 9, Supplement 11

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Supplement 5 response to RAI No. 345 was sent on August 31, 2010 to provide a revised schedule. Supplement 6 response to RAI No. 345 was sent on September 14, 2010 to provide technically correct and complete responses to six questions. Supplement 7 and Supplement 8 responses to RAI No. 345 were sent on September 29, 2010 and October 29, 2010, respectively, to provide a revised schedule. Supplement 9 response to RAI No. 345 was sent on November 4, 2010 to provide technically correct and complete responses to twelve questions and a technically correct and partial response to one question. Supplement 10 response to RAI No. 345 was sent on January 12, 2011 to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the response to Question 09.02.01-39.

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

Question #	Response Date (FSAR Markups)
RAI 345 — 09.02.01-39	February 15, 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: Wednesday, January 12, 2011 5:50 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. 345, FSAR Ch. 9, Supplement 10

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Supplement 5 response to RAI No. 345 was sent on August 31, 2010 to provide a revised schedule. Supplement 6 response to RAI No. 345 was sent on September 14, 2010 to provide technically correct and complete responses to six questions. Supplement 7 and Supplement 8 responses to RAI No. 345 were sent on September 29, 2010 and October 29, 2010, respectively, to provide a revised schedule. Supplement 9 was provided on November 04, 2010 to provide responses for the remaining thirteen questions. However, in the response itself it was stated that the FSAR markups for RAI 345 question 09.02.01-39 would be provided by January 12, 2011. Additional time is needed to finalize the markups and interact with the NRC so a revised date for the FSAR markups for question 09.02-01-39 is provided below.

Question #	**Response Date (FSAR Markups)**
RAI 345 — 09.02.01-39	January 28, 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, November 04, 2010 8:00 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. 345, FSAR Ch. 9, Supplement 9

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Supplement 5 response to RAI No. 345 was sent on August 31, 2010 to provide a revised schedule. Supplement 6 response to RAI No. 345 was sent on September 14, 2010 to provide technically correct and complete responses to six questions. Supplement 7 and Supplement 8 responses to RAI No. 345 were sent on September 29, 2010 and October 29, 2010, respectively, to provide a revised schedule.

The attached file, "RAI 345 Supplement 9 Response US EPR DC.pdf" provides technically correct and complete responses to the remaining thirteen 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 345 Questions 09.02.01-28, 09.02.01-32, 09.02.01-35, 09.02.01-36, 09.02.01-38, 09.02.01-41, 09.02.01-42, 09.02.01-46, 09.02.01-48 and 09.02.01-49.

The following table indicates the respective pages in the response document, "RAI 345 Supplement 9 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 345 — 09.02.01-28	2	5
RAI 345 — 09.02.01-29	6	6
RAI 345 — 09.02.01-32	7	8
RAI 345 — 09.02.01-34 (a, b and c)	9	10
RAI 345 — 09.02.01-35	11	14
RAI 345 — 09.02.01-36	15	17
RAI 345 — 09.02.01-38	18	19
RAI 345 — 09.02.01-39	20	21
RAI 345 — 09.02.01-41	22	24
RAI 345 — 09.02.01-42	25	26
RAI 345 — 09.02.01-46	27	28
RAI 345 — 09.02.01-48	29	30
RAI 345 — 09.02.01-49	31	33

This concludes the formal AREVA NP response to RAI 345, and there are no questions from this RAI for which AREVA NP has not provided responses.

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

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Supplement 5 response to RAI No. 345 was sent on August 31, 2010 to provide a revised schedule. Supplement 6 response to RAI No. 345 was sent on September 14, 2010 to provide technically correct and complete responses to six questions. Supplement 7 response to RAI No. 345 was sent on September 29, 2010 to provide a revised schedule. To provide additional time to process the responses, a revised schedule is provided in this e-mail.

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

Question #	Response Date
RAI 345 — 09.02.01-28	November 4, 2010
RAI 345 — 09.02.01-29	November 4, 2010
RAI 345 — 09.02.01-32	November 4, 2010
RAI 345 — 09.02.01-34 (a, b and c)	November 4, 2010
RAI 345 — 09.02.01-35	November 4, 2010
RAI 345 — 09.02.01-36	November 4, 2010
RAI 345 — 09.02.01-38	November 4, 2010
RAI 345 — 09.02.01-39	November 4, 2010
RAI 345 — 09.02.01-41	November 4, 2010
RAI 345 — 09.02.01-42	November 4, 2010
RAI 345 — 09.02.01-46	November 4, 2010
RAI 345 — 09.02.01-48	November 4, 2010
RAI 345 — 09.02.01-49	November 4, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Wednesday, September 29, 2010 5:19 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); GARDNER Darrell (RS/NB); KOWALSKI David (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Supplement 7

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Supplement 5 response to RAI No. 345 was sent on August 31, 2010 to provide a revised schedule. Supplement 6 response to RAI No. 345 was sent on September 14, 2010 to provide technically correct and complete response to six questions.

To provide additional time for interaction and feedback from the staff and to process the responses, a revised schedule is provided in this email for the response to the remaining 13 questions.

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

Question #	Response Date
RAI 345 — 09.02.01-28	October 29, 2010
RAI 345 — 09.02.01-29	October 29, 2010
RAI 345 — 09.02.01-32	October 29, 2010
RAI 345 — 09.02.01-34 (a, b and c)	October 29, 2010
RAI 345 — 09.02.01-35	October 29, 2010
RAI 345 — 09.02.01-36	October 29, 2010
RAI 345 — 09.02.01-38	October 29, 2010
RAI 345 — 09.02.01-39	October 29, 2010
RAI 345 — 09.02.01-41	October 29, 2010
RAI 345 — 09.02.01-42	October 29, 2010
RAI 345 — 09.02.01-46	October 29, 2010
RAI 345 — 09.02.01-48	October 29, 2010
RAI 345 — 09.02.01-49	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: Tuesday, September 14, 2010 5:33 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. 345, FSAR Ch. 9, Supplement 6

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Supplement 5 response to RAI No. 345 was sent on August 31, 2010 to provide a revised schedule.

The attached file, "RAI 345 Supplement 6 Response US EPR DC.pdf" provides technically correct and complete responses to six questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the responses to RAI 345 Questions 09.02.01-26, 09.02.01-31, 09.02.01-44, 09.02.01-45 and 09.02.01-47.

The following table indicates the respective pages in the response document, "RAI 345 Supplement 6 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 345 — 09.02.01-26	2	4
RAI 345 — 09.02.01-31	5	5
RAI 345 — 09.02.01-44	6	7
RAI 345 — 09.02.01-45	8	9
RAI 345 — 09.02.01-47	10	11
RAI 345 — 09.02.01-50	12	12

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

Question #	Response Date
RAI 345 — 09.02.01-28	September 29, 2010
RAI 345 — 09.02.01-29	September 29, 2010
RAI 345 — 09.02.01-32	September 29, 2010
RAI 345 — 09.02.01-34 (a, b and c)	September 29, 2010
RAI 345 — 09.02.01-35	September 29, 2010
RAI 345 — 09.02.01-36	September 29, 2010
RAI 345 — 09.02.01-38	September 29, 2010
RAI 345 — 09.02.01-39	September 29, 2010
RAI 345 — 09.02.01-41	September 29, 2010
RAI 345 — 09.02.01-42	September 29, 2010
RAI 345 — 09.02.01-46	September 29, 2010
RAI 345 — 09.02.01-48	September 29, 2010
RAI 345 — 09.02.01-49	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 2:44 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. 345, FSAR Ch. 9, Supplement 5

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule. Supplement 4 response to RAI No. 345 was sent on July 20, 2010 to provide technically correct and complete response to four questions and a technically correct and partial response to one question. Since responses to the remaining questions are being processed, a revised schedule is provided in this email.

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

Question #	Response Date
RAI 345 — 09.02.01-26	September 14, 2010
RAI 345 — 09.02.01-28	September 29, 2010
RAI 345 — 09.02.01-29	September 29, 2010
RAI 345 — 09.02.01-31	September 14, 2010
RAI 345 — 09.02.01-32	September 29, 2010
RAI 345 — 09.02.01-34 (a, b and c)	September 29, 2010
RAI 345 — 09.02.01-35	September 29, 2010
RAI 345 — 09.02.01-36	September 29, 2010
RAI 345 — 09.02.01-38	September 29, 2010
RAI 345 — 09.02.01-39	September 29, 2010
RAI 345 — 09.02.01-41	September 29, 2010
RAI 345 — 09.02.01-42	September 29, 2010
RAI 345 — 09.02.01-44	September 14, 2010
RAI 345 — 09.02.01-45	September 14, 2010
RAI 345 — 09.02.01-46	September 29, 2010
RAI 345 — 09.02.01-47	September 14, 2010
RAI 345 — 09.02.01-48	September 14, 2010
RAI 345 — 09.02.01-49	September 29, 2010
RAI 345 — 09.02.01-50	September 14, 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: Tuesday, July 20, 2010 5:24 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. 345, FSAR Ch. 9, Supplement 4

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions. Supplement 3 response to RAI No. 345 was sent on July 8, 2010 to provide a revised schedule.

The attached file, "RAI 345 Supplement 4 Response US EPR DC.pdf" provides a technically correct and complete response to four 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 responses to RAI 345 Questions 09.02.01-27, 09.02.01-30, 09.02.01-33, 09.02.01-34 and 09.02.01-43.

The following table indicates the respective pages in the response document, "RAI 345 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 345 — 09.02.01-27	2	3
RAI 345 — 09.02.01-30	4	5
RAI 345 — 09.02.01-33	6	6
RAI 345 — 09.02.01-34 (d and e)	7	9
RAI 345 — 09.02.01-43	10	11

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

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

Question #	Response Date
RAI 345 — 09.02.01-26	August 31, 2010
RAI 345 — 09.02.01-28	August 31, 2010
RAI 345 — 09.02.01-29	August 31, 2010
RAI 345 — 09.02.01-31	August 31, 2010
RAI 345 — 09.02.01-32	August 31, 2010
RAI 345 — 09.02.01-34 (a, b and c)	August 31, 2010
RAI 345 — 09.02.01-35	August 31, 2010
RAI 345 — 09.02.01-36	August 31, 2010
RAI 345 — 09.02.01-38	August 31, 2010
RAI 345 — 09.02.01-39	August 31, 2010
RAI 345 — 09.02.01-41	August 31, 2010
RAI 345 — 09.02.01-42	August 31, 2010
RAI 345 — 09.02.01-44	August 31, 2010
RAI 345 — 09.02.01-45	August 31, 2010
RAI 345 — 09.02.01-46	August 31, 2010
RAI 345 — 09.02.01-47	August 31, 2010
RAI 345 — 09.02.01-48	August 31, 2010

RAI 345 — 09.02.01-49	August 31, 2010
RAI 345 — 09.02.01-50	August 31, 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: Thursday, July 08, 2010 3:55 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. 345, FSAR Ch. 9, Supplement 3

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule. Supplement 2 response to RAI No. 345 was sent on June 22, 2010 to address two of the questions.

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the remaining 23 questions has been revised and is provided below.

Question #	Response Date
RAI 345 — 09.02.01-26	August 31, 2010
RAI 345 — 09.02.01-27	July 16, 2010
RAI 345 — 09.02.01-28	August 31, 2010
RAI 345 — 09.02.01-29	August 31, 2010
RAI 345 — 09.02.01-30	July 16, 2010
RAI 345 — 09.02.01-31	August 31, 2010
RAI 345 — 09.02.01-32	August 31, 2010
RAI 345 — 09.02.01-33	July 16, 2010
RAI 345 — 09.02.01-34	July 16, 2010
RAI 345 — 09.02.01-35	August 31, 2010
RAI 345 — 09.02.01-36	August 31, 2010
RAI 345 — 09.02.01-38	August 31, 2010
RAI 345 — 09.02.01-39	August 31, 2010
RAI 345 — 09.02.01-41	August 31, 2010
RAI 345 — 09.02.01-42	August 31, 2010
RAI 345 — 09.02.01-43	July 16, 2010
RAI 345 — 09.02.01-44	August 31, 2010
RAI 345 — 09.02.01-45	August 31, 2010
RAI 345 — 09.02.01-46	August 31, 2010
RAI 345 — 09.02.01-47	August 31, 2010

RAI 345 — 09.02.01-48	August 31, 2010
RAI 345 — 09.02.01-49	August 31, 2010
RAI 345 — 09.02.01-50	August 31, 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: Tuesday, June 22, 2010 1:23 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. 345, FSAR Ch. 9, Supplement 2

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010. Supplement 1 response to RAI No. 345 was sent on June 4, 2010 to provide a revised schedule.

The attached file, "RAI 345 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to two of the questions, as committed.

The following table indicates the respective pages in the response document, "RAI 345 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 345 — 09.02.01-37	2	3
RAI 345 — 09.02.01-40	4	4

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

Question #	Response Date
RAI 345 — 09.02.01-26	July 22, 2010
RAI 345 — 09.02.01-27	July 22, 2010
RAI 345 — 09.02.01-28	July 22, 2010
RAI 345 — 09.02.01-29	July 8, 2010
RAI 345 — 09.02.01-30	July 8, 2010
RAI 345 — 09.02.01-31	July 22, 2010
RAI 345 — 09.02.01-32	July 22, 2010
RAI 345 — 09.02.01-33	July 22, 2010
RAI 345 — 09.02.01-34	July 8, 2010
RAI 345 — 09.02.01-35	July 22, 2010
RAI 345 — 09.02.01-36	July 22, 2010

RAI 345 — 09.02.01-38	July 22, 2010
RAI 345 — 09.02.01-39	July 22, 2010
RAI 345 — 09.02.01-41	July 22, 2010
RAI 345 — 09.02.01-42	July 8, 2010
RAI 345 — 09.02.01-43	July 8, 2010
RAI 345 — 09.02.01-44	July 8, 2010
RAI 345 — 09.02.01-45	July 8, 2010
RAI 345 — 09.02.01-46	July 8, 2010
RAI 345 — 09.02.01-47	July 22, 2010
RAI 345 — 09.02.01-48	July 22, 2010
RAI 345 — 09.02.01-49	July 22, 2010
RAI 345 — 09.02.01-50	July 8, 2010

Sincerely,

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Martin.Bryan.ext@areva.com

From: BRYAN Martin (EXT)
Sent: Friday, June 04, 2010 2:04 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. 345, FSAR Ch. 9, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 25 questions in RAI No. 345 on April 2, 2010.

The responses to the questions in RAI 345 are in various stages of preparation or review with the NRC. The revised response dates below are relative to the where the question is in this process.

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

Question #	Response Date
RAI 345 — 09.02.01-26	July 22, 2010
RAI 345 — 09.02.01-27	July 22, 2010
RAI 345 — 09.02.01-28	July 22, 2010
RAI 345 — 09.02.01-29	July 8, 2010
RAI 345 — 09.02.01-30	July 8, 2010
RAI 345 — 09.02.01-31	July 22, 2010
RAI 345 — 09.02.01-32	July 22, 2010
RAI 345 — 09.02.01-33	July 22, 2010
RAI 345 — 09.02.01-34	July 8, 2010
RAI 345 — 09.02.01-35	July 22, 2010
RAI 345 — 09.02.01-36	July 22, 2010

RAI 345 — 09.02.01-37	June 22, 2010
RAI 345 — 09.02.01-38	July 22, 2010
RAI 345 — 09.02.01-39	July 22, 2010
RAI 345 — 09.02.01-40	June 22, 2010
RAI 345 — 09.02.01-41	July 22, 2010
RAI 345 — 09.02.01-42	July 8, 2010
RAI 345 — 09.02.01-43	July 8, 2010
RAI 345 — 09.02.01-44	July 8, 2010
RAI 345 — 09.02.01-45	July 8, 2010
RAI 345 — 09.02.01-46	July 8, 2010
RAI 345 — 09.02.01-47	July 22, 2010
RAI 345 — 09.02.01-48	July 22, 2010
RAI 345 — 09.02.01-49	July 22, 2010
RAI 345 — 09.02.01-50	July 8, 2010

Sincerely,

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From: BRYAN Martin (EXT)
Sent: Friday, April 02, 2010 5:34 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); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 345 (4021), FSAR Ch. 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 345 Response US EPR DC," provides a schedule since technically correct and complete responses to the twenty five questions are not provided.

The following table indicates the respective pages in the response document, "RAI 345 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 345 — 09.02.01-26	2	3
RAI 345 — 09.02.01-27	4	4
RAI 345 — 09.02.01-28	5	6
RAI 345 — 09.02.01-29	7	7
RAI 345 — 09.02.01-30	8	8
RAI 345 — 09.02.01-31	9	9
RAI 345 — 09.02.01-32	10	10
RAI 345 — 09.02.01-33	11	11
RAI 345 — 09.02.01-34	12	13
RAI 345 — 09.02.01-35	14	15

RAI 345 — 09.02.01-36	16	17
RAI 345 — 09.02.01-37	18	18
RAI 345 — 09.02.01-38	19	19
RAI 345 — 09.02.01-39	20	20
RAI 345 — 09.02.01-40	21	21
RAI 345 — 09.02.01-41	22	22
RAI 345 — 09.02.01-42	23	23
RAI 345 — 09.02.01-43	24	24
RAI 345 — 09.02.01-44	25	25
RAI 345 — 09.02.01-45	26	26
RAI 345 — 09.02.01-46	27	27
RAI 345 — 09.02.01-47	28	28
RAI 345 — 09.02.01-48	29	29
RAI 345 — 09.02.01-49	30	31
RAI 345 — 09.02.01-50	32	32

The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 345 — 09.02.01-26	June 4, 2010
RAI 345 — 09.02.01-27	June 4, 2010
RAI 345 — 09.02.01-28	June 4, 2010
RAI 345 — 09.02.01-29	June 4, 2010
RAI 345 — 09.02.01-30	June 4, 2010
RAI 345 — 09.02.01-31	June 4, 2010
RAI 345 — 09.02.01-32	June 4, 2010
RAI 345 — 09.02.01-33	June 4, 2010
RAI 345 — 09.02.01-34	June 4, 2010
RAI 345 — 09.02.01-35	June 4, 2010
RAI 345 — 09.02.01-36	June 4, 2010
RAI 345 — 09.02.01-37	June 4, 2010
RAI 345 — 09.02.01-38	June 4, 2010
RAI 345 — 09.02.01-39	June 4, 2010
RAI 345 — 09.02.01-40	June 4, 2010
RAI 345 — 09.02.01-41	June 4, 2010
RAI 345 — 09.02.01-42	June 4, 2010
RAI 345 — 09.02.01-43	June 4, 2010
RAI 345 — 09.02.01-44	June 4, 2010
RAI 345 — 09.02.01-45	June 4, 2010
RAI 345 — 09.02.01-46	June 4, 2010
RAI 345 — 09.02.01-47	June 4, 2010
RAI 345 — 09.02.01-48	June 4, 2010
RAI 345 — 09.02.01-49	June 4, 2010
RAI 345 — 09.02.01-50	June 4, 2010

Sincerely,

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Licensing Advisory Engineer
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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Thursday, March 04, 2010 2:49 PM
To: ZZ-DL-A-USEPR-DL
Cc: Wheeler, Larry; Lee, Samuel; Segala, John; Hearn, Peter; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 345 (4021), FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on December 10, 2009, and discussed with your staff on March 4, 2010. Drat RAI Questions 09.02.01-31, 09.02.01-47, and 09.02.01-48 were modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

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

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 4156

Mail Envelope Properties (554210743EFE354B8D5741BEB695E656041598)

Subject: DRAFT Revised Response to U.S. EPR Design Certification Application RAI No. 345, FSAR Ch. 9, Question 09.02.01-41
Sent Date: 12/19/2012 5:02:09 PM
Received Date: 12/19/2012 5:02:38 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

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

Post Office: FUSLYNCMX03.fdom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	38063	12/19/2012 5:02:38 PM
RAI 345 Q 09 02 01-41 Response US EPR DC-DRAFT .pdf	696994	

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

Response to

Request for Additional Information No. 345, Question 09.02.01-41

3/04/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.02.01 - Station Service Water System
Application Section: 9.2.1

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

Question 09.02.01-41:

Follow-up to RAI 119, Question 9.2.1-17

With respect to Surveillance Requirement (SR) 3.7.8.1, Tier 2 FSAR Figure 3.8-101 shows that the normal cooling tower basin water level is at 3.05 meters (10 feet) above grade elevation. SR 3.7.8.1 requires that the water level in the ESWS basin be maintained greater than or equal to 8.29 meters (27.2 feet) above the bottom of the basin. However, Figure 3.8-101 shows the bottom of the basin to be -4.88 meters (-16 feet) below grade. Therefore, Figure 3.8-101 shows that the normal basin water level is at 3.05+4.88=7.93 meters (16+10= 26 feet) above the bottom of the basin, which conflicts with the SR value of 8.29 meters (27.2 feet). The applicant needs to provide additional information in the FSAR to correct this apparent inconsistency.

Based on the staff's review of response to RAI 119, Question 9.2.1-17 and an audit by the staff conducted on October 27, 2009, this item remains open and requires further resolution and/or clarification by the applicant. The following description provides the results of the staff's evaluation of the applicant's initial response and justification for the item remaining open.

The staff reviewed the RAI response and determined that additional information is required related to basin water level as noted below.

a. Provide an explanation of the basis and technical justification for the changes which amount to about a 13 percent reduction in minimum stored water volume. At a minimum, the explanation should justify the acceptability of reduced margins for: (1) cooling tower basin minimum water level that remains after 72 hours of post accident operation and the minimum level required for pump operability, and (2) the cooling tower basin maximum temperature after 72 hours when compared to the maximum basin water temperature of 35°C (95°F) based on an assumed pre-event temperature at the maximum permitted by TS 3.7.19 of 32.2°C (90°F).

b. Provide an explanation or clarification of the basin water level at which the ESWS pumps will still be able to perform their intended safety related function since it appears based on Figure 09.02.01-17-1 that at elevation 6.92' (minimum 72 hours water losses volume), the ESWS pumps remain operable at this level. Add to the table NPSH and vortex water level elevation from RAI 9.2.1-08.

c. Provide an explanation or clarification of the basin water level control system during torrential rains and hurricanes since blowdown piping is considered non-safety.

d. The applicant should consider providing Figure 09-02-01-17-1 as a DCD figure since this is an important part of the licensing basis of the ESW pumps defining margins related to NPSH and vortexing, alarms, operating bands, related to the UHS basin.

Response to Question 09.02.01-41:

This revised response to Question 09.02.01-41 supersedes in its entirety the response that was provided in RAI 345, Supplement 9, Question 09.02.01-41.

Part (a)

The ultimate heat sink (UHS) analysis has been updated. This analysis determines:

- The cooling tower evaporative water loss and remaining basin inventory for three days.
- The maximum basin water temperature for the UHS following a postulated design basis accident (DBA).

Previously conservatively-considered CCW heat loads were removed from the analysis, since these loads do not remain in operation during a LOCA DBA. All margins utilized for this analysis, including the water level required for pump operability, remained the same. Refer to the Responses to RAI 351, Questions 09.02.05-27 and 09.02.05-24(a), for information on the key assumptions and inputs used in this analysis.

An additional depth of two feet was added to the UHS basin. This allowed for the addition of two feet to the amount of water allowed for evaporation from the cooling tower throughout the 72-hour duration. This inherently increased the margin to the required volume of water to be stored within the cooing tower basin.

This analysis determined that the maximum cooling tower basin water temperature during the 72-hour DBA condition, using an initial basin temperature of 92°F, is below the 95°F temperature required by the ESWS during a DBA, as shown in U.S. EPR FSAR Tier 2, Table 9.2.5-1. The actual maximum UHS tower basin temperature is 90°F. Refer to U.S. EPR FSAR Tier 2, Chapter 16, "Technical Specifications," and U.S. EPR FSAR Tier 2, Section 3.7.19.2, "Surveillance Requirement." However, an initial basin temperature of 92°F is used for conservatism within this analysis, since the maximum component cooling water heat exchanger inlet ESW temperature at the start of a DBA is 92°F. Refer to U.S. EPR FSAR Tier 2, Table 9.2.5-1.

Part (b)

Seventy-two hours post accident, the basin water level will be no lower than Elevation -7.58 feet with six inches margin to the minimum pump submergence Elevation -8.08 feet. The essential service water system (ESWS) pumps will perform their intended safety-related function and remain operable at this elevation. Additionally, a 10-inch basin level margin is provided above the minimum 72-hour water losses volume at Elevation +6.92 feet.

Assuming atmospheric pressure at sea level, the available net positive suction head (NPSH) is calculated to be approximately 32.4 feet at the minimum water level condition in the cooling tower basin. The minimum water level and height for minimum pump submergence from the bottom of the basin is 119 inches (Elevation -8.08 feet). This height is 95 inches above the pump suction inlet. An additional six inches of water height exceeds the water level for vortex suppression and instrument uncertainty but is not credited in the calculation of available NPSH. NPSH values will vary slightly with atmospheric pressure at altitude depending on location.

U.S. EPR FSAR Tier 2, Table 9.2.1-1, was revised in Revision 4 to show that the required minimum water level in the basin for NPSH and vortex suppression is 95 inches above suction inlet.

U.S. EPR FSAR Tier 2, Table 9.2.1-2, was revised in Revision 4 to show that the required minimum water level in the basin for NPSH and vortex suppression is 46 inches above suction inlet.

Part (c)

Refer to RAI 345, Question 9.2.5-22, for an explanation of basin water level control system during torrential rains and hurricanes and changes to the blowdown piping configuration.

Part (d)

U.S. EPR FSAR Tier 2, Section 9.2.5, was originally revised to reflect a new figure (Figure 9.2.5-3) which was based on Figure 09.02.01-17-1 that was provided in the Response to RAI 119, Supplement 2, Question 09.02.01-17. U.S. EPR FSAR Tier 2, Section 9.2.5, will be revised to reflect a revised Figure 9.2.5-3–Cross-Section of UHS Tower Basin. A basin tower height with the required margin and allowance is 28 feet from the bottom of the basin. This change has been made to provide increased basin inventory and additional margin for evaporation.

U.S. EPR FSAR Tier 2, Chapter 16, "Technical Specifications, Surveillance Requirement (SR) 3.7.19 and Bases," will be revised to reflect an updated Technical Specifications limit level of 25.75 feet from the bottom of the basin.

U.S. EPR FSAR Tier 2, Table 9.2.5-2–Ultimate Heat Sink Design Parameters, will be revised to reflect the updated Technical Specifications limit level of 25.75 feet from the bottom of the basin. The minimum basin water volume will also be updated to reflect a value of 319,970 ft^3, which corresponds to a minimum basin water level of 25.75 feet.

U.S. EPR FSAR Tier 1, Table 2.1.5-2–Key Dimensions of Essential Service Water Building Foundation Footprint, will be revised to reflect the increase in the UHS basin depth.

U.S. EPR FSAR Tier 2, Figure 3.8-101–Essential Service Water Building, Section A-A, was revised in U.S. EPR FSAR Revision 4 to provide the normal water level of 26.75 feet from the bottom of the basin.

To completely define basin water level, the 24-inch distance between the pump suction inlet and the bottom of the basin will also be clearly identified.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.1.5-2, and U.S. EPR FSAR Tier 2, Table 9.2.5-2, Figure 9.2.5-3, and Chapter 16 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR FSAR Tier 2, Tables 9.2.1-1 and 9.2.1-2, were revised in Revision 4 as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 2.1.5-2—Key Dimensions of Essential Service Water Building Foundation Footprint

Label	Section Descriptions	Region	Key Dimension	Tolerance (inches)
D14	Distance from North to South edge of ESWB foundation base slab.	Refer to Figure 2.1.5-1.	164 ft (2)	+/- 12 in.
D15	Distance from East to West edge of ESWB foundation base slab.	Refer to Figure 2.1.5-1.	107 ft – 11 ¼ in. (2)	+/- 12 in.
D16	Distance from +0 ft elevation to ESWB roof elevation.	Refer to Figure 2.1.5-4.	96 ft	+/- 12 in.(1)
D17	Distance from +0 ft elevation to top of ESWB foundation base slab.	Refer to Figure 2.1.5-4.	186 ft	

1. Tolerance specified is for the total dimension from top of foundation to top of roof elevation. The key dimensions individually are permitted to utilize up to the total tolerance specified provided the combined total tolerance for the two key dimensions does not exceed the tolerance specified.

2. Key dimension does not include basemat extensions.

RAI 345, Q. 09.02.01-41

Table 9.2.1-1—Essential Service Water Design Parameters

Essential Service Water Pump 30PEB10/20/30/40 AP001	
Description	Technical Data
Number	4
Type	Wet Pit Vertical Turbine
Normal Flow Rate	19,340 gpm
Required Pump Head at Normal Flow Rate	185 ft/H_2O
Required Minimum Water Level in the Basin for NPSH and Vortex Suppression	95 inches (above suction inlet)
Design Cold (UHS Outlet) Water Temperature, (Max, DBA)	95°F
Max Cooling Tower Basin Temperature Limit during Normal Plant Operation to Verify UHS Performance in a DBA, (Max)	90°F
System Design Pressure	190 psig
System Design Temperature	135°F

RAI 345
Question 09.02.01-41(b)

Table 9.2.1-2—Dedicated Essential Service Water Design Parameters

Dedicated Essential Service Water Pump 30PEB80 AP001	
Description	Technical Data
Number	1
Type	Wet Pit Vertical Turbine
Normal Flow Rate	2737 gpm
Required Pump Head at Normal Flow Rate	150 ft/H_2O
System Design Pressure	100 psig
System Design Temperature	150°F
Required Minimum Water Level in the Basin for NPSH and Vortex Suppression	46 inches (above suction inlet)

Table 9.2.5-2—Ultimate Heat Sink Design Parameters

Cooling Tower Cells 31/32/33/34 URB	
Description	**Technical Data**
Cooling Tower Type	Mechanical Induced Draft
Design Water Flow (total both cells)	19,200 gpm
Design Hot (Inlet) Water Temperature	135°F
Design Cold (Outlet) Water Temperature	≤95°F (max, DBA)
Winter Design Cold (Outlet) Water Temperature @ 50°F Inlet WB	71°F Normal Ops/72°F Cooldown 78.5°F DBA
Design Inlet Wet Bulb Temperature	81°F (non-coincident, 0% exceedance value)(1)(2)
Maximum Drift Loss (Percent of Water Flow)	< 0.005%
Maximum Evaporation Loss at Design Conditions (total both cells)	571 gpm
Number of Cells	2 Cell/Tower
Basin Water Volume (Min)	≥319,970~~295,120~~ ft^3
Basin Water Level (Min)	25~~3~~.75 ft
Required Cooling Tower Emergency Makeup Flow, -post-DBA (72 hours through 30 days)	≥300 gpm

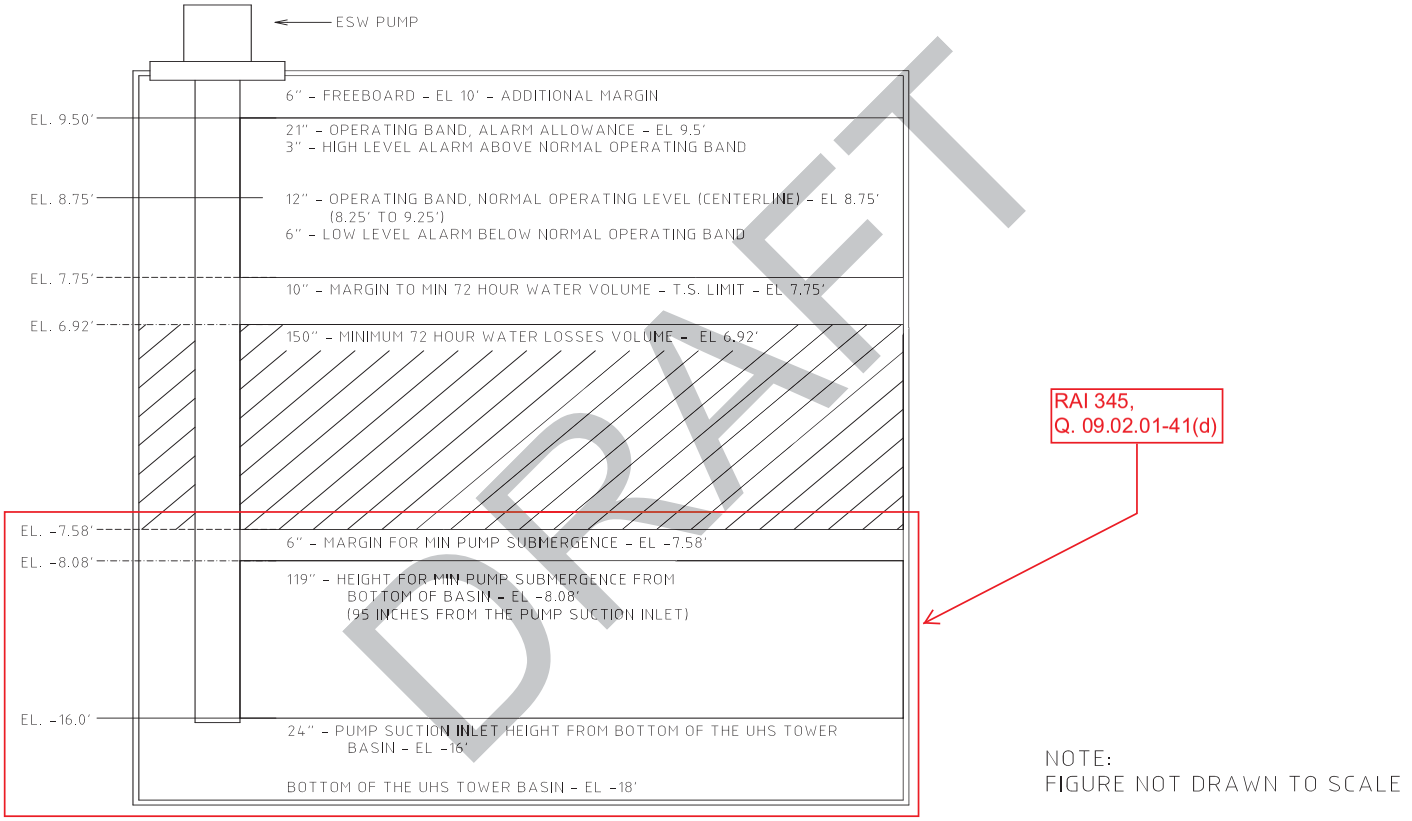
Note:

1. COL applicant to determine wet bulb temperature correction factor to account for potential interference and recirculation effects. (Refer to COL Item 9.2-7 in Table 1.8-2).

2. An important meteorological design point for the establishment of the cooling tower performance for the U.S. EPR DBA maximum load case and consequently establishes all subsequent cooling tower performance for other wet bulb conditions and lower loads.

RAI 345, Q. 09.02.01-41(d)

Figure 9.2.5-3—Cross-Section of UHS Tower Basin



Next File

SURVEILLANCE REQUIREMENTS

----------REVIEWER'S NOTE----------
A surveillance to verify the ability to supply emergency makeup water to each UHS cooling tower basin at ≥ 300 gpm will be provided by the COL applicant.

SURVEILLANCE		FREQUENCY
SR 3.7.19.1	Verify water level of each UHS cooling tower basin is ≥ 25~~3~~.75 feet.	24 hours
SR 3.7.19.2	Verify water temperature of each UHS cooling tower basin is ≤ 90°F.	24 hours
SR 3.7.19.3	Operate each UHS cooling tower fan for ≥ 15 minutes in each speed setting and direction, including reverse.	31 days
SR 3.7.19.4	Verify each UHS cooling tower fan starts automatically on an actual or simulated actuation signal.	24 months
SR 3.7.19.5	Verify each UHS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24 months
[SR 3.7.19.6	Verify the ability to supply emergency makeup water to each UHS cooling tower basin at ≥ 300 gpm.]	[In accordance with the Inservice Testing Program]

RAI 345, Q. 09.02.01-41(d)

BASES

LCO

The UHS consists of four trains. Four UHS trains are required to be OPERABLE to provide the required redundancy to ensure that the system functions to remove post accident heat loads.

A UHS train is considered OPERABLE when two cooling tower fans, associated piping, valves, and instrumentation and controls required to perform the safety related function are OPERABLE and the UHS basin contains ≥ 253.75 feet of water at ≤ 90°F with capability from makeup from OPERABLE source. [COL applicant to provide definition of OPERABLE makeup source.]

RAI 345, Q. 09.02.01-41(d)

APPLICABILITY

In MODES 1, 2, 3, and 4, the UHS is a normally operating system that is required to support the OPERABILITY of the equipment serviced by the UHS and required to be OPERABLE in these MODES.

In MODES 5 and 6, the OPERABILITY requirements of the UHS is determined by the systems it supports.

ACTIONS

A.1

If one UHS train is inoperable, action must be taken to restore OPERABLE status within 120 days. In this condition, the remaining OPERABLE UHS trains are adequate to perform the heat removal function.

The 120 day Completion Time to restore a UHS train to OPERABLE is reasonable since its operation is not assumed in the safety analysis to mitigate the consequences of postulated accidents or AOOs, it provides a reasonable time for repairs, and the low probability of a postulated accident or AOO occurring during this period.

B.1

If two UHS trains are inoperable, action must be taken to restore one to OPERABLE status within 72 hours. In this condition, the two remaining OPERABLE UHS trains are adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in one of the OPERABLE UHS trains could result in loss of UHS function.

The 72 hour Completion Time is based on the redundant capabilities afforded by the two OPERABLE trains, and the low probability of a postulated accident occurring during this time period.

BASES

ACTIONS (continued)

C.1 and C.2

If a UHS train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power.

SURVEILLANCE REQUIREMENTS

[The COL applicant to provide a surveillance for makeup water to UHS cooling tower.]

SR 3.7.19.1

This SR verifies that adequate short term (3 day) cooling can be maintained. The specified level also ensures that sufficient NPSH is available to operate the ESW pumps during the first 3 days post LOCA. The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES. This SR verifies that the UHS basin water level is ≥ 253.75 feet from the bottom of the basin.

RAI 345, Q. 09.02.01-41(d)

SR 3.7.19.2

This SR verifies that the UHS is available to cool the CCW System and EDG to at least its maximum design temperature with the maximum accident or normal design heat loads for 30 days following a postulated accident. With water temperature of the UHS basin ≤ 90°F, the design basis assumptions associated with initial UHS temperature are bounded. With the water temperature of the UHS basin > 90°F, long term cooling capability of the Emergency Core Cooling System (ECCS) loads and Emergency Diesel Generators (EDG) may be affected. The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.