

ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Monday, February 07, 2011 10:13 AM
To: Tesfaye, Getachew
Cc: Miernicki, Michael; CORNELL Veronica (EXTERNAL AREVA); BREDEL Daniel (AREVA); WILLIFORD Dennis (AREVA); RYAN Tom (AREVA); HAYS Lynn (AREVA); COLEMAN Sue (AREVA); GARDNER Darrell (AREVA); ALCHAAR Nawar (AREVA); ROMINE Judy (AREVA); DELANO Karen (AREVA)
Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Questions 3.8.5-24 and 29
Attachments: RAI 376 Question 03.08.05-24 & 29 Response US EPR DC - (DRAFT).pdf

Getachew,

To support the final response date for questions 3.8.5-24 and 29, a draft response is attached. Let me know if you have questions or if the response can be sent as a final response.

Thanks,

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 27, 2011 6:27 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); CORNELL Veronica (External RS/NB); BREDEL Daniel (EP/PE); COLEMAN Sue (RS/NB); ALCHAAR Nawar (EP/PE); WILLIFORD Dennis (RS/NB); SLAY Lysa (RS/NB); HAYS Lynn (RS/NB); Miernicki, Michael; HALLINGER Pat (EXT)
Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Questions 3.8.5-25&26

Getachew,

To support the final response date for questions 3.8.5-25 and 26, a draft response is attached. Let me know if you have questions or if the response can be sent as a final response.

Thanks,

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: Monday, November 22, 2010 7:33 PM

To: 'Tesfaye, Getachew'

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

Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 15

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed. AREVA NP submitted Supplement 7 on July 29, 2010, to provide a FINAL response to 2 of the remaining 10 question, as committed. AREVA NP submitted Supplement 8 on August 9, 2010, to provide a revised schedule for INTERIM response to question 03.08.05-29. AREVA NP submitted Supplement 9 on August 16, 2010, to provide INTERIM responses for Questions 03.08.05-26 and 03.08.05-27 and a revised schedule for INTERIM response to question 03.08.05-25. On August 27, 2010, AREVA NP submitted Supplement 10 to provide INTERIM responses for Questions 03.08.05-25 and 03.08.05-29. AREVA NP submitted a revised schedule for the final response to question 03.08.05-30 in Supplements 11 and 12 on September 15, 2010 and October 7, 2010, respectively. On October 25, 2010, AREVA NP submitted Supplement 13 to provide INTERIM responses for Questions 03.08.05-28 and 03.08.05-31. AREVA NP submitted Supplement 14 on October 27, 2010, to provide a revised schedule for Question 03.08.05-29.

The attached file, "RAI 376 Supplement 15 Response US EPR DC.pdf" provides technically correct and complete FINAL responses to Questions 03.08.05-27 and 03.08.05-30, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 376 Question 03.08.05-27.

The following table indicates the respective pages in the response document, RAI 376 Supplement 15 Response US EPR DC.pdf," that contains AREVA NP's response to the subject questions. Please note that the similar table for RAI 376 Supplement 13 listed the RAI question as 354 when it should have been 376. The schedule for the remaining questions is unchanged.

| Question # | Start Page | End Page |
|-----------------------|-------------------|-----------------|
| RAI 376 - 03.08.05-27 | 2 | 4 |
| RAI 376 - 03.08.05-30 | 5 | 5 |

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

| Question # | Interim Response Date | Response Date |
|---------------------|------------------------------|----------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 27, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-29 | August 27, 2010 (Actual) | February 28, 2011 |
| RAI 376-03.08.05-31 | October 25, 2010 (Actual) | February 17, 2011 |

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager

AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Wednesday, October 27, 2010 1:24 PM
To: 'Tefsaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 14

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed. AREVA NP submitted Supplement 7 on July 29, 2010, to provide a FINAL response to 2 of the remaining 10 question, as committed. AREVA NP submitted Supplement 8 on August 9, 2010, to provide a revised schedule for INTERIM response to question 03.08.05-29. AREVA NP submitted Supplement 9 on August 16, 2010, to provide INTERIM responses for Questions 03.08.05-26 and 03.08.05-27 and a revised schedule for INTERIM response to question 03.08.05-25. On August 27, 2010, AREVA NP submitted Supplement 10 to provide INTERIM responses for Questions 03.08.05-25 and 03.08.05-29. AREVA NP submitted a revised schedule for the final response to question 03.08.05-30 in Supplements 11 and 12 on September 15, 2010 and October 7, 2010, respectively. On October 25, 2010, AREVA NP submitted Supplement 13 to provide INTERIM responses for Questions 03.08.05-28 and 03.08.05-31.

The schedule for Question 03.08.05-29 is being revised to allow additional time for AREVA NP to address NRC comments. The schedule for the remaining questions is unchanged.

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

| Question # | Interim Response Date | Response Date |
|---------------------|------------------------------|----------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 27, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-29 | August 27, 2010 (Actual) | February 28, 2011 |
| RAI 376-03.08.05-30 | N/A | November 22, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 (Actual) | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (External RS/NB)
Sent: Monday, October 25, 2010 4:37 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 13

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed. AREVA NP submitted Supplement 7 on July 29, 2010, to provide a FINAL response to 2 of the remaining 10 question, as committed. AREVA NP submitted Supplement 8 on August 9, 2010, to provide a revised schedule for INTERIM response to question 03.08.05-29. AREVA NP submitted Supplement 9 on August 16, 2010, to provide INTERIM responses for Questions 03.08.05-26 and 03.08.05-27 and a revised schedule for INTERIM response to question 03.08.05-25. On August 27, 2010, AREVA NP submitted Supplement 10 to provide INTERIM responses for Questions 03.08.05-25 and 03.08.05-29. AREVA NP submitted a revised schedule for the final response to question 03.08.05-30 in Supplements 11 and 12 on September 15, 2010 and October 7, 2010, respectively.

The attached file, "RAI 376 Supplement 13 Response US EPR DC-INTERIM.pdf" provides a technically correct and complete INTERIM response to Questions 03.08.05-28 and 03.08.05-31, as committed.

The following table indicates the respective pages in the response document, RAI 376 Supplement 13 Response US EPR DC - INTERIM.pdf," that contains AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|-----------------------|------------|----------|
| RAI 354 - 03.08.05-28 | 2 | 10 |
| RAI 354 - 03.08.05-31 | 11 | 12 |

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

| Question # | Interim Response Date | Response Date |
|---------------------|---------------------------|-------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 27, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-29 | August 27, 2010 (Actual) | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | November 22, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 (Actual) | February 17, 2011 |

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager

AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Thursday, October 07, 2010 2:50 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 12

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed. AREVA NP submitted Supplement 7 on July 29, 2010, to provide a FINAL response to 2 of the remaining 10 question, as committed. AREVA NP submitted Supplement 8 on August 9, 2010, to provide a revised schedule for INTERIM response to question 03.08.05-29. AREVA NP submitted Supplement 9 on August 16, 2010, to provide INTERIM responses for Questions 03.08.05-26 and 03.08.05-27 and a revised schedule for INTERIM response to question 03.08.05-25. On August 27, 2010, AREVA NP submitted Supplement 10 to provide INTERIM responses for Questions 03.08.05-25 and 03.08.05-29. AREVA NP submitted Supplement 11 on September 15, 2010, to provide a revised schedule for the final response to question 03.08.05-30

The schedule for Question 03.08.05-30 is being revised to allow additional time for AREVA NP to address NRC comments. The schedule for the remaining questions is unchanged.

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

| Question # | Interim Response Date | Response Date |
|---------------------|------------------------------|--------------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 27, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 27, 2010 (Actual) | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | November 22, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (External RS/NB)

Sent: Wednesday, September 15, 2010 9:21 AM

To: 'Tesfaye, Getachew'

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

Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 11

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed. AREVA NP submitted Supplement 7 on July 29, 2010, to provide a FINAL response to 2 of the remaining 10 question, as committed. AREVA NP submitted Supplement 8 on August 9, 2010, to provide a revised schedule for INTERIM response to question 03.08.05-29. AREVA NP submitted Supplement 9 on August 16, 2010, to provide INTERIM responses for Questions 03.08.05-26 and 03.08.05-27 and a revised schedule for INTERIM response to question 03.08.05-25. On August 27, 2010, AREVA NP submitted Supplement 10 to provide INTERIM responses for Questions 03.08.05-25 and 03.08.05-29.

The schedule for Question 03.08.05-30 is being revised to allow additional time for AREVA NP to interact with the NRC. The schedule for the remaining questions is unchanged.

The schedule for technically correct and complete responses to the remaining 8 questions is unchanged and provided below:

| Question # | Interim Response Date | Response Date |
|---------------------|------------------------------|----------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 27, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 27, 2010 (Actual) | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | October 14, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (External RS/NB)

Sent: Friday, August 27, 2010 4:58 PM

To: 'Tesfaye, Getachew'

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

Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 10-INTERIM

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed. AREVA NP submitted Supplement 7 on July 29, 2010, to provide a FINAL response to 2 of the remaining 10 question, as committed. AREVA NP submitted Supplement 8 on August 9, 2010, to provide a revised schedule for INTERIM response to question 03.08.05-29. AREVA NP submitted Supplement 9 on August 16, 2010, to provide INTERIM responses for Questions 03.08.05-26 and 03.08.05-27 and a revised schedule for INTERIM response to question 03.08.05-25.

The attached file, "RAI 376 Supplement 10 Response US EPR DC- INTERIM.pdf" provides a technically correct and complete INTERIM response to 2 of the remaining 8 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 376 Supplement 10 Response US EPR DC- INTERIM.pdf," that contain AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|-----------------------|------------|----------|
| RAI 376 — 03.08.05-25 | 2 | 3 |
| RAI 376 — 03.08.05-29 | 4 | 5 |

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

| Question # | Interim Response Date | Response Date |
|---------------------|--------------------------|--------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 27, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 27, 2010 (Actual) | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | September 16, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (External RS/NB)

Sent: Monday, August 16, 2010 12:34 PM

To: 'Tesyfaye, Getachew'

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

Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 9

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed. AREVA NP submitted Supplement 7 on July 29, 2010, to provide a FINAL response to 2 of the remaining 10 question, as committed. AREVA NP submitted Supplement 8 on August 9, 2010, to provide a revised schedule for INTERIM response to question 03.08.05-29.

The schedule for INTERIM response to Question 03.08.05-25 is revised to allow AREVA NP additional time to prepare the response. The FINAL response date for Question 03.08.05-25 has not changed. The FINAL response date for Question 03.08.05-30 is being changed to account for the interaction with NRC being scheduled at a later date than the existing FINAL response date.

The attached file, "RAI 376 Supplement 9 Response - INTERIM.pdf" provides a technically correct and complete INTERIM response to 2 of the remaining 8 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 376 Supplement 9 Response - INTERIM.pdf," that contain AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|-----------------------|------------|----------|
| RAI 376 — 03.08.05-26 | 2 | 2 |
| RAI 376 — 03.08.05-27 | 3 | 5 |

The schedule for technically correct and complete responses to the remaining 8 questions is changed and provided below:

| Question # | Interim Response Date | Response Date |
|---------------------|--------------------------|---------------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | September 8, 2010 | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 (Actual) | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 27, 2010 | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | September 16, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (EXT)
Sent: Monday, August 09, 2010 5:45 PM

To: 'Tesfaye, Getachew'

Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (EXT)

Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 8

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed. AREVA NP submitted Supplement 7 on July 29, 2010, to provide a FINAL response to 2 of the remaining 10 question, as committed.

The schedule for INTERIM response to Question 03.08.05-29 is revised to allow AREVA NP additional time to prepare the interim response. The final response date for Question 03.08.05-29 has not changed.

The schedule for technically correct and complete responses to the remaining 8 questions is unchanged and provided below:

| Question # | Interim Response Date | Response Date |
|---------------------|------------------------------|----------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 27, 2010 | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | August 16, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (EXT)

Sent: Thursday, July 29, 2010 7:56 PM

To: 'Tesfaye, Getachew'

Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); CORNELL Veronica (EXT); VAN NOY Mark (EXT)

Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 7

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2

and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010 to provide an INTERIM response to question 03.08.05-24. AREVA NP submitted Supplement 6 on July 26, 2010, to provide a FINAL response to 3 of the remaining 13 question, as committed.

The attached file, "RAI 376 Supplement 7 FINAL Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the remaining 10 questions, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 376 Questions 03.08.01-48 and 03.08.03-24.

The following table indicates the respective pages in the response document, RAI 376 Supplement 7 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|-----------------------|------------|----------|
| RAI 376 — 03.08.01-48 | 2 | 3 |
| RAI 376 — 03.08.03-24 | 4 | 8 |

The schedule for technically correct and complete responses to the remaining 8 questions is unchanged and provided below:

| Question # | Interim Response Date | Response Date |
|---------------------|------------------------|-------------------|
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 9, 2010 | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | August 16, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (EXT)
Sent: Monday, July 26, 2010 4:00 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); VAN NOY Mark (EXT); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14

questions. AREVA NP submitted a revised schedule for the remaining 13 questions in Supplements 2 and 3 on June 8, 2010, and June 24, 2010, respectively. AREVA NP submitted Supplement 4 on July 13, 2010, to provide a revised schedule for question 03.08.05-30. AREVA NP submitted Supplement 5 on July 15, 2010, an INTERIM response to question 03.08.05-24.

The attached file, "RAI 376 Supplement 6 Response U.S. EPR DC.pdf" provides a technically correct and complete FINAL response to 3 of the remaining 13 questions, as committed. The schedule for the remaining 10 questions is unchanged.

The following table indicates the respective pages in the response document, "RAI 376 Supplement 6 Response U.S. EPR DC.pdf," that contain AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|-----------------------|------------|----------|
| RAI 376 — 03.08.01-47 | 2 | 3 |
| RAI 376 — 03.08.03-21 | 4 | 5 |
| RAI 376 — 03.08.03-22 | 6 | 7 |

The schedule for technically correct and complete responses to the remaining 13 questions is provided below.

| Question # | Interim Response Date | Response Date |
|---------------------|------------------------|-------------------|
| RAI 376-03.08.01-48 | N/A | July 29, 2010 |
| RAI 376-03.08.03-24 | N/A | July 29, 2010 |
| RAI 376-03.08.05-24 | July 15, 2010 (Actual) | February 17, 2011 |
| RAI 376-03.08.05-25 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 9, 2010 | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | August 16, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (EXT)
Sent: Thursday, July 15, 2010 7:13 PM
To: 'Tefaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); VAN NOY Mark (EXT); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 5 - Interim

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to RAI No. 376 on April 26, 2010. AREVA NP submitted Supplement 1 to the response on May 20, 2010 to address 1 of the remaining 14 questions. AREVA NP submitted Supplement 2 to the response on June 8, 2010, to change the schedule for responding to Question 03.08.05-30. AREVA NP submitted Supplement 3 to the response on June 24, 2010, to provide a changed schedule based upon the civil/structural re-planning activities and revised RAI response schedule presented to the NRC during the June 9, 2010, Public Meeting, and to allow time to interact with the NRC on the responses. AREVA NP submitted Supplement 4 on July 13, 2010 to provide a revised schedule for question 03.08.05-30. The attached file, "RAI 376 Question 03.08.05-24 Response - INTERIM.pdf" provides a technically correct and complete INTERIM response to 1 of the remaining 13 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 376 Question 03.08.05-24 Response - INTERIM.pdf," that contain AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|-----------------------|------------|----------|
| RAI 376 — 03.08.05-24 | 2 | 5 |

The schedule for technically correct and complete FINAL responses to the remaining 13 questions is unchanged and provided below:

| Question # | Interim Response Date | Response Date |
|---------------------|-----------------------------|-------------------|
| RAI 376-03.08.01-47 | N/A | August 17, 2010 |
| RAI 376-03.08.01-48 | N/A | July 29, 2010 |
| RAI 376-03.08.03-21 | N/A | July 26, 2010 |
| RAI 376-03.08.03-22 | N/A | July 26, 2010 |
| RAI 376-03.08.03-24 | N/A | July 29, 2010 |
| RAI 376-03.08.05-24 | July 15, 2010 Actual | February 17, 2011 |
| RAI 376-03.08.05-25 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 9, 2010 | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | August 16, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (EXT)
Sent: Tuesday, July 13, 2010 6:08 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC);

CORNELL Veronica (EXT); VAN NOY Mark (EXT)

Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted Supplement 2 to the response on June 8, 2010, to provide a schedule for the remaining 13 questions, which were affected by the work underway to address NRC comments from the April 26, 2010, audit. AREVA NP submitted RAI No. 376 Supplement 3 on June 24, 2010, to reflect the revised RAI response schedule as a result of the civil/structural re-planning activities.

RAI 376 Supplement 4 revises the schedule for the response to Question 03.08.05-30 to allow time to interact with the NRC on the draft response. The schedule for the remaining 12 questions is unchanged.

The schedule for technically correct and complete responses to the remaining 13 questions is provided below.

| Question # | Interim Response Date | Response Date |
|---------------------|-----------------------|-------------------|
| RAI 376-03.08.01-47 | N/A | August 17, 2010 |
| RAI 376-03.08.01-48 | N/A | July 29, 2010 |
| RAI 376-03.08.03-21 | N/A | July 26, 2010 |
| RAI 376-03.08.03-22 | N/A | July 26, 2010 |
| RAI 376-03.08.03-24 | N/A | July 29, 2010 |
| RAI 376-03.08.05-24 | July 15, 2010 | February 17, 2011 |
| RAI 376-03.08.05-25 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 9, 2010 | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | August 16, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (EXT)

Sent: Thursday, June 24, 2010 11:56 AM

To: 'Tesyfaye, Getachew'

Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); RYAN Tom (AREVA NP INC); VAN NOY Mark (EXT); CORNELL Veronica (EXT); GARDNER George Darrell (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions. AREVA NP submitted Supplement 2 to the response on June 8, 2010, to provide a schedule for the

remaining 13 questions, which were affected by the work underway to address NRC comments from the April 26, 2010, audit.

Based upon the civil/structural re-planning activities and revised RAI response schedule presented to the NRC during the June 9, 2010, Public Meeting, and to allow time to interact with the NRC on the responses, the schedule has been changed. The schedule for 03.08.05-30 remains unchanged.

Prior to submittal of the final RAI response, AREVA NP will provide an interim RAI response that includes:

- (1) a description of the technical work (e.g., methodology)
- (2) U.S. EPR FSAR revised pages, as applicable

The revised schedule for an interim response and the technically correct and complete response to these questions is provided below.

| Question # | Interim Response Date | Response Date |
|---------------------|-----------------------|-------------------|
| RAI 376-03.08.01-47 | N/A | August 17, 2010 |
| RAI 376-03.08.01-48 | N/A | July 29, 2010 |
| RAI 376-03.08.03-21 | N/A | July 26, 2010 |
| RAI 376-03.08.03-22 | N/A | July 26, 2010 |
| RAI 376-03.08.03-24 | N/A | July 29, 2010 |
| RAI 376-03.08.05-24 | July 15, 2010 | February 17, 2011 |
| RAI 376-03.08.05-25 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-26 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-27 | August 16, 2010 | February 8, 2011 |
| RAI 376-03.08.05-28 | October 25, 2010 | February 17, 2011 |
| RAI 376-03.08.05-29 | August 9, 2010 | October 29, 2010 |
| RAI 376-03.08.05-30 | N/A | July 14, 2010 |
| RAI 376-03.08.05-31 | October 25, 2010 | February 17, 2011 |

Sincerely,

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

From: BRYAN Martin (EXT)
Sent: Tuesday, June 08, 2010 3:32 PM
To: 'Tefaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); VAN NOY Mark (EXT); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI 376 on April 26, 2010. RAI 376 Supplement 1 provided a technically correct and complete response to 1 of 14 questions.

The schedule for the response to Question 03.08.05-30 has been changed. The final schedule for this question as well as the remaining questions below will be evaluated based on the information that will be presented at the June 9, 2010, public meeting and subsequent NRC feedback.

| Question # | Response Date |
|---------------------|----------------|
| RAI 376-03.08.01-47 | July 14, 2010 |
| RAI 376-03.08.01-48 | August 3, 2010 |
| RAI 376-03.08.03-21 | June 24, 2010 |
| RAI 376-03.08.03-22 | June 24, 2010 |
| RAI 376-03.08.03-24 | August 3, 2010 |
| RAI 376-03.08.05-24 | August 3, 2010 |
| RAI 376-03.08.05-25 | August 3, 2010 |
| RAI 376-03.08.05-26 | August 3, 2010 |
| RAI 376-03.08.05-27 | July 14, 2010 |
| RAI 376-03.08.05-28 | August 3, 2010 |
| RAI 376-03.08.05-29 | August 3, 2010 |
| RAI 376-03.08.05-30 | July 14, 2010 |
| RAI 376-03.08.05-31 | August 3, 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, May 20, 2010 4:24 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); VAN NOY Mark (EXT); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to RAI No. 376 on April 26, 2010. The attached file, "RAI 376 Supplement 1 Response US EPR DC.pdf," provides technically correct and complete responses to 1 of the remaining 14 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 376 Question 03.08.03-23.

The response to one question, 03.08.05-30, cannot be provided at this time due to its dependence on path-to-closure related work-planning currently being rescheduled and reviewed by the NRC.

The following table indicates the respective pages in the response document, "RAI 376 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|---------------------|------------|----------|
| RAI 376-03.08.03-23 | 2 | 2 |

A complete answer is not provided for 13 of the 14 questions. The schedule for a technically correct and complete response to these questions has been changed and is provided below.

| Question # | Response Date |
|---------------------|----------------|
| RAI 376-03.08.01-47 | July 14, 2010 |
| RAI 376-03.08.01-48 | August 3, 2010 |
| RAI 376-03.08.03-21 | June 24, 2010 |
| RAI 376-03.08.03-22 | June 24, 2010 |
| RAI 376-03.08.03-24 | August 3, 2010 |
| RAI 376-03.08.05-24 | August 3, 2010 |
| RAI 376-03.08.05-25 | August 3, 2010 |
| RAI 376-03.08.05-26 | August 3, 2010 |
| RAI 376-03.08.05-27 | July 14, 2010 |
| RAI 376-03.08.05-28 | August 3, 2010 |
| RAI 376-03.08.05-29 | August 3, 2010 |
| RAI 376-03.08.05-30 | June 10, 2010 |
| RAI 376-03.08.05-31 | August 3, 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: Monday, April 26, 2010 12:49 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); RYAN Tom (AREVA NP INC); VAN NOY Mark (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 376 (4355,4367,4377), FSAR Ch. 3

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 376 Response US EPR DC.pdf" provides a schedule since a technically correct and complete response to the 14 questions is not provided.

The following table indicates the respective pages in the response document, "RAI 376 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|---------------------|------------|----------|
| RAI 376-03.08.01-47 | 2 | 2 |

| | | |
|---------------------|----|----|
| RAI 376-03.08.01-48 | 3 | 4 |
| RAI 376-03.08.03-21 | 5 | 6 |
| RAI 376-03.08.03-22 | 7 | 7 |
| RAI 376-03.08.03-23 | 8 | 8 |
| RAI 376-03.08.03-24 | 9 | 10 |
| RAI 376-03.08.05-24 | 11 | 12 |
| RAI 376-03.08.05-25 | 13 | 13 |
| RAI 376-03.08.05-26 | 14 | 14 |
| RAI 376-03.08.05-27 | 15 | 16 |
| RAI 376-03.08.05-28 | 17 | 19 |
| RAI 376-03.08.05-29 | 20 | 20 |
| RAI 376-03.08.05-30 | 21 | 21 |
| RAI 376-03.08.05-31 | 22 | 22 |

A complete answer is not provided for 14 of the 14 questions. The schedule for a technically correct and complete response to these questions is provided below.

| Question # | Response Date |
|---------------------|----------------|
| RAI 376-03.08.01-47 | July 14, 2010 |
| RAI 376-03.08.01-48 | August 3, 2010 |
| RAI 376-03.08.03-21 | June 24, 2010 |
| RAI 376-03.08.03-22 | June 24, 2010 |
| RAI 376-03.08.03-23 | May 20, 2010 |
| RAI 376-03.08.03-24 | August 3, 2010 |
| RAI 376-03.08.05-24 | August 3, 2010 |
| RAI 376-03.08.05-25 | August 3, 2010 |
| RAI 376-03.08.05-26 | August 3, 2010 |
| RAI 376-03.08.05-27 | July 14, 2010 |
| RAI 376-03.08.05-28 | August 3, 2010 |
| RAI 376-03.08.05-29 | August 3, 2010 |
| RAI 376-03.08.05-30 | May 20, 2010 |
| RAI 376-03.08.05-31 | August 3, 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: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Thursday, March 25, 2010 2:13 PM
To: ZZ-DL-A-USEPR-DL
Cc: Xu, Jim; Hawkins, Kimberly; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 376 (4355,4367,4377), FSAR Ch. 3

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on March 11, 2010, and on March 24, 2010, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. 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: 2512

Mail Envelope Properties (199EBB4D1CD9644D9472AA84D5D8EFA719397B)

Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 376, FSAR Ch. 3, Questions 3.8.5-24 and 29
Sent Date: 2/7/2011 10:12:48 AM
Received Date: 2/7/2011 10:14:04 AM
From: BRYAN Martin (EXTERNAL AREVA)

Created By: Martin.Bryan.ext@areva.com

Recipients:

"Miernicki, Michael" <Michael.Miernicki@nrc.gov>
Tracking Status: None
"CORNELL Veronica (EXTERNAL AREVA)" <Veronica.Cornell.ext@areva.com>
Tracking Status: None
"BREDEL Daniel (AREVA)" <Daniel.Bredel@areva.com>
Tracking Status: None
"WILLIFORD Dennis (AREVA)" <Dennis.Williford@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"HAYS Lynn (AREVA)" <Lynn.Hays@areva.com>
Tracking Status: None
"COLEMAN Sue (AREVA)" <Sue.Coleman@areva.com>
Tracking Status: None
"GARDNER Darrell (AREVA)" <Darrell.Gardner@areva.com>
Tracking Status: None
"ALCHAAR Nawar (AREVA)" <Nawar.Alchaar@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

| Files | Size | Date & Time | |
|--|-------------|------------------------|--------|
| MESSAGE | 45889 | 2/7/2011 10:14:04 AM | |
| RAI 376 Question 03.08.05-24 & 29 Response US EPR DC - (DRAFT).pdf | | | 456623 |

Options

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

Response to

Request for Additional Information No. 376

Question 03.08.05-24

Question 03.08.05-29

3/25/2010

U.S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 03.08.01 - Concrete Containmentment

**SRP Section: 03.08.03 - Concrete and Steel Internal Structures of Steel or
Concrete Containmentments**

SRP Section: 03.08.05 - Foundations

Application Section: 3.8

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

Question 03.08.05-24:**Follow-up to RAI 155, Question 03.08.05-4**

The response to this RAI provided additional information about general procedures applicable to Seismic Category I (SC I) foundations. However, the staff finds that portions of this RAI response may be superseded in light of the response to RAI 3.8.5-8, which states that: (a) a new SSI analysis of the NI Common Basemat Structure has been performed using fully embedded conditions to address sliding and overturning issues; and (b) the new analysis models the tendon gallery as a shear key. Consequently, revise the RAI response and the relevant sections of the FSAR so that they are compatible with the aforementioned new analysis assumptions. The revised response should address the questions raised in the original RAI for all SC I structures, not just the NI Common Basemat Structure. In addition, provide further clarification on several issues as discussed below.

1. The response to Item 1 of this RAI provides the formulas utilized in the calculation of factors of safety for sliding, overturning, and flotation. These formulas are based on standard free body formulations of moments and forces. However, the staff notes that vertical wind forces ("Fz_wind") are added to the resisting forces/moments in the sliding and overturning calculations; in addition, forces due to soil pressure (e.g., Fy, Fz, and Mx) are also utilized. In order to determine whether the stability evaluations are performed in accordance with the criteria in SRP 3.8.5.II, provide a description along with a diagram that explains the use of these forces in the methodology to calculate the minimum factors of safety.
2. The response to Item 2 of this RAI indicates that minimum factors of safety for overturning and sliding for the load combination including E' will be provided in response to RAI 3.8.5-8. However, the response to RAI 3.8.5-8 only provides the minimum factors of safety for the NI Common Basemat Structure. The response to this Item should be revised to address all SC I structures.
3. Revise the response to Item 3 of this RAI in light of the response to RAI 3.8.5-8. In addition, provide the technical basis for assuming that the value $\mu = 0.7$ is applicable as a dynamic coefficient of friction as well as the minimum static coefficient of friction, for all soil types considered. The staff notes that dynamic coefficients of friction have values that are typically lower than static coefficients of friction. If these values are overestimated, then the corresponding factors of safety against sliding could also be overestimated and it would not be possible to determine if the foundation design meets the acceptance criteria in SRP 3.8.5.II.
4. Revise the response to Item 4 of this RAI in light of the response to RAI 3.8.5-8. In addition, since the current response to Item 4 states that the submerged unit weight of the soil was used for all structural analyses, provide the technical bases for assuming that this is always the worst condition or describe what other conditions were considered. This information is needed to determine if the foundation design meets the acceptance criteria in SRP 3.8.5.II.
5. The response to Item 5 of this RAI is not complete. As requested in the original RAI, compare the seismic soil pressure used in the design of foundation walls to the maximum calculated (lateral) soil pressure load distribution from the sliding and overturning seismic analysis. This information is needed because the assessment of lateral soil pressures is explicitly identified in SRP 3.8.5.II.4 as an area of staff review.

6. The response to Item 7 of this RAI indicates that negligible impact was noted when the NI Common Basemat was subjected to a differential displacement of 1 inch in 50 feet. However, as stated in the staff's evaluation of RAI 3.8.5-11, it appears that a rigid body-type evaluation was performed to assess differential settlement effects. If this approach was used, the staff finds this unacceptable. For a typical shear wall structure, a differential settlement of 1 inch in 50 feet can result in significant demands on the structure when the differential settlement is defined as an imposed vertical shear deformation and not as a rigid body rotation. The demands on the structure will be a function of the stiffness of the foundation soils supporting the basemat. If such demands are ignored in the design of the basemat, then overstressed conditions and cracking of the basemat could result. Therefore, clarify the approach used to determine differential settlement effects. If differential settlement effects are not negligible, then address the issues raised by Item 7 of the original RAI in regard to load cases and load combinations. In addition, the RAI response indicates that differential settlement effects were evaluated for the softest soil type (soil case 1u). However, the staff notes that the use of the softest soil profile does not necessarily lead to the largest demands on the structure at all locations. Therefore, provide the results of analyses performed to show that bounding estimates were determined, and that induced demands are small for any acceptable soil type. Finally, no mention is made of how differential settlement effects were evaluated for SC I structures outside of the NI Common Basemat. Confirm that differential settlement effects were analyzed for these other SC I structures and provide a discussion of the analysis findings.

Response to Question 03.08.05-24:

Item 1:

For load combinations including W, Wt, and Fb, the sliding, overturning, and flotation factors of safety will be calculated using results from the static model according to the following formulas, which complies with SRP 3.8.5.II:

$$FS \text{ Sliding} = \frac{F_S + F_P}{F_H}$$

where:

F_S = shearing or sliding resistance at bottom of basemat

F_P = maximum soil passive pressure resistance, neglecting surcharge effect

F_H = maximum lateral force due to active soil pressure, including surcharge, and tornado or design wind load

$$FS \text{ Overturning} = \frac{M_R}{M_O}$$

where:

M_R = resisting moment

M_O = overturning moment of tornado or design wind

$$F_S \text{ Flotation} = \frac{D}{(F \text{ or } B)}$$

where:

D = total weight of structures and foundation

F = buoyant force due to the design basis flood

B = buoyant force due to high ground water table

Factors of safety will be calculated for each direction, and the minimum factor of safety will be reported in U.S. EPR FSAR Tier 2, Table 3.8-12. U.S. EPR FSAR Tier 2, Table 3.8-12 and Section 3.8.5 will be revised to show resulting factors of safety.

The results of Nuclear Island (NI) stability analysis, including corresponding factors of safety, will be provided in the Response to RAI 376, Question 3.8.5-28.

The results of Emergency Power Generating Building (EPGB) and Essential Service Water Building (ESWB) stability analyses, including corresponding factors of safety, will be provided in the Response to RAI 376, Question 3.8.5-31.

Item 2:

See the response to Item 1 for factor of safety for Seismic Category I structures.

Item 3:

Stability of the NI will be based on SASSI analyses described in the responses to RAI 320, Question 3.7.2-63 and RAI 371, Question 03.07.02-69. The NI stability analysis results will be reported in the Response to RAI 376, Question 3.8.5-28.

Stability of the EPGB/ESWB will be based on SASSI analyses described in the responses to RAI 376, Question 3.8.5-31 and RAI 371, Question 3.7.2-69. The EPGB/ESWB stability analysis results will be reported in the Response to RAI 376, Question 3.8.5-31.

A coefficient of friction of 0.5 is used for stability analysis of Seismic Category I structures.

Item 4:

The stability analysis methodology for Seismic Category I structures will be provided in the Response to RAI 371, Question 3.7.2-69.

Item 5:

Soil bearing pressures used for Seismic Category I structural design of embedded foundation walls will be based on seismic sliding and overturning analyses performed with SASSI as described in the responses to RAI 320, Question 3.7.2-63 and RAI 371, Question 3.7.2-69. NI results will be provided in the responses to RAI 376, Question 3.8.5-28 and Question 3.8.5-31 for the ESWB. NI and ESWB foundation walls are included as critical sections. The design of the foundation walls will be described in the Response to RAI 155, Question 3.8.4-6.

Item 6:

Settlement for Seismic Category I structures is addressed in the Response to RAI 354, Question 3.8.5-22.

FSAR Impact:

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

DRAFT

Question 03.08.05-29:**Follow-up to RAI 155, Question 03.08.05-9**

The RAI response states that the use of a uniform subgrade modulus distribution underestimates soil bearing pressures, but that this is acceptable since the bearing pressure requirements are controlled by the larger and more massive NI structure. However, this may not be the case since the EPGB and ESWB structures may have different foundation material with bearing pressure requirements that are less than the NI structure. Therefore, provide further justification for not considering the elliptical subgrade modulus distribution for all soil cases in determining the bearing pressure requirements for the EPGB and ESWB structures. The bearing pressure requirements for these structures should be specified in the FSAR along with a discussion of the technical bases for the requirements. This information is needed to ensure that the soil bearing pressures for all safety-related structures meet the acceptance criteria in SRP 3.8.5.II.

The RAI response also states that K_o for the EPGB soil case 5a is 13,944 kcf. This is considered to be a very high value for typical soils and as compared to all the other reported values. Clarify if this value is correct. If it is, describe how this value was determined.

Response to Question 03.08.05-29:

The stability analysis methodology and the determination of bearing pressures for the Emergency Power Generating Building and Essential Service Water Building will be described in the Response to RAI 371, Question 03.07.02-69. The results of these analyses will be provided in the Response to RAI 376, Question 03.08.05-31.

FSAR Impact:

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