

ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Friday, November 18, 2011 8:05 AM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); GUCWA Len (EXTERNAL AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 11
Attachments: RAI 191 Supplement 11 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to provide a revised response schedule. AREVA NP submitted Supplement 4 to the response on April 22, 2010 to provide a revised response schedule. AREVA NP submitted Supplement 5 to the response on May 20, 2010 to provide a revised response to Question 15.06.05-48. The Supplement 5 response also deferred the completion schedule until a public meeting could be held. On July 14, 2010 and November 18, 2010, AREVA NP submitted Supplement 6 and Supplement 7 response to RAI 191, respectively, to revise the response schedule. Supplement 8, Supplement 9 and Supplement 10 responses to RAI 191 were provided on March 31, 2011, April 28, 2011, and August 25, 2011, respectively, to revise the schedule for responding to the remaining questions.

The attached file, "RAI 191 Supplement 11 Response US EPR DC.pdf" provides technically correct and complete responses to the 6 remaining questions.

The following table indicates the respective pages in the response document, "RAI 191 Supplement 11 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 191 — 15.06.05-43	2	2
RAI 191 — 15.06.05-44	3	3
RAI 191 — 15.06.05-45	4	4
RAI 191 — 15.06.05-46	5	5
RAI 191 — 15.06.05-47	6	6
RAI 191 — 15.06.05-49	7	7

This concludes the formal AREVA NP response to RAI 191, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

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

7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262

From: WILLIFORD Dennis (RS/NB)
Sent: Thursday, August 25, 2011 5:46 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); GUCWA Len (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 10

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to provide a revised response schedule. AREVA NP submitted Supplement 4 to the response on April 22, 2010 to provide a revised response schedule. AREVA NP submitted Supplement 5 to the response on May 20, 2010 to provide a revised response to Question 15.06.05-48. The Supplement 5 response also deferred the completion schedule until a public meeting could be held. On July 14, 2010 and November 18, 2010, AREVA NP submitted Supplement 6 and Supplement 7 response to RAI 191, respectively, to revise the response schedule. Supplement 8 and Supplement 9 responses to RAI 191 were provided on March 31, 2011 and April 28, 2011, respectively, to revise the schedule for responding to the remaining questions.

The schedule for responding to the remaining 6 questions in RAI 191 has been revised and is provided below.

Question #	Response Date
RAI 191—15.06.05-43	November 18, 2011
RAI 191—15.06.05-44	November 18, 2011
RAI 191—15.06.05-45	November 18, 2011
RAI 191—15.06.05-46	November 18, 2011
RAI 191—15.06.05-47	November 18, 2011
RAI 191—15.06.05-49	November 18, 2011

Sincerely,

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

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

From: WELLS Russell (RS/NB)
Sent: Thursday, April 28, 2011 6:08 PM
To: Tesfaye, Getachew
Cc: GUCWA Len (External RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 9

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to provide a revised response schedule. AREVA NP submitted Supplement 4 to the response on April 22, 2010 to provide a revised response schedule. AREVA NP submitted Supplement 5 to the response on May 20, 2010 to provide a revised response to Question 15.06.05-48. The Supplement 5 response also deferred the completion schedule until a public meeting could be held. On July 14, 2010 and November 18, 2010, AREVA NP submitted Supplement 6 and Supplement 7 response to RAI 191, respectively, to revise the response schedule. Supplement 8 response to RAI 191 was provided on March 31, 2011 to revise the schedule for responding to the remaining questions.

To provide an opportunity for additional technical evaluations and interaction with the NRC staff, AREVA NP is providing a revised schedule for responding to Questions 15.06.05-43 through 15.06.05-47 and Question 15.06.05-49 as provided below.

Question #	Response Date
RAI 191—15.06.05-43	August 31, 2011
RAI 191—15.06.05-44	August 31, 2011
RAI 191—15.06.05-45	August 31, 2011
RAI 191—15.06.05-46	August 31, 2011
RAI 191—15.06.05-47	August 31, 2011
RAI 191—15.06.05-49	August 31, 2011

Sincerely,

Russ Wells

U.S. EPR Design Certification Licensing Manager

AREVA NP, Inc.

3315 Old Forest Road, P.O. Box 10935

Mail Stop OF-57

Lynchburg, VA 24506-0935

Phone: 434-832-3884 (work)

434-942-6375 (cell)

Fax: 434-382-3884

Russell.Wells@Areva.com

From: WELLS Russell (RS/NB)

Sent: Thursday, March 31, 2011 1:31 PM

To: 'Tesyfaye, Getachew'

Cc: GUCWA Len (External RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 8

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to provide a revised response schedule. AREVA NP submitted Supplement 4 to the response on April 22, 2010

to provide a revised response schedule. AREVA NP submitted Supplement 5 to the response on May 20, 2010 to provide a revised response to Question 15.06.05-48. The Supplement 5 response also deferred the completion schedule until a public meeting could be held. On July 14, 2010 and November 18, 2010, AREVA NP submitted Supplement 6 and Supplement 7 response to RAI 191, respectively, to revise the response schedule.

The 6 remaining questions include evaluations of the in-vessel, downstream effects of debris bypassing sump strainers. The schedule for responding to the remaining RAI 191 questions has been revised and is provided below.

Question #	Response Date
RAI 191—15.06.05-43	April 30, 2011
RAI 191—15.06.05-44	April 30, 2011
RAI 191—15.06.05-45	April 30, 2011
RAI 191—15.06.05-46	April 30, 2011
RAI 191—15.06.05-47	April 30, 2011
RAI 191—15.06.05-49	April 30, 2011

Sincerely,

Russ Wells

U.S. EPR Design Certification Licensing Manager

AREVA NP, Inc.

3315 Old Forest Road, P.O. Box 10935

Mail Stop OF-57

Lynchburg, VA 24506-0935

Phone: 434-832-3884 (work)

434-942-6375 (cell)

Fax: 434-382-3884

Russell.Wells@Areva.com

From: BRYAN Martin (External RS/NB)

Sent: Thursday, November 18, 2010 11:49 AM

To: Tesfaye, Getachew

Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); GUCWA Len (External RS/NB); Miernicki, Michael

Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 7

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to provide a revised response schedule. AREVA NP submitted Supplement 4 to the response on April 22, 2010 to provide a revised response schedule. AREVA NP submitted Supplement 5 to the response on May 20, 2010 to provide a revised response to Question 15.06.05-48. The Supplement 5 response also deferred the completion schedule until a public meeting could be held.

On July 14, 2010, AREVA NP submitted Supplement 6 response to RAI 191 to revise the response schedule. The responses to the 6 remaining questions in RAI 191 are dependent upon the results of ongoing re-evaluations of GSI-191 source term, sump strainer design and testing. A revised schedule for providing

technically correct and complete responses to the remaining questions in RAI 191 was developed based on these ongoing activities. The schedule for technically correct and complete responses to the RAI 191 questions is provided below.

Question #	Response Date
RAI 191—15.06.05-43	March 31, 2011
RAI 191—15.06.05-44	March 31, 2011
RAI 191—15.06.05-45	March 31, 2011
RAI 191—15.06.05-46	March 31, 2011
RAI 191—15.06.05-47	March 31, 2011
RAI 191—15.06.05-49	March 31, 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: Wednesday, July 14, 2010 3:08 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to provide a revised response schedule. AREVA NP submitted Supplement 4 to the response on April 22, 2010 to provide a revised response schedule. AREVA NP submitted Supplement 5 to the response on May 20, 2010 to provide a revised response to Question 15.06.05-48. The Supplement 5 response also deferred the completion schedule until a public meeting could be held.

The responses to the 6 questions in RAI 191 are dependent upon the results of ongoing GSI-191 testing and evaluations of downstream effects on fuel assemblies. A revised schedule for providing technically correct and complete responses to the remaining questions in RAI 191 was developed based on these ongoing activities. Timelines for completing supporting activities were discussed with the NRC staff during a public meeting held at NRC headquarters on July 7, 2010. The schedule for technically correct and complete responses to the RAI 191 questions is provided below.

Question #	Response Date
RAI 191—15.06.05-43	November 19, 2010
RAI 191—15.06.05-44	November 19, 2010
RAI 191—15.06.05-45	November 19, 2010
RAI 191—15.06.05-46	November 19, 2010
RAI 191—15.06.05-47	November 19, 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 3:57 PM
To: 'Tesyfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 5

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI No. 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to provide a revised response schedule. AREVA NP submitted Supplement 4 to the response on April 22, 2010 to provide a revised response schedule.

The attached file, "RAI 191 Supplement 5 Response US EPR DC.pdf" supersedes the response to Question 15.06.05-48 provided in the April 9, 2009 response. The revised response is based on the recently revised technical report ANP-10293, Rev. 1, "U.S. EPR Design Features to Address GSI-191."

The following table indicates the respective page in the response document, "RAI 191 Supplement 5 Response US EPR DC.pdf," that contains AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 191 — 15.06.05-48	2	2

The schedule for technically correct and complete responses to the remaining 6 questions is pending the results of an upcoming GSI-191 public meeting.

Question #	Response Date
RAI 191—15.06.05-43	(to be determined)
RAI 191—15.06.05-44	(to be determined)
RAI 191—15.06.05-45	(to be determined)
RAI 191—15.06.05-46	(to be determined)
RAI 191—15.06.05-47	(to be determined)
RAI 191—15.06.05-49	(to be determined)

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, April 22, 2010 6:24 PM
To: 'Getachew.Tesfaye@nrc.gov'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI No. 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to provide a revised response schedule.

The responses to the remaining questions in RAI 191 are dependent upon the results of ongoing GSI-191 evaluations of downstream effects on fuel assemblies, including additional testing. Because of these ongoing activities, AREVA NP is not providing a response at this time. A revised schedule for providing a technically correct and complete response to the remaining questions in RAI 191 will be provided within two weeks following the April 29, 2010 public meeting on GSI-191.

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: Pederson Ronda M (AREVA NP INC)
Sent: Friday, December 18, 2009 3:25 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI No. 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. AREVA NP submitted Supplement 2 to the response on June 1, 2009 providing a revised response to Question 15.06.05-46.

Responses to the remaining RAI 191 questions are dependent upon the results of ongoing GSI-191 head loss testing, which will demonstrate sump strainer performance. Because additional testing is planned, AREVA NP is not providing a response at this time.

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

Question #	Response Date
RAI 191—15.06.05-43	April 22, 2010
RAI 191—15.06.05-44	April 22, 2010
RAI 191—15.06.05-45	April 22, 2010
RAI 191—15.06.05-46	April 22, 2010
RAI 191—15.06.05-47	April 22, 2010
RAI 191—15.06.05-49	April 22, 2010

Sincerely,

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

AREVA NP Inc.

An AREVA and Siemens company

3315 Old Forest Road

Lynchburg, VA 24506-0935

Phone: 434-832-3694

Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)

Sent: Monday, June 01, 2009 3:30 PM

To: 'Getachew Tesfaye'

Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); DUNCAN Leslie E (AREVA NP INC); GUCWA Len T (EXT)

Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI No. 191 on April 9, 2009. AREVA NP submitted Supplement 1 to the response on May 29, 2009 providing partial responses to the 6 remaining questions. The attached file, "RAI 191 Supplement 2 Response US EPR DC.pdf" provides a revised response to Question 15.06.05-46. This response supersedes, in its entirety, the respective Supplement 1 response to RAI 191, Question 15.06.05-46 provided by email dated May 29, 2009.

The following table indicates the respective pages in the response document, "RAI 191 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's partial response to the subject question.

Question #	Start Page	End Page
RAI 191—15.06.05-46	2	3

The schedule for technically correct and complete responses to the remaining 6 questions is unchanged and provided below.

Question #	Response Date
RAI 191—15.06.05-43	December 18, 2009
RAI 191—15.06.05-44	December 18, 2009
RAI 191—15.06.05-45	December 18, 2009
RAI 191—15.06.05-46	December 18, 2009
RAI 191—15.06.05-47	December 18, 2009
RAI 191—15.06.05-49	December 18, 2009

Sincerely,

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

AREVA NP Inc.

An AREVA and Siemens company

3315 Old Forest Road
Lynchburg, VA 24506-0935

Phone: 434-832-3694

Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)

Sent: Friday, May 29, 2009 9:45 AM

To: 'Getachew Tesfaye'

Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); GUCWA Len T (EXT); 'Michael Miernicki'

Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh. 15, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 7 questions of RAI No. 191 on April 9, 2009.

The response file, "RAI 191 Supplement 1 Response US EPR DC.pdf" provides partial responses to the 6 remaining questions.

The following table indicates the respective pages in the response document, "RAI 191 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 191—15.06.05-43	2	2
RAI 191—15.06.05-44	3	3
RAI 191—15.06.05-45	4	4
RAI 191—15.06.05-46	5	6
RAI 191—15.06.05-47	7	7
RAI 191—15.06.05-49	8	8

A complete answer is not provided for 6 of the 7 questions of RAI No. 191. The schedule for providing technically correct and complete responses to the remaining questions has been changed and is provided below.

Question #	Response Date
RAI 191—15.06.05-43	December 18, 2009
RAI 191—15.06.05-44	December 18, 2009
RAI 191—15.06.05-45	December 18, 2009
RAI 191—15.06.05-46	December 18, 2009
RAI 191—15.06.05-47	December 18, 2009
RAI 191—15.06.05-49	December 18, 2009

Sincerely,

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

AREVA NP Inc.

An AREVA and Siemens company

3315 Old Forest Road

Lynchburg, VA 24506-0935

Phone: 434-832-3694

Cell: 434-841-8788

From: DUNCAN Leslie E (AREVA NP INC)

Sent: Thursday, April 09, 2009 11:29 AM

To: Getachew Tesfaye

Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 191 (2228), FSARCh. 15

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 191 Response US EPR DC.pdf" provides a technically correct and complete response to 1 of the 7 questions.

The following table indicates the respective pages in the response document, "RAI 191 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 191—15.06.05-43	2	2
RAI 191—15.06.05-44	3	3
RAI 191—15.06.05-45	4	4
RAI 191—15.06.05-46	5	5
RAI 191—15.06.05-47	6	6
RAI 191—15.06.05-48	7	10
RAI 191—15.06.05-49	11	11

A complete answer is not provided for 6 of the 7 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 191—15.06.05-43	May 29, 2009
RAI 191—15.06.05-44	May 29, 2009
RAI 191—15.06.05-45	May 29, 2009

RAI 191—15.06.05-46	May 29, 2009
RAI 191—15.06.05-47	May 29, 2009
RAI 191—15.06.05-49	May 29, 2009

Sincerely,

(on the behalf of Ronda Pederson)

Les Duncan
Licensing Engineer
AREVA NP Inc.
An AREVA and Siemens Company
Tel: (434) 832-2849
Leslie.Duncan@areva.com

From: Getachew Tesfaye [<mailto:Getachew.Tesfaye@nrc.gov>]
Sent: Wednesday, March 11, 2009 6:24 PM
To: ZZ-DL-A-USEPR-DL
Cc: Fred Forsaty; Shanlai Lu; Joseph Donoghue; Jason Carneal; Joseph Colaccino; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 191 (2228), FSARCh. 15

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on February 20, 2009, and discussed with your staff on March 3, 2009. The staff took action to review previous RAIs to determine if some of the draft questions were previously asked as suggested by AREVA during that discussion. The staff reviewed the references AREVA provided and concluded that the new RAIs were not covered by previous RAIs. Therefore, with minor modifications to draft RAI Questions 15.06.05-43, 15.06.05-44, 15.06.05-45, and 15.06.05-46, for clarification, the draft RAIs are issued as final. 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: 3569

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D49B583D)

Subject: Response to U.S. EPR Design Certification Application RAI No. 191, FSARCh.
15, Supplement 11
Sent Date: 11/18/2011 8:05:22 AM
Received Date: 11/18/2011 8:05:26 AM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:

"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"GUCWA Len (EXTERNAL AREVA)" <Len.Gucwa.ext@areva.com>
Tracking Status: None
"Tsfaye, Getachew" <Getachew.Tsfaye@nrc.gov>
Tracking Status: None

Post Office: auscharm02.adom.ad.corp

Files	Size	Date & Time
MESSAGE	25983	11/18/2011 8:05:26 AM
RAI 191 Supplement 11 Response US EPR DC.pdf		70316

Options

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

Response to

Request for Additional Information No. 191, Supplement 11

03/11/2009

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

**SRP Section: 15.06.05 - Loss of Coolant Accidents Resulting From Spectrum of
Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary**

Application Section: Ch 15

QUESTIONS for Reactor System, Nuclear Performance and Code Review (SRSB)

Question 15.06.05-43:

Addressing Regulatory Position 1.1.1.12 in Regulatory Guide RG 1.82 Revision 3 on buildup of debris at downstream flow restriction locations including coolant channel openings in the core fuel assemblies and fuel assembly inlet debris screens, Appendix A of ANP-10293 Revision 0, in its conformance assessment states that “The impact of debris clogging downstream of the ECC sump screens on ... fuel assemblies is expected to be negligible. An evaluation to support this conclusion is part of the U.S. EPR design process. This issue will be further assessed based on the results of industry consensus regarding confirmation of downstream effects.”

Provide the results from such further assessments and the resolution for the U.S. EPR that considers such additional results of industry consensus regarding confirmation of downstream effects on fuel assemblies, including inlet nozzle, grid spacers, and fuel rods, in accordance with Regulatory Position 1.1.1.12 in Regulatory Guide RG 1.82 Revision 3. In this regard, provide the basis for the resolution and describe the impact of additional experimental and analytical work, including such that was carried out in addressing the resolution of GSI-191 and made available after the publication of Generic Letter GL-2004-02 on September 13, 2004, which is the most recently dated reference considered in ANP-10293 Revision 0, on the U.S. EPR FSAR and ANP-10293, if any.

Response to Question 15.06.05-43:

ANP-10293P, Appendix F, Section F.5.5 will be revised to address the tests pertaining to the confirmation of downstream effects on fuel assemblies. The update to ANP-10293P will be provided by separate letter.

FSAR Impact:

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

Technical Report Impact:

Technical Report ANP-10293P will be revised as described in the response.

Question 15.06.05-44:

Addressing Regulatory Position 1.1.2.3 in Regulatory Guide RG 1.82 Revision 3 on chemical reaction effects, Appendix A of ANP-10293 Revision 0, in its conformance assessment states that “The need to address the potential impact of chemical reaction with the debris sources, filter differential pressure and other downstream effects is recognized by the U.S. EPR design program. This issue will be further assessed based on the results of industry consensus regarding confirmation of downstream effects.”

Provide the results from such further assessments and the resolution for the U.S. EPR that considers additional results of industry consensus regarding confirmation of downstream effects on fuel assemblies, including inlet nozzle, grid spacers, and fuel rods in accordance with Regulatory Position 1.1.2.3 in Regulatory Guide RG 1.82 Revision 3. In this respect, provide the basis for the resolution and describe the impact of additional experimental and analytical work, including such that was carried out in addressing the resolution of GSI-191 and made available after the publication of Generic Letter GL-2004-02 on September 13, 2004, which is the most recently dated reference considered in ANP-10293 Revision 0, on the U.S. EPR FSAR and ANP-10293, if any.

Response to Question 15.06.05-44:

ANP-10293P, Appendix F, Section F.5.5 and Section F.5.6 will be revised to address the test results regarding confirmation of downstream effects on fuel assemblies. The update to ANP-10293P will be provided by separate letter.

FSAR Impact:

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

Technical Report Impact:

Technical Report ANP-10293P will be revised as described in the response.

Question 15.06.05-45:

In response to requested information item 2.(d)(v) in Generic Letter GL-2004-02, Appendix B of ANP-10293 Revision 0 states that “The impact of debris clogging downstream of the ECCS sump screens on ... fuel assemblies is expected to be negligible. An evaluation to support this conclusion is part of the U.S. EPR design process. This issue is to be addressed based on the results of industry consensus regarding confirmation of downstream effects.”

Provide the results from additional assessments and the resolution for the U.S. EPR based on the results of such industry consensus regarding confirmation of downstream effects on fuel assemblies, including inlet nozzle, grid spacers, and fuel rods related to requested information item 2.(d)(v) in Generic Letter GL-2004-02. In this regard, provide the basis for the resolution and explain the impact on the U.S. EPR FSAR and ANP-10293, if any.

Response to Question 15.06.05-45:

ANP-10293P, Appendix F, Section F.5.5 and Section F.5.6 will be revised to address the test results regarding confirmation of downstream effects on fuel assemblies. The update to ANP-10293P will be provided by separate letter.

FSAR Impact:

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

Technical Report Impact:

Technical Report ANP-10293P will be revised as described in the response.

Question 15.06.05-46:

Provide quantification of all types of debris generating/representing materials initially present in the U.S. EPR containment building along with sufficient evidence that the amounts assumed account in a conservative manner for any associated data uncertainties. Based on the amount and location of the identified debris generating/representing materials in the containment, determine and provide explanation of the critical LOCA conditions that will result in the maximum possible negative impact on the long-term coolability of the fuel assemblies. In particular, provide the amounts of generated debris of all possible types under the critical LOCA conditions determined, taking into account latent debris as well, and explain how the debris amounts, types, characteristics and flow conditions, along with limiting strainer response assumptions, lead to the most limiting downstream effects on the fuel. In assessing those effects, consider the impact of specific design characteristics and features of the U.S. EPR vessel and fuel assembly components, including inlet nozzle, grid spacers and fuel rods on the fluid flow and debris behavior in accounting for possible participating phenomena like chemical plate-out on fuel rod surfaces, blocking of core plates or fuel assembly inlet nozzles due to thin-bed or large fiber beds formation, localized hot spots formation due to fibers hanging up on fuel assembly grid spacer straps.

Response to Question 15.06.05-46:

ANP-10293P, Appendix C, Section C.5 will be revised to address the amount of materials initially present in containment inside a given zone of influence (ZOI). Section C.1 provides the critical LOCA conditions that result in the maximum possible negative impact on the long-term coolability of the fuel assemblies. Section C.6 discusses the various break locations and the debris generation amounts for each location.

ANP-10293P, Appendix D presents the potential amounts of chemical precipitates generated as a result of a LOCA.

Strainer response assumptions and testing results are presented in ANP-10293P, Appendix E.

ANP-10293P Appendix F, Section F.5 will be revised to provide a discussion of the downstream effects testing for the fuel assemblies and fuel assembly components. The debris and chemical precipitant values used for the downstream effects testing is based on bounding values presented in Appendix C and Appendix D.

The update to ANP-10293P will be provided by separate letter.

FSAR Impact:

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

Technical Report Impact:

Technical Report ANP-10293P will be revised as described in the response.

Question 15.06.05-47:

Provide a conservative estimate for the potential core inlet flow area blockage fraction in the U.S. EPR and assess the core cooling conditions versus the minimum core boil-off flow rate requirements. In assessing the core inlet flow area blockage, account for downstream effects associated with debris particulates, fibers and chemical reaction by-products entering into the reactor coolant system under the most limiting post-LOCA conditions in terms of debris ingress. Discuss associated possible effects from potential flow blockages and formation of flow restriction patterns within the core region itself, if any.

Response to Question 15.06.05-47:

ANP-10293P will be revised to include the following: The core inlet flow area blockage is summarized by the K/A^2 values and will be incorporated into ANP-10293P, Appendix F, Section F.5 based on the downstream effects testing performed for the U.S. EPR fuel assemblies. The debris and chemical precipitant quantities for the downstream effects testing is based on the debris generation amounts documented in ANP-10293P, Appendix C, Section C.6 and chemical precipitant amounts documented in ANP-10293, Appendix D, Section D.3.6.

The update to ANP-10293P will be provided by separate letter.

FSAR Impact:

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

Technical Report Impact:

Technical Report ANP-10293P will be revised as described in the response.

Question 15.06.05-49:

Demonstrate that the solids concentration in the downstream water of 10 ppm at 30 minutes into the test, as reported in ANP-10293 Revision 0, is representative for the worst U.S. EPR post-LOCA conditions in terms of downstream effects on the fuel in the core. Demonstrate how this experimental evidence can be scaled and applied to evaluate potential downstream effects considering the presence of debris particulates, fibers and chemical reaction by-products in the U.S. EPR reactor coolant system under post-LOCA conditions that lead to most limiting conditions in terms of downstream effects on the fuel. Explain why the independent review of the ANP-10293 Revision 0 did not address reported observations on downstream effects.

Response to Question 15.06.05-49:

The testing process for the downstream effects testing conservatively loaded all debris and chemicals that are expected for a given operating configuration during a LOCA (first total particulate, then fiber incrementally, and finally chemical incrementally). The addition sequence of the debris and chemicals is designed to maximize the differential pressure across the fuel assembly.

The downstream effects testing and results will be presented in revised ANP-10293P, Appendix F, Sections F.5.5 and F.5.6.

The update to ANP-10293P will be provided by separate letter.

FSAR Impact:

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

Technical Report Impact:

Technical Report ANP-10293P will be revised as described in the response.