

ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Monday, May 06, 2013 4:54 PM
To: Snyder, Amy
Cc: Miernicki, Michael; ANDERSON Katherine (EXTERNAL AREVA); DELANO Karen (AREVA); HONMA George (EXTERNAL AREVA); LEIGHLITER John (AREVA); LEWIS Ray (EXTERNAL AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); VANCE Brian (AREVA); ABAYAN Victor (AREVA); LOSEKE Brian (AREVA); ALCHAAR Nawar (AREVA); CORNELL Veronica (EXTERNAL AREVA)
Subject: Advanced Response to U.S. EPR Design Certification Application RAI No. 338, FSARCh. 3, Question 03.06.03-27
Attachments: RAI 338 Advanced Response Question 03.06.03-27 - US EPR DC.pdf

Amy,

Attached is an Advanced Response to RAI No.338, Question 03.06.03-27 in advance of the final response date of June 21, 2013.

To keep our commitment to send a final response to this question by the commitment date, we need to receive all NRC staff feedback and comments no later than **June 14, 2013**.

Please let me know if NRC staff has any questions or if this response can be sent as final.

Sincerely,

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

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

From: WILLIFORD Dennis (RS/NB)
Sent: Monday, May 06, 2013 2:46 PM
To: Amy.Snyder@nrc.gov
Cc: Michael.Miernicki@nrc.gov; ANDERSON Katherine (External AREVA NP INC.); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); HONMA George (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 338, FSARCh. 3, Supplement 2

Amy,

AREVA NP Inc. provided a schedule for the response to the one question in RAI No. 338 on January 18, 2010. AREVA NP submitted Supplement 1 on March 02, 2010, to provide a final response to Question 03.06.03-27.

As provided in AREVA NP Inc. letter NRC:13:012 dated April 12, 2013 which transmitted a Periodic Update to Closure Plans for Resolution of Open Items for U.S. EPR Design Certification Application, AREVA NP committed to provide NRC a revised schedule and response for Question 03.06.03-27.

The schedule for a technically correct and complete revised response to Question 03.06.03-27 is provided below.

Question #	Advanced Response Date	NRC Comment Request Date	Final Response Date
RAI 338 — 03.06.03-27	May 21, 2013	June 14, 2013	June 21, 2013

Sincerely,

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

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

From: BRYAN Martin (EXT)
Sent: Tuesday, March 02, 2010 11:23 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); WELLS Russell D (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 338, FSARCh. 3, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for the response to the one question in RAI No. 338 on January 18, 2010. As committed, the attached file, "RAI 338 Supplement 1 Response US EPR DC.pdf" provides a technically correct and complete response to the one question as committed.

The following table indicates the respective pages in the response document "RAI 338 Supplement 1 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 338 — 03.06.03-27	2	4

This concludes the formal AREVA NP response to RAI 338, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.
Tel: (434) 832-3016
Martin.Bryan.ext@areva.com

From: DUNCAN Leslie E (AREVA NP INC)
Sent: Monday, January 18, 2010 4:21 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 338, FSARCh. 3

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 338 Response US EPR DC.pdf," provides a schedule since a technically correct and complete response to the 1 question is not provided.

The following table indicates the respective pages in the response document, "RAI 338 Response US EPR DC.pdf," that contain AREVA NP's responses to the subject question.

Question #	Start Page	End Page
RAI 338 — 03.06.03-27	2	2

A complete answer is not provided for the 1 question. The schedule for a technically correct and complete response to this question is provided below.

Question #	Response Date
RAI 338 — 03.06.03-27	March 5, 2010

Sincerely,

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

From: Tesfaye, Getachew [<mailto:Getachew.Tesfaye@nrc.gov>]
Sent: Tuesday, December 15, 2009 1:46 PM
To: ZZ-DL-A-USEPR-DL
Cc: Reichelt, Eric; Terao, David; Patel, Jay; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 338 (4077), FSARCh. 3

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on December 6, 2009, and on December 15, 2009, 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 with the exception of typographical error correction in Draft RAI Question 03.08.04-8 identified by AREVA. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs, excluding the time period of **December 25, 2009 thru January 3, 2010, to account for the holiday season** as discussed with AREVA NP. For any RAIs that cannot be answered **within 40 days**, it is expected that a date for receipt of this information will be provided to the staff within the 40-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: 4430

Mail Envelope Properties (554210743EFE354B8D5741BEB695E6561554B5)

Subject: Advanced Response to U.S. EPR Design Certification Application RAI No. 338, FSARCh. 3, Question 03.06.03-27
Sent Date: 5/6/2013 4:54:29 PM
Received Date: 5/6/2013 4:54:38 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

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Files	Size	Date & Time	
MESSAGE	6186	5/6/2013 4:54:38 PM	
RAI 338 Advanced Response Question 03.06.03-27 - US EPR DC.pdf			304066

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal

Expiration Date:
Recipients Received:

Advanced Response to

**Request for Additional Information No. 338 (4077),
Question 03.06.03-27**

12/15/2009

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 03.06.03 - Leak-Before-Break Evaluation Procedures

Application Section: 03.06.03

**QUESTIONS for Component Integrity, Performance, and Testing Branch 1
(AP1000/EPR Projects) (CIB1)**

Question 03.06.03-27:**Follow-up Question to RAI No. 265, Question 03-06-03-24**

In response to RAI question 03.06.03-24, AREVA stated that the safety factor of 1.7 for dynamic loads to be applied for leak-before-break (LBB) of the main steam line will be revised to 2.0 due to a decrease in seismic loads based on the application of more accurate, but still conservative, methods of modal combinations as described in RG 1.92 Revision 2. Please provide an explanation as to how using RG 1.92 Revision 2, it was able to achieve the LBB dynamic safety factor of 2.0 for its main steam piping. Specifically, discuss which modal combination method was used previously and which modal combination was used that resulted in lower seismic loads. Also, provide a comparison of the seismic loads for both of these methods.

Response to Question 03.06.03-27:

The previous analysis for the main steam line (MSL) was performed using the Modal Response combination methods from RG 1.92, Revision 1. The specific combination method used was the "Ten Percent Method" for combination of closely spaced modes (see Section 1.2.2 of RG 1.92, Revision 1). This method applies a penalty for modal frequencies that are closely spaced (less than or equal to ten percent as defined in Section 1.1 of RG 1.92, Revision 1). The MSL analysis models all four loops for greater accuracy. As a result, there are many frequencies that fall within the category of "closely spaced modes" and, hence, a higher penalty on the modal responses.

The support configuration has also been modified to facilitate load reduction and stress qualification. This was not clarified in the Response to RAI 265, Question 03-06.03-24.

The revised analysis was performed using the updated modal combination methods discussed in RG 1.92, Revision 2. This revision of RG 1.92 includes improved methods for modal combinations. The method used for the revised seismic analysis of the MSL includes combining the periodic modal responses by "Complete Quadratic Combination" (CQC) (see Section 1.1 of RG 1.92, Revision 2) method with the modal correlation factor calculated by the "Rosenbleuth Correlation Coefficient" method (see Section 1.1.2 of RG 1.92, Revision 2). The "Gupta Method" (in Section 1.3.1 of RG 1.92, Revision 2) is used for the separation of periodic and rigid components of each response. The residual rigid response is evaluated by the "Missing Mass" method in Section 1.4.1 of RG 1.92, Revision 2.

The modal combination methods provided in RG 1.92, Rev.1 are conservative as stated in RG 1.92, Revision 2:

"Since the issuance of Revision 1 of Regulatory Guide 1.92 in 1976, research in the United States has resulted in improved methods for combining modal responses and spatial components that provide more accurate estimates of SSC seismic response, while reducing unnecessary conservatism."

A comparative plot of maximum moments versus the allowable load limit (ALL) curve for both analyses is provided in Figure 03.06.03-27-1. This plot provides a qualitative understanding of load reduction due to the changes in modal combination methods as well as the support configuration. The load points shown in the figure are for the highest loaded locations using the

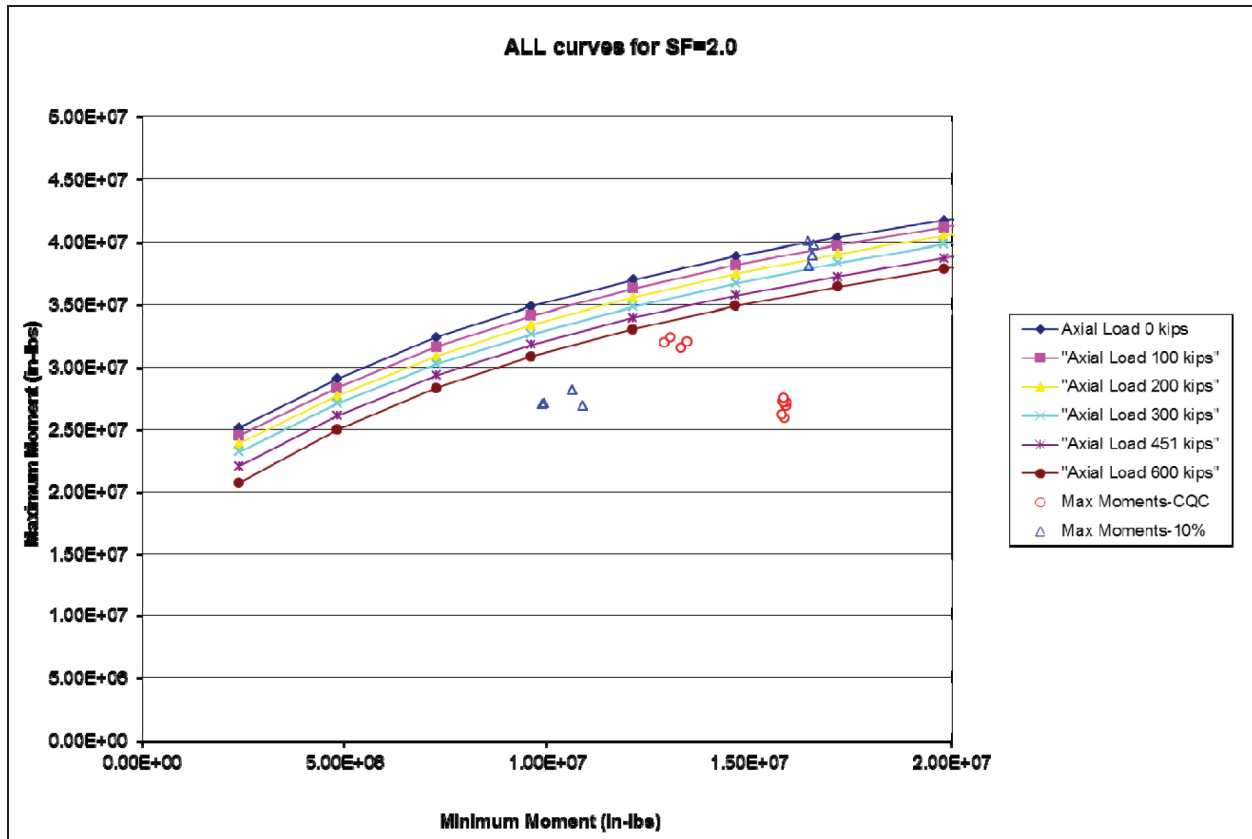
ten percent and the CQC methods. Since the load points are enveloped by the ALL curves, a safety factor of 2.0 provides acceptable results for the qualification of LBB for the MSL.

This response has been revised to update the comparison Figure 03.06.03-27-1 for the MSLs due to changes in the seismic analysis of the steam lines.

The RG 1.61 damping values for the Internal Concrete Structure and the Reactor Building have been modified to use OBE damping values for generation of in-structure response spectra as discussed in RAI 370, Question 03.07.01-27. The MSL analysis includes both of these structures in the analysis as boundary conditions for the pipe in the seismic event. Therefore, the response of the main steam pipe has changed as a result of the lower RG 1.61 damping values.

There are no changes to the modal combination methods used in the seismic analysis of the pipe as discussed in the response above. Figure 03.06.03-27-1 has been updated to reflect the new LBB loads comparison. The conclusion of the comparison remains unchanged; the MSL analysis is qualified for LBB.

Figure 03.06.03-27-1: Comparison of Load Points on the MSL for ALL with SF=2.0



FSAR Impact:

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