



October 20, 2009
NRC:09:107

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Response to U.S. EPR Design Certification Application RAI No. 215, Question 03.07.01-22

Ref. 1: E-Mail, Getachew Tesfaye (NRC) to Ronda Pederson, et al (AREVA NP Inc.),
U.S. EPR Design Certification Application RAI No. 215 (2560, 2561, 2565, 2588), FSAR Ch.
3," May 19, 2009

In Reference 1, the NRC provided a request for additional information (RAI) regarding the U.S. EPR design certification application (i.e., RAI No. 215). AREVA NP, Inc. (AREVA NP) is submitting a technically correct and complete response to the remaining question, RAI 215, Question 03.07.01-22.

The following table indicates the respective pages in the enclosure that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 215—03.07.01-22	2	3

This concludes the formal AREVA NP response to RAI 215, and there are no questions from this RAI for which AREVA NP has not provided responses.

AREVA NP considers some of the material contained in the enclosure to be proprietary. As required by 10 CFR 2.390(b), an affidavit is enclosed to support the withholding of the information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided. If you have any questions related to this submittal, please contact me. I may be reached by telephone at 434-832-2369 or by e-mail at sandra.sloan@areva.com.

Sincerely,

Sandra M. Sloan
Sandra M. Sloan, Manager
New Plants Regulatory Affairs
AREVA NP Inc.

Enclosures

cc: G. Tesfaye
Docket 52-020

D077
NRO

AREVA NP INC.
An AREVA and Siemens company

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Tel: (434) 832-3000 Fax: (434) 832-3840

requested qualifies under 10 CFR 2.390(a)(4) "Trade secrets and commercial or financial information".

6. The following criteria are customarily applied by AREVA NP to determine whether information should be classified as proprietary:

- (a) The information reveals details of AREVA NP's research and development plans and programs or their results.
- (b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.
- (c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for AREVA NP.
- (d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for AREVA NP in product optimization or marketability.
- (e) The information is vital to a competitive advantage held by AREVA NP, would be helpful to competitors to AREVA NP, and would likely cause substantial harm to the competitive position of AREVA NP.

The information in the Document is considered proprietary for the reasons set forth in paragraphs 6(b) and 6(c) above.

7. In accordance with AREVA NP's policies governing the protection and control of information, proprietary information contained in this Document has been made available, on a limited basis, to others outside AREVA NP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. AREVA NP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

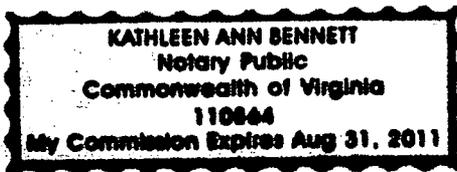
9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

Londa M Pedersen

SUBSCRIBED before me this 20th
day of October, 2009.

Kathleen A. Bennett

Kathleen A. Bennett
NOTARY PUBLIC, COMMONWEALTH OF VIRGINIA
MY COMMISSION EXPIRES: 8/31/2011



Response to

Request for Additional Information No. 215, Supplement 5

5/19/2009

U.S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 03.07.01 - Seismic Design Parameters

SRP Section: 03.07.02 - Seismic System Analysis

SRP Section: 03.07.03 - Seismic Subsystem Analysis

SRP Section: 03.12 - ASME Code Class 1, 2, and 3 Piping Systems and Piping

Components and Their Associated Supports

Application FSAR Ch. 3

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

QUESTIONS for AP1000 Projects Branch 1 (NWE1)

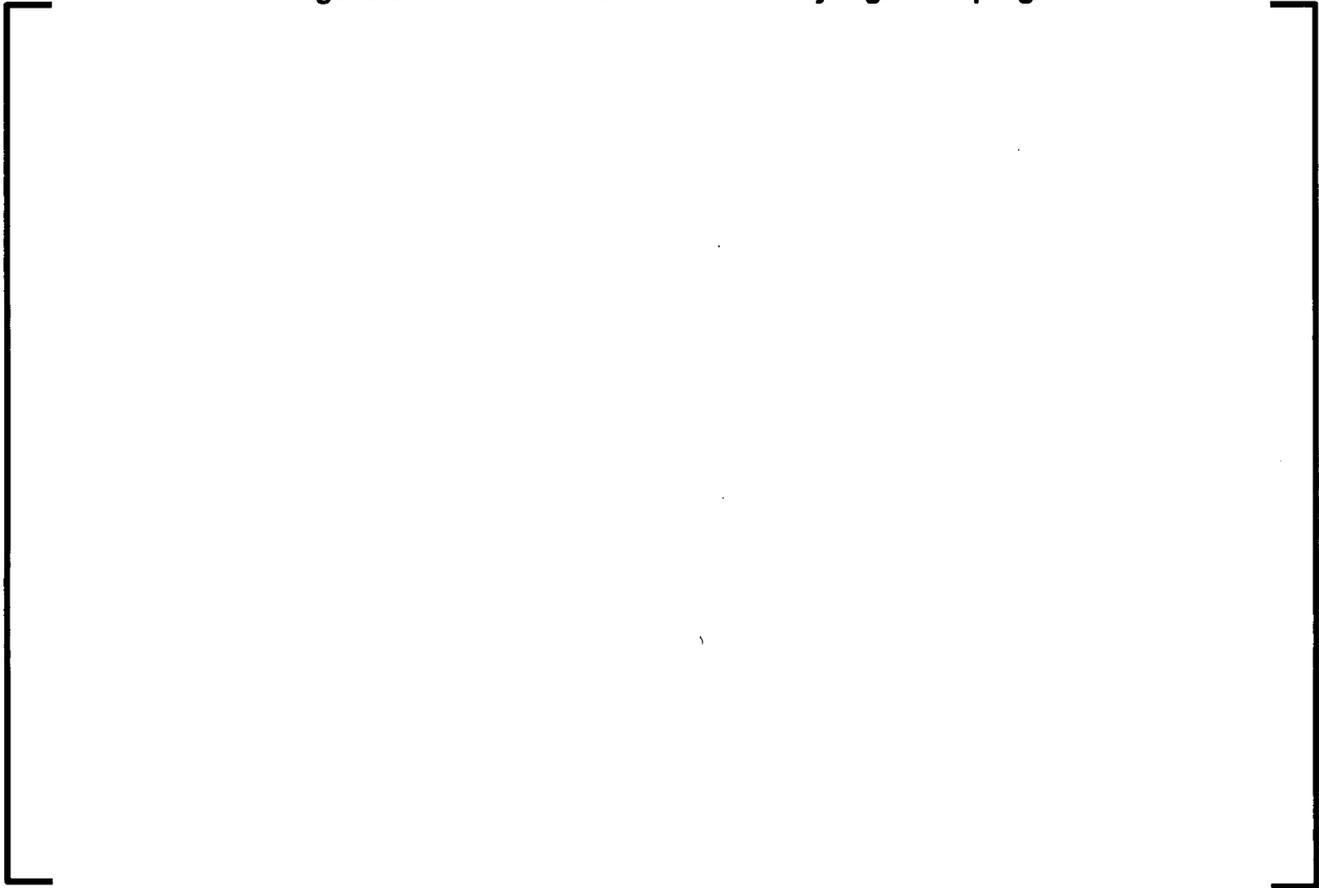
Question 03.07.01-22:**Follow-Up RAI to Question 03.07.01-14:**

In the computation of the magnitude of Rayleigh mass and stiffness weighted damping appropriate for a given analysis, the behavior over a given frequency range is typically evaluated to generate an effective damping to use in the numerical calculations. The magnitude of the assumed effective damping modulus impacts the magnitude of the computed responses. As the nonlinear analysis does not specifically calculate system frequencies, it is not clear how the Rayleigh mass and stiffness weighted damping matrix was computed for numerical computation. The applicant is requested to describe in the FSAR the computation method, equation, damping values, and assumptions used in determining the Rayleigh mass and stiffness weighting damping coefficients which are applied in the direct step-by-step integration analysis.

Response to Question 03.07.01-22:

The computation methods, equations, damping values, and assumptions used to determine Rayleigh mass and stiffness damping coefficients, specific to the reactor coolant system (RCS), are provided in U.S. EPR FSAR Tier 2, Appendix 3C. In U.S. EPR FSAR Tier 2, Figure 3C-9, two curves of damping value as a function of frequency are presented: Rayleigh and Modal. The Modal curve is produced (in accordance with RG 1.61, Revision 1) with a linear model to get a set of natural frequencies with associated damping values. Figure 3.7.1-22-1 shows Modal curve numerical values for the frequency and damping scales. The range of frequencies plotted is sufficient to address significant modal contributions for RCS components. The Rayleigh curve is produced using the equation in U.S. EPR FSAR Tier 2, Section 3C-1.1 with alpha and beta values that result in conservatively lower values of damping than the corresponding Modal for most of the lower frequencies within the range.

Figure 3.7.1-22-1—Modal Mass vs. Rayleigh Damping



FSAR Impact:

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