ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Thursday, February 19, 2009 6:46 PM
To: Getachew Tesfaye
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); VAN NOY Mark (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 109, Supplement 2
Attachments: RAI 109 Supplement 2 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided responses to 4 of the 7 questions of RAI No. 109 on December 15, 2008. AREVA NP submitted Supplement 1 to the response on February 13, 2009 to address 2 of the remaining 3 questions. The attached file, "RAI 109 Supplement 2 Response US EPR DC.pdf," provides technically correct and complete responses to the remaining question.

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 109 Supplement 2, Question 03.05.01.03-2.

The following table indicates the respective pages in the response document, "RAI 109 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 109 — 03.05.01.03-2	2	4

This concludes the formal AREVA NP response to RAI 109 and there are no questions from this RAI for which AREVA NP has not provided responses.

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
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From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, February 13, 2009 5:30 PM
To: 'Getachew Tesfaye'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); VAN NOY Mark (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 109, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 4 of the 7 questions of RAI No. 109 on December 15, 2008. The attached file, "RAI 109 Supplement 1 Response US EPR DC.pdf," provides technically correct and complete responses to 2 of the remaining 3 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 109 Supplement 1 Question 03.05.01.01-1, and 03.05.01.02-1.

The following table indicates the respective pages in the response document, "RAI 109 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 109 — 03.05.01.01-1	2	6
RAI 109 — 03.05.01.02-1	7	8

A complete answer is not provided for 1 of the 7 questions. The schedule for a technically correct and complete response to the remaining question is unchanged and provided below:

Question #	Response Date
RAI 109 — 03.05.01.03-2	February 20, 2009

Sincerely,

Ronda Pederson
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From: WELLS Russell D (AREVA US)
Sent: Monday, December 15, 2008 7:30 PM
To: 'Getachew Tesfaye'
Cc: 'John Rycyna'; Pederson Ronda M (AREVA US); BENNETT Kathy A (OFR) (AREVA US); DELANO Karen V (AREVA US)
Subject: Response to U.S. EPR Design Certification Application RAI No. 109, FSAR Ch 3

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 109 Response US EPR DC.pdf" provides technically correct and complete responses to 4 of the 7 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 109 Questions 03.04.01-1, 03.04.01-2, 03.04.01-3, 03.05.01.01-1, and 03.05.01.02-1.

The following table indicates the respective pages in the response document, "RAI 109 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 109 — 03.04.01-1	2	2
RAI 109 — 03.04.01-2	3	3
RAI 109 — 03.04.01-3	4	5
RAI 109 — 03.05.01.01-1	6	9
RAI 109 — 03.05.01.02-1	10	11
RAI 109 — 03.05.01.03-2	12	12
RAI 109 — 03.05.01.03-3	13	14

A complete answer is not provided for 3 of the 7 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 109 — 03.05.01.01-1.a	February 13, 2009
RAI 109 — 03.05.01.01-1.c	February 13, 2009
RAI 109 — 03.05.01.01-1.e	February 13, 2009
RAI 109 — 03.05.01.01-1.g	February 13, 2009
RAI 109 — 03.05.01.02-1.b	February 13, 2009
RAI 109 — 03.05.01.03-2.a	February 20, 2009
RAI 109 — 03.05.01.03-2.b	February 20, 2009
RAI 109 — 03.05.01.03-2.c	February 20, 2009
RAI 109 — 03.05.01.03-2.d	February 20, 2009

Sincerely,

(Russ Wells on behalf of)

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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, November 14, 2008 10:31 AM
To: ZZ-DL-A-USEPR-DL
Cc: Chang Li; Stephen Campbell; David Shum; John Segala; John Honcharik; David Terao; Michael Miernicki; Joseph Colaccino; John Rycyna; Tarun Roy
Subject: U.S. EPR Design Certification Application RAI No. 109 (1523, 1524,1525, 1128, 1129, 1419), FSAR Ch. 3

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 20, 2008, and discussed with your staff on November 4, 2008. No change was made to the draft RAI as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to

the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

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

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 230

Mail Envelope Properties (5CEC4184E98FFE49A383961FAD402D31B0D71D)

Subject: Response to U.S. EPR Design Certification Application RAI No. 109, Supplement 2
Sent Date: 2/19/2009 6:46:24 PM
Received Date: 2/19/2009 6:46:30 PM
From: Pederson Ronda M (AREVA NP INC)

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Files	**Size**	**Date & Time**
MESSAGE	6510	2/19/2009 6:46:30 PM
RAI 109 Supplement 2 Response US EPR DC.pdf	171235	

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

Response to

Request for Additional Information No. 109 Supplement 2

11/14/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.04.01 - Internal Flood Protection for Onsite Equipment Failures
SRP Section: 03.05.01.01 - Internally Generated Missiles (Outside Containment)
SRP Section: 03.05.01.02 - Internally Generated Missiles (Inside Containment)
SRP Section: 03.05.01.03 - Turbine Missiles
Application Section: FSAR Ch. 3

QUESTIONS for Balance of Plant Branch 2 (ESBWR/ABWR) (SBPB)
QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

Question 03.05.01.03-2:

The U.S. EPR FSAR, Tier 2 Section 3.5.1.3 states that all safety-related structures, except for two of the four essential service water buildings (ESWBs) and a portion of one of the four emergency power Generating buildings (EPGBs) are located outside of the low-trajectory missile strike zone, as defined in RG 1.115. Therefore, the U.S. EPR FSAR considers the turbine generator is favorably positioned, because most of the safety-related SSCs are located outside the low-trajectory missile strike zone. In addition, the supporting turbine missile analysis evaluates that the probability of a turbine missile being ejected will be less than 1 $x10^{-4}$. Based on this information, provide the following to ensure that safety-related structures, systems and components are protected against missiles in accordance with GDC 4 of 10 CFR Part 50, Appendix A:

a. Discuss in detail how the turbine generator is favorably positioned when the ESWBs and the EPGBs are considered safety-related structures and systems (which are used to safely shutdown and maintain the reactor in a safe shutdown condition) and are located in the low-trajectory missile strike zone. Otherwise, the turbine generator should be considered in an unfavorable position in accordance with RG 1.115, and the probability of turbine failure resulting in ejection of turbine rotor fragments (P1) should be less than 1 x 10^{-5} in lieu of 1 $x10^{-4}$.

b. It appears from Figure 2.1.2-1 in Tier 1 of the U.S. EPR FSAR that more than one EPGB may be within the low-trajectory missile strike zone. Which EPGB is located in the low-trajectory missile strike zone, and discuss why the other EPGBs are not considered in the low-trajectory missile strike zone.

c. Since ESWBs 3 and 4 are in the low-trajectory missile strike zone, discuss whether the reactor can be shutdown and maintained in a safe condition with ESWBs 1 and 2 only?

d. Since the switch-gear building (SWGB) is adjacent to the turbine building and in the low-trajectory missile strike zone, discuss how a turbine missile strike in the SWGB would affect safety-related components and systems (e.g., offsite power buses, etc.) that could prevent the reactor from being safely shutdown and maintained in a safe condition.

Response to Question 03.05.01.03-2:

a. SRP Section 3.5.1.3 Acceptance Criteria 1 states that a favorable turbine orientation has the containment and all, or almost all, safety-related SSC located outside the turbine low-trajectory hazard zone.

   As stated in U.S. EPR FSAR, Tier 2, Section 3.5.1.3, almost all of the U.S. EPR safety-related SSC are located outside the low-trajectory zone. In addition, the U.S. EPR has four redundant divisions, each of which is capable of bringing the reactor to safe shut down and maintaining it in safe shutdown condition, as stated in U.S. EPR FSAR, Tier 2, Section 1.2.3.1.1. Thus, having a turbine orientation with one EPGB and two ESWBs within the turbine low-trajectory strike zone is acceptable.

b. U.S. EPR FSAR, Tier 2, Section 3.5.1.3 will be revised to read:

   "The axis of the turbine rotor shafts is positioned such that safety-related structures, except for two of the four ESWBs and two of the four EPGBs, are located outside the turbine low-trajectory hazard zone, as defined by RG 1.115."

Figure 1 shows the Regulatory Guide 1.115 (Revision 1) Low-Trajectory Turbine Missile Strike Zone superimposed on the U.S. EPR plot plan. As indicated, the strike zone intercepts the northwest corner of the 2UBP fuel tank enclosure and the northeast corner of the 3UBP fuel tank enclosure. Both 1UBP and 4UBP are outside the strike zone.

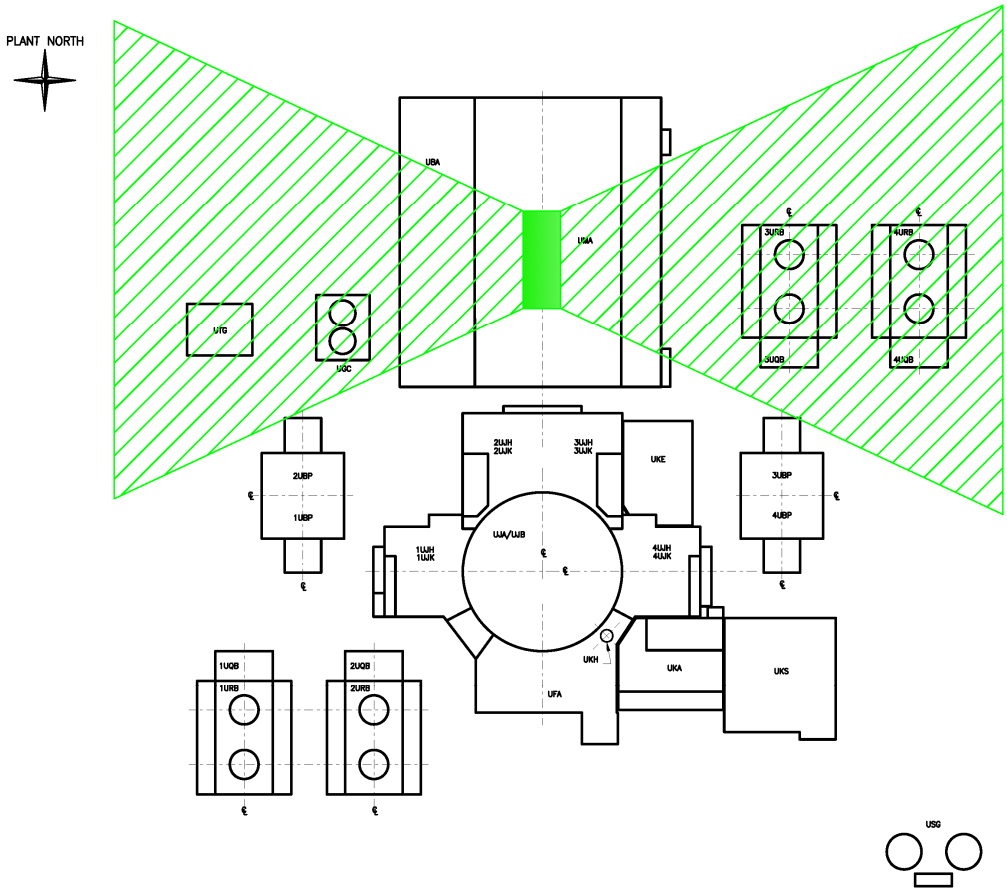

Figure 03.05.01.03-2-1—Low-Trajectory Turbine Missile Strike Zone

c. Two of the four divisions remain available and each division is capable of performing the necessary safety functions, as stated in U.S. EPR FSAR, Tier 2, Section 1.2.3.1.1.

d. The switch gear building and all of its systems and components are not safety-related, as stated in U.S. EPR FSAR, Tier 2, Table 3.2.2-1.

FSAR Impact:

U.S. EPR FSAR, Tier 2, Section 3.5.1.3 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

a CRDM nozzle flange or pressure housing thereby providing adequate protection of other SSC inside containment.

Therefore, ~~SSCs~~SSC inside containment are designed to withstand a postulated CRDM missile, even though this event is deemed non-credible.

A combined license (COL) applicant that references the U.S. EPR design certification will describe controls to confirm that unsecured maintenance equipment, including that required for maintenance and that are undergoing maintenance, will be removed from containment prior to operation, moved to a location where it is not a potential hazard to ~~SSCs~~SSC important to safety, or seismically restrained to prevent it from becoming a missile.

3.5.1.3 Turbine Missiles

03.05.01.03-2

The plant layout, as shown in Figure 1.2-1 in Section 1.2, is a longitudinal arrangement for the turbine generators. The axis of the turbine rotor shafts is positioned such that safety-related structures, except for two of the four ESWBs and ~~a portion of one~~two of the four EPGBs, are located outside ~~of~~ the turbine low-trajectory hazard zone ~~for the turbine~~, as defined by RG 1.115. Redundancy of the UHS and ESW systems and the EDGs provides adequate protection for U.S. EPR safety-related systems. Therefore, the turbine generator is favorably positioned, as defined by NUREG-0800 (Reference 10) Standard Review Plan Section 3.5.1.3, because the containment and most of the safety-related ~~SSCs~~SSC are located outside the low-trajectory hazard zone defined by RG 1.115.

Section 10.2 describes the design of the turbine generator. The probability of turbine failure resulting in ejection of the turbine rotor (or internal structure) fragments through the turbine casing, P_1, will be less than 1×10^{-4}. In accordance with guidance provided by Reference 10, Standard Review Plan Section 3.5.1.3, Table 3.5.1.3-1, an overall turbine missile safety objective for the probability of unacceptable damage resulting from turbine missiles, P_4, of less than 1×10^{-7} is satisfied with P_1 less than 1×10^{-4} for favorably oriented turbine-generators. Therefore, given the redundancy and the low probability of a turbine missile being generated, the impact of turbine-generated missiles on safety-related ~~SSCs~~SSC is not safety significant. A COL applicant that references the U.S. EPR design certification will confirm the evaluation of the probability of turbine missile generation for the selected turbine generator, P_1, is less than 1×10^{-4} for turbine-generators favorably oriented with respect to containment.

Section 10.2 describes requirements for disk and rotor integrity, rotor material fracture toughness, overspeed protection, inspection, testing, examination, startup procedures, operation procedures, and maintenance of the turbine generator equipment. A COL applicant that references the U.S. EPR design certification will assess the effect of