

ArevaEPRDCPEm Resource

From: WELLS Russell D (AREVA NP INC) [Russell.Wells@areva.com]
Sent: Tuesday, January 27, 2009 6:07 PM
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. 111, FSAR Ch 6, Supplement 1
Attachments: RAI 111 Supplement 1 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided responses to 6 of the 10 questions of RAI No. 111 on December 3, 2008. The attached file, "RAI 111 Supplement 1 Response US EPR DC.pdf" provides a technically correct and complete response to portions of 2 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 111 Supplement 1 US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 111—06.02.02-8I.13	2	2
RAI 111—06.02.02-8K11	3	3
RAI 111—06.02.02-17.2	4	4

The schedule for technically correct and complete responses to the remaining RAI No. 111 questions is unchanged and is provided below:

Question #	Response Date
RAI 111—06.02.02-8A3	June 23, 2009
RAI 111—06.02.02-8A4	June 23, 2009
RAI 111—06.02.02-8C1	April 1, 2009
RAI 111—06.02.02-8C2	April 1, 2009
RAI 111—06.02.02-8C5b	April 1, 2009
RAI 111—06.02.02-8C5e	April 1, 2009
RAI 111—06.02.02-8D2	March 1, 2009
RAI 111—06.02.02-8D4	March 1, 2009
RAI 111—06.02.02-8E1	February 15, 2009
RAI 111—06.02.02-8E4	February 15, 2009
RAI 111—06.02.02-8G	June 23, 2009
RAI 111—06.02.02-8H13	March 1, 2009
RAI 111—06.02.02-8H15-19	March 1, 2009
RAI 111—06.02.02-8I.3	March 15, 2009
RAI 111—06.02.02-8I.7-10	March 15, 2009
RAI 111—06.02.02-8J1	March 15, 2009
RAI 111—06.02.02-8K1	March 15, 2009
RAI 111—06.02.02-8K2	March 15, 2009
RAI 111—06.02.02-8K6	March 15, 2009
RAI 111—06.02.02-8K10	March 15, 2009
RAI 111—06.02.02-8K14	April 1, 2009
RAI 111—06.02.02-9	April 15, 2009

Question #	Response Date
RAI 111—06.02.02-11	April 15, 2009
RAI 111—06.02.02-17.1	April 1, 2009

Sincerely,

(Russ Wells on behalf of)

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

New Plants Deployment

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: WELLS Russell D (AREVA NP INC)

Sent: Wednesday, December 03, 2008 6:14 PM

To: 'Getachew Tesfaye'

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

Subject: Response to U.S. EPR Design Certification Application RAI No. 111, FSAR Ch 6

Getachew,

The proprietary and non-proprietary versions of the response to RAI No. 111 are submitted via AREVA NP Inc. letter, "Response to U.S. EPR Design Certification Application RAI No. 111" NRC 08:094, dated December 3, 2008. An affidavit to support withholding of information from public disclosure, per 10CFR2.390(b), is provided as an enclosure to that letter.

The following table indicates the respective pages in the response document, "Response to U.S. EPR Design Certification Application RAI No. 111," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 111 — 06.02.02-8 A-K	2	36
RAI 111 — 06.02.02-9	37	37
RAI 111 — 06.02.02-10	38	38
RAI 111 — 06.02.02-11	39	39
RAI 111 — 06.02.02-12	40	40
RAI 111 — 06.02.02-13	41	41
RAI 111 — 06.02.02-14	42	42
RAI 111 — 06.02.02-15	43	43
RAI 111 — 06.02.02-16	44	44
RAI 111 — 06.02.02-17	45	45

The schedule for technically correct and complete responses to the remaining RAI No. 111 questions is provided below:

Question #	Response Date
RAI 111—06.02.02-8A3	June 23, 2009
RAI 111—06.02.02-8A4	June 23, 2009

Question #	Response Date
RAI 111—06.02.02-8C1	April 1, 2009
RAI 111—06.02.02-8C2	April 1, 2009
RAI 111—06.02.02-8C5b	April 1, 2009
RAI 111—06.02.02-8C5e	April 1, 2009
RAI 111—06.02.02-8D2	March 1, 2009
RAI 111—06.02.02-8D4	March 1, 2009
RAI 111—06.02.02-8E1	February 15, 2009
RAI 111—06.02.02-8E4	February 15, 2009
RAI 111—06.02.02-8G	June 23, 2009
RAI 111—06.02.02-8H13	March 1, 2009
RAI 111—06.02.02-8H15-19	March 1, 2009
RAI 111—06.02.02-8I.3	March 15, 2009
RAI 111—06.02.02-8I.7-10	March 15, 2009
RAI 111—06.02.02-8I.13	February 1, 2009
RAI 111—06.02.02-8J1	March 15, 2009
RAI 111—06.02.02-8K1	March 15, 2009
RAI 111—06.02.02-8K2	March 15, 2009
RAI 111—06.02.02-8K6	March 15, 2009
RAI 111—06.02.02-8K10	March 15, 2009
RAI 111—06.02.02-8K11	February 1, 2009
RAI 111—06.02.02-8K14	April 1, 2009
RAI 111—06.02.02-9	April 15, 2009
RAI 111—06.02.02-11	April 15, 2009
RAI 111—06.02.02-17.1	April 1, 2009
RAI 111—06.02.02-17.2	February 1, 2009

Sincerely,

(Russ Wells on behalf of)

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

New Plants Deployment

AREVA NP Inc.

An AREVA and Siemens company

3315 Old Forest Road

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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]

Sent: Monday, November 03, 2008 4:31 PM

To: ZZ-DL-A-USEPR-DL

Cc: Clinton Ashley; Walton Jensen; Christopher Jackson; Charles Hammer; David Terao; Michael Miernicki; Joseph Colaccino; John Rycyna; James Steckel

Subject: U.S. EPR Design Certification Application RAI No. 111 (1446, 1471,1508), FSAR Ch. 6

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 3, 2008. Draft RAI Questions 06.02.02-8 (C)(7) was deleted 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: 157

Mail Envelope Properties (1F1CC1BBDC66B842A46CAC03D6B1CD410106D505)

Subject: Response to U.S. EPR Design Certification Application RAI No. 111, FSAR Ch
6, Supplement 1
Sent Date: 1/27/2009 6:07:04 PM
Received Date: 1/27/2009 6:07:06 PM
From: WELLS Russell D (AREVA NP INC)

Created By: Russell.Wells@areva.com

Recipients:

"Pederson Ronda M (AREVA NP INC)" <Ronda.Pederson@areva.com>

Tracking Status: None

"BENNETT Kathy A (OFR) (AREVA NP INC)" <Kathy.Bennett@areva.com>

Tracking Status: None

"DELANO Karen V (AREVA NP INC)" <Karen.Delano@areva.com>

Tracking Status: None

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Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	Size	Date & Time
MESSAGE	6377	1/27/2009 6:07:06 PM
RAI 111 Supplement 1 Response US EPR DC.pdf		81075

Options

Priority: Standard

Return Notification: No

Reply Requested: No

Sensitivity: Normal

Expiration Date:

Recipients Received:

Response to

Request for Additional Information No. 111, Supplement 1

11/03/2008

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 06.02.02 - Containment Heat Removal Systems

Application Section: FSAR Ch. 6

**QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects)
(SPCV)**

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

Question 06.02.02-8:

In ANP-10293, dated February 2008, the applicant assesses the U.S. EPR design with respect to RG 1.82 Revision 3 (November 2003). All reference material, used in development of ANP-10293, was published prior to September 2004. Since September 2004, substantial experimental and analytical work has been performed to address the resolution of GSI-191. In December 2004, in an effort to aid resolution of Generic Safety Issue (GSI)-191, "Assessment of Debris Accumulation on PWR Sump Performance," (issued in September 1996), the NRC staff evaluated industry guidance to resolve GSI-191 that was submitted through NEI. The NEI submission, as approved in accordance with the staff safety evaluation, provides an acceptable overall guidance methodology for evaluation of emergency core cooling system (ECCS) performance following any postulated accident for which ECCS recirculation is required, with specific attention given to the potential for debris accumulation that could impede or prevent the ECCS from performing its intended safety functions.

The applicants' submittal (FSAR) and the subsequent technical report (ANP-10293) provided the staff with a high level overview of sump design features and selected results. However, in accordance with available guidance, more details are needed on AREVA's methods and evaluation techniques, selected to meet NRC's regulations, in order to complete an evaluation of emergency core cooling system (ECCS) performance following any postulated accident for which ECCS recirculation is required, with specific attention given to the potential for debris accumulation that could impede or prevent the ECCS from performing its intended safety functions. As such, several areas require additional information or clarification and form the basis for the following RAIs.

In each area below, the level of detail provided should include a summary, with information needed to address the area, description of the methodology used to reach the conclusion, basis for methods and key assumptions not consistent with NRC-approved guidance, and sufficient information to show correct application of any NRC-approved guidance.

I. NPSH

The applicant in Table 3-2 of ANP-10293 provides the NPSH assessment. More details are necessary for the staff to reach a conclusion.

13. Specify the containment accident pressure (value and units) selected in the NPSH analysis.

K. DCD Section 6.2 and 6.3 and ANP-10293 questions related to GSI-191.

11. Table 6.3-4—IRWST Design Parameters lists ceiling area, wall area, and bottom area. Please explain the area difference between the IRWST bottom ~ 5800 ft² and the ceiling ~ 1800 ft².

Response to Question 06.02.02-8 (I) – NPSH:

13. The net positive suction head (NPSH) analysis utilized a containment pressure of Psat (14.7 psia) at an in-containment refueling water storage tank (IRWST) temperature (212 degrees F).

FSAR Impact:

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

Response to Question 06.02.02-8 (K) - DCD Section 6.2 and 6.3 and ANP-10293 questions related to GSI-191:

11. U.S. EPR FSAR, Tier 2, Table 6.3-4—IRWST Design Parameters lists the IRWST bottom area and ceiling area as ~5800 ft² and ~1800 ft², respectively. These areas relate to the surface areas for the fluid wetted parts (i.e., lined with stainless steel plate). The difference in the two areas is attributable to the configuration and physical layout of the IRWST. The IRWST ceiling areas are at two elevations. The ceiling area at elevation -9.5 ft (~1800 ft²) is lower in elevation than the upper most surface area of the IRWST and the lower ceiling area is wetted.

FSAR Impact:

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

Question 06.02.02-17:Containment Atmospheric Circulation System
FSAR Section 6.2.2

2. The containment circulation dampers are described as being opened by motors and a spring in ANP-10268P or by solenoid operated actuators (FSAR Section 6.2.5). The pressure required for opening is stated to be 0.5 psid or 17 psia in FSAR Section 6.2.5. In the response to RAI No. 1 Table 6.2.1-07-3, the opening differential pressure is stated to be 7.252 psi. In the response to RAI No. 40 Table 06.02-11-3, the opening differential pressure is stated to be 7.25 psi. The MAAP4 input deck which Areva provided to the NRC staff uses opening differential pressures of 7.0 psi. The NRC staff understands that the actual opening differential pressure is 0.7 psi. Describe the design of the dampers including the opening mechanism and the design opening pressure. Provide appropriate corrections to the information previously provided to the NRC staff.

Response to Question 06.02.02-17:

2. AREVA NP submitted Supplement 2 Response to RAI 1 Question 6.2.1-07 on December 19, 2008, which supersedes the original Response to RAI 1 Question 6.2.1-07 and revises U.S. EPR FSAR, Tier 2, Table 6.2.5-1. Therefore, refer to the information provided in the supplemental response regarding containment foils and dampers.

The dampers are equipped with actuators following the fail-safe-open principle and loss of coolant accident (LOCA) proofed position indicators. The design is similar to those used as fire dampers or in HVAC systems. The actuator operates the damper normally. When the damper is closed, a spring is compressed which is held in the loaded position by a solenoid brake. In case of power failure to the solenoid, the spring drives the actuator and damper without any external energy supply to the safety position "OPEN". Once power is restored, the actuator becomes available for normal operation. The associated dashpot controls the spring speed and ensures a safe and widely shock-free closing and opening of the damper.

The hydrogen mixing dampers open by passive means if criteria indicating LOCA or severe accident situations are met:

- Differential pressure threshold exceeded to ensure opening also in case of unintentional open rupture foil device (single failure) at a $\Delta p = 35$ mbar (0.5 psi) in case of small break loss of coolant accident (SB-LOCA).
- Absolute pressure threshold exceeded $p = 1.2$ bar abs (17.4 psia).

FSAR Impact:

No further FSAR Impact. U.S. EPR FSAR, Tier 2, Table 6.2.5-1 will be revised as described in the Supplement 2 Response to RAI 1, Question 6.2.1-07.