

ArevaEPRDCPEm Resource

From: DUNCAN Leslie E (AREVA NP INC) [Leslie.Duncan@areva.com]
Sent: Thursday, February 11, 2010 11:11 AM
To: Tesfaye, Getachew
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 242, FSAR Ch 6, Supplement 3
Attachments: RAI 242 Supplement 3 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for responding to RAI No. 242 on July 14, 2009, and provided revised schedules on October 8, 2009 and December 1, 2009. The attached file, "RAI 242 Supplement 3 Response US EPR DC.pdf," provides a technically correct and complete response to the 1 remaining question, as committed.

The following table indicates the pages in the response document, "RAI 242 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 242 — 06.02.02-31	2	4

This concludes the formal AREVA NP response to RAI 242, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

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

From: WELLS Russell D (AREVA NP INC)
Sent: Tuesday, December 01, 2009 7:18 AM
To: 'Getachew Tesfaye'; 'Michael Miernicki'
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. 242, FSAR Ch 6, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for responding to RAI 242 on July 14, 2009 and provided a revised schedule on October 08, 2009.

The schedule for a technically correct and complete response to the remaining question has been revised and is provided below. Examination of the subject area identified the need for additional evaluation, which remains in process.

Question #	Response Date
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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: Pederson Ronda M (AREVA NP INC)

Sent: Thursday, October 08, 2009 4:39 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. 242, FSARCh. 6, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for responding to RAI 242 on July 14, 2009.

The schedule for a technically correct and complete response to the remaining question has been revised and is provided below. Examination of the subject area identified the need for additional evaluation, which remains in process.

Question #	Response Date
RAI 242 — 06.02.02-31	December 10, 2009

Sincerely,

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

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Phone: 434-832-3694

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From: Pederson Ronda M (AREVA NP INC)

Sent: Tuesday, July 14, 2009 9:50 AM

To: 'Tefsaye, 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. 242 (2974), FSARCh. 6

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 242 Response US EPR DC.pdf" provides 0 responses to the 1 question.

The following table indicates the respective pages in the response document, "RAI 242 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 242 — 06.02.02-31	2	3

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 242 — 06.02.02-31	October 14, 2009

Sincerely,

Ronda Pederson

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

Sent: Monday, June 15, 2009 8:24 PM

To: ZZ-DL-A-USEPR-DL

Cc: Ashley, Clinton; Jackson, Christopher; Carneal, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource

Subject: U.S. EPR Design Certification Application RAI No. 242 (2974), FSARCh. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on June 5, 2009, and on June 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. 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: 1134

Mail Envelope Properties (F322AA625A7A7443A9C390B0567503A10193AF3B)

Subject: Response to U.S. EPR Design Certification Application RAI No. 242, FSAR Ch 6,
Supplement 3
Sent Date: 2/11/2010 11:10:49 AM
Received Date: 2/11/2010 11:11:04 AM
From: DUNCAN Leslie E (AREVA NP INC)

Created By: Leslie.Duncan@areva.com

Recipients:

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

Tracking Status: None

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

Tracking Status: None

"ROMINE Judy (AREVA NP INC)" <Judy.Romine@areva.com>

Tracking Status: None

"GUCWA Len T (EXT)" <Len.Gucwa.ext@areva.com>

Tracking Status: None

"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>

Tracking Status: None

Post Office: AUSLYNCMX01.adom.ad.corp

Files	Size	Date & Time
MESSAGE	5658	2/11/2010 11:11:04 AM
RAI 242 Supplement 3 Response US EPR DC.pdf		66257

Options

Priority: Standard

Return Notification: No

Reply Requested: No

Sensitivity: Normal

Expiration Date:

Recipients Received:

Response to

Request for Additional Information No. 242 (2947), Supplement 3, Revision 0

6/15/2009

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 06.02.02 - Containment Heat Removal Systems

Application Section: 6.3.2.2.2 and 6.5.3.1 and 15.0.3.12

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

Question 06.02.02-31:

This question is a follow-up question to RAI 111, question 06.02.02-8K3 and question 06.02.02-8K6

For its evaluation of the offsite radiological consequences, the applicant is using the guidance of RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," as indicated in DCD Tier 2 Table 1.9-2—"U.S. EPR Conformance with Regulatory Guides," and DCD Tier 2 Section 15.0.3. Appendix A Item 2 to RG 1.183 identifies the need for the containment sump pH to be greater than 7.0 for the assumptions for iodine speciation in the regulatory guide to remain valid, thus preventing iodine re-evolution.

RAI 06.02.02-8K3 response states:

"The tri-sodium phosphate (TSP) baskets are located in the containment heavy floor opening below the IRWST trash racks. Figure 06.02.02-8-2 shows the location of the TSP basket for each of the four heavy floor openings and its relation to the ECCS sump blockage mitigation design features."

RAI 06.02.02-8K6 response states:

"...if a break occurs in the pressurizer compartment, the loss of coolant accident (LOCA) water would drain down to the steam generator blowdown system (SGBS) rooms, flow to the annular space, and drain into the small compartments of the double compartment retaining baskets."

From the above RAI responses, it appears that a LOCA could occur and result in break water bypassing the heavy floor and TSP baskets. Therefore, the staff is concerned that the water from a break in the pressurizer compartment would not interact with the chemical buffering agent.

Further, it is unclear to the staff if there are other postulated pipe breaks for which the break flow would bypass the heavy floor openings and the TSP baskets. It is also unclear to the staff the extent of the areas of the containment that do not drain to the IRWST resulting in retained pools of water or "hold up volumes." The water in these hold up volumes would likely not be buffered so could have a pH below 7.0, which would need to be accounted for in the analysis of radiological consequences.

Requested Information

1. Describe how the US-EPR design controls sump (IRWST) pH under all design basis accident conditions. For example, in the event of a pipe break in the pressurizer compartment, how would the buffer be dissolved since the leakage flow path appears to bypass the heavy floor openings where the TSP baskets are located.
2. List and describe all postulated pipe breaks in which the flow from the break would bypass the heavy floor opening and therefore bypass the TSP baskets. In the event of such breaks that bypass the TSP baskets, describe the resulting pH of the IRWST water and the effect on the radiological consequence analyses.
3. Provide a numerical estimate (volume) of the volume of water that would be retained in areas of the containment that do not drain to the IRWST (hold-up volumes or ineffective

pools). In the response discuss the amount of expected holdup in the reactor cavity and refueling cavity.

4. Provide a numerical estimate of the pH of the various hold-up volumes and the effect on the radiological consequence analyses.

Provide a numerical estimate of the pH of the various hold-up volumes and the effect on the radiological consequence analyses.

Response to Question 06.02.02-31:

1. Under design basis accident conditions, the water discharged from a LOCA drains to the containment heavy floor and flows to four openings where baskets containing granulated trisodium phosphate dodecahydrate (TSP-C) are located. The coolant flow through the heavy floor openings and the baskets dissolves the TSP-C and returns to the in-containment refueling water storage tank (IRWST) to neutralize entrained acids and maintain the alkalinity of the IRWST.

To address the issue identified in this question, the U.S. EPR design has been modified to re-direct LOCA water from draining to the annular area. Per the modified design, a LOCA involving a pipe break in the pressurizer compartment will cause the water to flow down to elevation +5 feet into the SGBS tank room and pressurizer relief discharge system tank room. This new design incorporates four wall openings in the SGBS tank room: two openings that communicate with the reactor coolant pump (RCP) room Loop 2 and two openings that communicate with RCP room Loop 3. Each of the four wall openings is located two inches above the floor level. These four openings allow the water to discharge from the SGBS tank room onto the containment heavy floor where the trash racks and floor openings containing TSP baskets are located. To avoid unintentional flooding of the annular area, the doors between the SGBS tank room and the annular area are equipped with a flooding berm to prevent the released coolant from reaching the annular area. Also, the opening around the SGBS tank is equipped with a flooding berm to avoid flooding the room below.

This design routes the coolant to the heavy floor where it passes through the trash racks, the installed TSP baskets and is buffered before it enters the IRWST pool.

2. For postulated LOCAs (including LOCAs in the reactor coolant pressurizer system and pressurizer relief discharge system) inside the equipment rooms, the LOCA water is routed via floor openings and gratings to the heavy floor and finally through the installed TSP baskets into the IRWST where it is buffered sufficiently. Refer to response 06.02.02-31(1) regarding the pressurizer compartment and the postulated surge line break.
3. As discussed in RAI 111, Question 06.02.02-8(J), a review of the return flow paths to the IRWST resulting from a LOCA break indicates that condensed steam drains in the containment structure to the annular space. From there the water enters the IRWST pool through wall openings. Some of the water is retained on the containment floors (approximately 4,238 ft³ on the annular space floors and approximately 2,507 ft³ on other floors). Any water or condensed steam that reaches the reactor cavity or refueling cavity is drained into the IRWST by the fuel pool cooling and purification system.
4. The liquid that is pumped from the IRWST pool eventually mixes with the holdup volumes and flows back into the IRWST. Therefore, the holdup volumes are also mixed with buffered

IRWST liquid. Buffering the IRWST liquid maintains its pH > 7 for 30 days post-LOCA (see also U.S. EPR FSAR Tier 2, Table 15.0-54).

5. The estimated pH of the retaining volumes is the same as the IRWST liquid (pH > 7), because the retaining volumes are mixed with the re-injected IRWST water. Due to the long mixing period a chemical equilibrium develops between the IRWST water and the retained water.

FSAR Impact:

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