ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Thursday, November 11, 2010 6:10 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); GUCWA Len (EXTERNAL AREVA); Carneal, Jason
Subject: Response to U.S. EPR Design Certification Application RAI No. 429, FSAR Ch. 6
Attachments: RAI 429 Response US EPR DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 429 Response US EPR DC.pdf" provides a technically correct and complete response to 1 of the 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 429 Question 06.02.02-68.

The following table indicates the respective pages in the response document, "RAI 429 Response US EPR DC.pdf," that contains AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 429 — 06.02.02-67	2	2
RAI 429 — 06.02.02-68	3	3
RAI 429 — 06.03-16	4	4

A complete answer is not provided for 2 of the 3 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 429 — 06.02.02-67	January 6, 2011
RAI 429 — 06.03-16	March 31, 2011

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, October 15, 2010 2:50 PM
To: ZZ-DL-A-USEPR-DL
Cc: Ashley, Clinton; Jackson, Christopher; McKirgan, John; Budzynski, John; Lu, Shanlai; Thomas, George; Donoghue, Joseph; Carneal, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 429 (4821, 4914), FSAR Ch. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on July 21, 2010, and on October 15, 2010, 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: 2250

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB7108425551)

Subject: Response to U.S. EPR Design Certification Application RAI No. 429, FSAR Ch. 6
Sent Date: 11/11/2010 6:10:22 PM
Received Date: 11/11/2010 6:11:07 PM
From: BRYAN Martin (EXTERNAL AREVA)

Created By: Martin.Bryan.ext@areva.com

Recipients:
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>
Tracking Status: None
"GUCWA Len (EXTERNAL AREVA)" <Len.Gucwa.ext@areva.com>
Tracking Status: None
"Carneal, Jason" <Jason.Carneal@nrc.gov>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	2488	11/11/2010 6:11:07 PM
RAI 429 Response US EPR DC.pdf	46275	

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

Response to

Request for Additional Information No. 429(4821, 4914), Revision 0

10/15/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 06.02.02 - Containment Heat Removal Systems
SRP Section: 06.03 - Emergency Core Cooling System

Application Section: FSAR Chapter 6

QUESTIONS for Reactor System, Nuclear Performance and Code Review (SRSB)
QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

Question 06.02.02-67:

Follow Up to RAI 292, Question 14.03-12:

In RAI 140, Question 14.03-7, the NRC asked AREVA to develop ITAAC or justify why no ITAAC is required, related to the containment debris source term. In response, AREVA developed ITAAC to verify a portion of the US EPR debris source term – reflective metal insulation. This ITAAC did not consider aspects of the debris generation analysis (source term) that are more likely to impact ECCS analysis and downstream effects (e.g. fiber insulation, particulate insulation, coatings, chemicals etc). As a result, staff developed RAI 292, Question 14.03-12. In response AREVA indicated the addition of these other debris sources to the ITAAC are not necessary because of margin between tested performance and design basis. Guidance for ITAAC is discussed in SRP 14.3. The existence and extent of margin (small or large) for a safety significant system does not appear to be a sufficient basis for determining if ITAAC is needed.

As discussed in SRP 14.3, a purpose for ITAAC is to verify that the as-built facility conforms to the approved plant design and applicable regulations. ITAAC should verify that the key design characteristics and performance requirements of SSC's are met. The level of detail specified in the ITAAC should be commensurate with the safety significance of the functions and bases for that SSC.

The staff is particularly interested in ensuring that the assumptions and insights from key safety and integrated plant safety analyses in Tier 2, where plant performance is dependent on contributions from multiple systems of the design, are adequately considered in Tier 1. Addressing these assumptions and insights in Tier 1 ensures that the integrity of the fundamental analyses for the design are preserved in an as-built facility referencing the certified design. Examples of these analyses include containment analyses, core cooling analyses, and Generic Safety Issue items.

The ECCS system is considered a safety significant system. The debris generation analysis is considered a key safety analysis. This analysis determines the debris source term used for ECCS head loss testing. The debris source term is a function of materials installed in the containment and is a main consideration of Generic Safety Issue (GSI) 191. Industry experience shows that the impact on head loss due to changes in debris source term quantities and/or combinations of source material is difficult to analytically predict, in the absence of testing. Therefore, given the discussion provided above, the verification that the as-built plant is consistent with the approved plant design, with respect to debris source term, should be adequately considered in Tier 1.

AREVA is requested to justify the debris source term materials selected (and reasons for not selecting other materials) as part of this as-built verification (ITAAC).

Response to Question 06.02.02-67:

A response to this question will be provided by January 6, 2011.

Question 06.02.02-68:

Follow-up to RAI 281, Question 06.02.02-36.

A conference call was held on June 28th, 2010 with AREVA personnel and NRC Tech Spec reviewers to discuss the information contained in RAI 281 response. The proposed changes to Technical Specifications provided in RAI 281 Supplement 1 require correction or clarification:

1) SR 3.5.4.1 included new information (i.e., "...passive flooding line valve is closed.") that appears to have been made in response to question 06.02.02-36 of RAI 281 but was not identified as such. Please clarify this apparent change to the Tech Spec and associated RAI.

2) SR 3.5.4.5 frequency is 31 days. Please provide a basis for the frequency selected given the potential to impact multiple safety trains. Guidance in the Westinghouse STS (NUREG-1431) for SR 3.5.2.1 recommends a frequency of 12 hours for such application.

3) The ECCS three-way isolation valves are included in the IRWST Tech Spec. Justify the inclusion of these valves in the IRWST Tech Spec (3.5.4, 3.5.6, 3.5.7) versus the ECCS Operating and Shutdown Tech Specs (3.5.2, 3.5.3, 3.5.8).

Response to Question 06.02.02-68:

<u>Items 1 and 2</u>

U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, Surveillance Requirement 3.5.4.1 will be revised to add a verification of power removal from the passive flooding line isolation valves. Surveillance Requirement (SR) 3.5.4.5 will be deleted and SR 3.5.6.1, SR 3.5.7.2 and Bases B 3.5.4 will be revised, as appropriate.

<u>Item 3</u>

The in-containment refueling water storage tank (IRWST) three-way isolation valves are part of the emergency core cooling system (ECCS) flowpath and did not need to be included in U.S. EPR FSAR Tier 2, Chapter 16, Technical Specification 3.5.4. Conditions A and B, which had been previously added, were deleted in Revision 2 of the U.S. EPR FSAR.

FSAR Impact:

U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Sections 3.5.4, 3.5.6, 3.5.7, and Bases B3.5.4 will be revised as described in the response and indicated on the enclosed markup.

Question 06.03-16:

After review of "US EPR Safety Injection System Analysis for Design Certification Document," Doc. No. 32-9017755-005 conducted on July 2, 2010 at AREVA's Rockville office, the staff has requested additional information as a supplement to RAI Question 06.03-15 which requested justifying why the selected approach, use of containment accident pressure (CAP) to support ECCS NPSH analysis, is acceptable. In your response, include:

(1) From a PRA risk perspective, justify that significant containment breaching during a LOCA event is a low probability event;

(2) Evaluate any possible activation of non-safety grade containment equipment and systems; and

(3) Provide a graphical representation of the most limiting IRWST water saturation pressure versus time and the most limiting lower bound containment accident pressure taking into account of possible leakage.

Response to Question 06.03-16:

A response to this question will be provided by March 31, 2011.

U.S. EPR Final Safety Analysis Report Markups

SURVEILLANCE REQUIREMENTS

06.02.02-68	SURVEILLANCE	FREQUENCY
SR 3.5.4.1	Verify each motor-operated IRWST passive flooding line valve is closed and power is removed from each valve operator.	12 hours
SR 3.5.4.2	Verify IRWST borated water temperature is ≥ 59°F and ≤ 122°F.	24 hours
SR 3.5.4.3	Verify IRWST borated water volume is ≥ 500,342 gallons and ≤ 523,703 gallons.	7 days
SR 3.5.4.4	Verify IRWST boron concentration is ≥ 1700 ppm and ≤ 1900 ppm enriched boron.	7 days
~~SR 3.5.4.5~~	~~Verify power is removed from each motor-operated passive flooding line valve.~~	~~31 days~~
SR 3.5.4.5~~6~~	Verify isotopic concentration of B-10 in the IRWST is ≥ 37%.	24 months

06.02.02-68

06.02.02-68

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.6.1	SRs 3.5.4.1, 3.5.4.3, and 3.5.4.4~~, and 3.5.4.5~~ of Specification 3.5.4, "In-Containment Refueling Water Storage Tank (IRWST) – Operating" are applicable.	In accordance with applicable SRs.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.7.1	Verify IRWST, refueling canal, and refueling cavity borated water volume is ≥ 500,342 gallons.	24 hours
SR 3.5.7.2	SR~~s~~ 3.5.4.1 ~~and 3.5.4.5~~ of Specification 3.5.4, "In-Containment Refueling Water Storage Tank (IRWST) – Operating" ~~are~~ is applicable.	In accordance with applicable SR~~s~~.

06.02.02-68

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.4.3

The IRWST water volume should be verified every 7 days to be within limits. The required minimum volume is verified in order to ensure that a sufficient NPSH is available for injection and to support continued ECCS pump operation. The maximum volume is verified in order to ensure the value assumed in the post-LOCA boron precipitation evaluation is not exceeded. Since the IRWST volume is normally stable and is protected by an alarm, a 7 day Frequency is appropriate and has been shown to be acceptable through operating experience.

SR 3.5.4.4

The boron concentration of the IRWST should be verified every 7 days to be within the required limits. This SR ensures that the reactor will remain subcritical following a LOCA. Further, it assures that the resulting sump pH will be maintained in an acceptable range so that boron precipitation in the core will not occur and the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized.

Since the IRWST inventory is normally stable, a 7 day sampling Frequency to verify boron concentration is appropriate and has been shown to be acceptable through operating experience.

~~SR 3.5.4.5~~

~~This surveillance requires verification that power is removed from each motor-operated passive flooding line valve operator. Removal of power from these valves reduces the likelihood that the valves will be inadvertently opened. Since power is removed under administrative control, the 31 day Frequency will provide adequate assurance that power is removed.~~

06.02.02-68

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.4.5~~6~~ 06.02.02-68

The boron used in the IRWST is enriched to ≥ 37% in the B-10 isotope. Verification every 24 months that the B-10 enrichment is ≥ 37% ensures that the B-10 concentration assumed in the accident analysis is available. Since B-10 in the IRWST is not exposed to a significant neutron field, 24 months is considered conservative.

REFERENCES

1. FSAR Chapter 6 and Chapter 15.