

ArevaEPRDCPEm Resource

From: Getachew Tesfaye
Sent: Friday, May 15, 2009 8:57 AM
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Cc: Chang Li; John Segala; Michael Miernicki; Joseph Colaccino; ArevaEPRDCPEm Resource; Jay Patel
Subject: U.S. EPR Design Certification Application RAI No. 218 (2613), FSAR Ch. 3
Attachments: RAI_218_SBPB_2613.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on April 22, 2009, and discussed with your staff on May 12, 2009. No change was to the draft RAI questions 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,
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Request for Additional Information No. 218 (2613), Revision 0

05/15/2009

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

Application Section: 3.4.1

QUESTIONS for Balance of Plant Branch 2 (ESBWR/ABWR) (SBPB)

03.04.01-8

This is a follow-up of RAI 03.04.01-1, -4, and -7.

The staff in RAI 03.04.01-1 requested the applicant to:

“...Clarify whether the U.S. EPR flood protection design intends to include the option of submerged SSCs operation in the design certification stage or in the COL application stage. If it is in the DC stage, provide the information about the submerged SSCs and the qualification program for those SSCs in the FSAR for the DC. However, if it is in the COL stage, identify a COL information item that requires the applicant to provide the above information, if the applicant will locate safety-related SSCs below the flood level. ...”

The applicant responded as follows:

- a. In Response to eRAI No. 109, Question 03.04.01-1, the applicant stated, “There are no safety-related structures, systems, and components (SSC) required to perform a safety-related function while being completely or partially flooded. The U.S. EPR flood protection design does not include an option of submerged SSC operation.”
- b. In Response to eRAI No. 118, Question 03.04.01-4, the applicant responded by stating that the safety-related SSCs for structures without physical separation between divisions (containment and annulus) have the safe shutdown systems and components located above the flood level.
- c. In Response to eRAI No. 118, Supplement 1, Response to Question 03.04.01-7, the applicant responded with Tier 1 (ITAAC) and Tier 2 FSAR changes that state the U.S. EPR flood protection design includes the option of SSCs withstanding flooding. It states that a flood analysis will be performed prior to fuel load by the COL applicant, and COL Information Items (U.S. FSAR Tier 2, Table 1.8-2, Items 3.4-4 and 3.4-5) were created.

These RAI responses are inconsistent as related to the operation of submerged SSCs. The staff finds the response to RAI 03.04.01-7 with Tier 1 and Tier 2 FSAR changes acceptable in providing COL information items and ITAAC inspections. However, the details of the COL information items and the ITAAC inspection need to be revised; this is discussed in RAI 03.04.01-9.

To be consistent with this change in the response to RAI 03.04.01-7, the applicant needs to revise the FSAR Tier 2, Section 3.4.3.3, Page 3.4-6 changes associated with RAI 03.04.01-1. In addition, the applicant is requested to clarify this inconsistency among the responses to RAI 03.04.01-1, -4 and -07 with respect to the operation of submerged SSCs.

03.04.01-9

This is a follow-up of the responses to RAI 04.03.01-1, -4, and -7.

- a. The staff noted that in the responses to the above RAIs and FSAR Tier 1 and Tier 2, the applicant identified the components to be protected from internal flooding being limited to safe shutdown equipment. SRP Section 3.4.1, Subsection I, "Areas of Review," and Subsection III, "Review Procedures," indicate that the review of the plant internal flood protection includes all safety-related SSCs. Based on SRP Section 3.4.1, the staff believes that the components to be protected from internal flooding should include all safety-related components, not just being limited to safe shutdown equipment. The applicant is requested to clarify and revise the FSAR accordingly.
- b. In the response to RAI 03.04.01-7, the applicant proposed a COL Information Items 3.4-5. It states that "A COL applicant that references the U.S. EPR design certification will perform an internal flooding analysis prior to fuel load for the Reactor Building and Reactor Building Annulus to demonstrate that the essential equipment required for safe shutdown is located above the internal flood level **or is designed to withstand flooding.**"

In accordance with SRP Section 3.4.1, Review Procedure No. 5, the safety-related SSCs being located below the flood level should be identified in the FSAR, and the qualification program should be described in the FSAR for the staff review. Exceptions, if any, should be justified in the FSAR. Clarification is needed that if the operation of submerged SSCs is allowed, the COL applicant should identify the submerged components and describe the qualification program for the staff review in accordance with SRP Section 3.4.1.

03.04.01-10

This is a follow-up of the response to RAI 03.04.01-5. The applicant was requested to provide the information about door seals to ensure that water tight doors serve their intended flood protection function in RAI 03.04.01-5. The applicant responded to RAI 03.04.01-5 (eRAI No. 118) stating that water resistant door design details are to be specified later in the design process and that water resistant doors would be designed and engineered to meet leak-rate limits, door-seal aging-degradation characteristics, and maintainability. The applicant stated that maintenance requirements would be based on manufacturer recommendations and that maintenance procedures would be prepared by COL applicants in accordance with their respective regulatory approved maintenance

programs. The staff found that the commitment for the seals design to meet leakage limits with maintenance based on manufacturer recommendations acceptable.

The applicant is requested to revise FSAR Tier 2 to reflect the above response and identify a COL information item in FSAR Tier 2, Table 1.8-2, "U.S. EPR Combined License Information Items," to reflect the above RAI response.

03.04.01-11

This is a follow-up of the response to RAI 03.04.01-6. The staff found that the response to RAI 03.04.01-6 did not address the questions.

- a) In RAI 118 Question 04.03.01-6 (a), the staff asked the applicant to provide a list of potential flood sources in the containment and reactor building annulus. In the response, the applicant stated that "all" of the water-carrying systems inside each building including high and moderate energy lines were considered for the potential flood sources. The staff found the response using "all of the water systems" without explicit system names to be nonresponsive to the question. In an audit of February 19, 2009, the staff found in the audit documentation that there was a list of systems being considered as potential flood sources. The applicant is requested to provide such list in the FSAR.
- b) In Question 04.03.01-6 (b), the staff asked the applicant to explain how the bounding pipe breaks for the flood analysis in the containment and in reactor building annulus were determined. In the responses, the applicant restated what the bounding cases are, but did not respond the staff's question as how the bounding cases were determined. The staff found that the response did not address the question. In the audit review, the applicant explained verbally how the bounding cases were determined, but that was not documented in the FSAR or in the audit documentation. The applicant is requested to document how the bounding cases were determined in the RAI responses.
- c) In Question 04.03.01-6 part (c), the applicant was requested to provide details of the analysis outlined in FSAR Tier 2 Section 3.4.3.1, "Internal Flooding Events," for the containment and reactor building annulus, including flood water volumes, flow rates, building floor elevation, free areas, free volumes, and assumptions used for obtaining these volumes and flood levels. The applicant referred the response to an audit. The staff reviewed the audit documentation regarding the details of the analysis and found the analysis acceptable. However, the staff believes that the key parameters that were used in the analysis determining the flood levels in the design should be documented in the RAI responses. Such parameters include flood water volumes and flow rates, building bottom floor elevation, free areas, free volumes, % of area occupied by equipments.

03.04.01-12

This is a follow-up to the response to RAI 03.04.01-2 (eRAI No. 109). In the response, the applicant states that "the internal flood is restricted to one emergency power generating building (EPGB) and it is assumed the associated safety-related SSCs in the

flooded division are lost.” This statement that the internal flood is restricted to one EPGB is inconclusive in explaining the adequacy of the flood protection for the safety-related SSCs in the EPGBs. It needs further to explain that the remaining EPGBs are sufficient to perform the intended safety function. The staff understood from the discussion in the audit that there are three redundant EPGB divisions remaining un-flooded, and that 50% load can be carried by the equipment in each EPGB. The remaining three divisions of SSCs in the un-flooded EPGBs have sufficient capability to carry out the intended safety function. The applicant is requested to confirm and document the above understanding in the FSAR.

Further, other buildings, such as safeguard building, fuel building, essential service water pump building, applied the same concept of physical separation by division for flood protection need a similar FSAR statement that with one division flooded, the systems and components in the remaining divisions are sufficient to perform the intended safety function. Assuming one division of the equipment is in maintenance and another division is flooded, are there any operational arrangement, or interaction among systems and components between divisions could prevent the remaining two divisions to perform the intended safety function?