ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Wednesday, October 21, 2009 6:11 PM
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Cc: Budzynski, John; VanWert, Christopher; Donoghue, Joseph; Carneal, Jason; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 310 (3709), FSAR Ch. 6
Attachments: RAI_310_SRSB_3709.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 9, 2009, and on October 21, 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,
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Hearing Identifier: AREVA_EPR_DC_RAIs
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Request for Additional Information No. 310 (3709), Revision 0

10/21/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 06.03 - Emergency Core Cooling System
Application Section: 6.3

QUESTIONS for Reactor System, Nuclear Performance and Code Review (SRSB)

06.03-12

Gas Accumulation

Section 6.3 of the US EPR FSAR refers to certain design features of the ECCS piping systems as “continuously vented” to prevent the accumulation of gases without any descriptions of such feature. Section 5.4.7 also refers to “self venting” as a piping system design feature to preclude “water hammer” events by assuring the safety injection system is always full of water. Again there is not a description of the feature. These features suggest possible protection against ECCS pump suction cavitation ECCS and voiding conditions during shutdown cooling operations to meet regulatory requirements such as GDC 4 and GL 2008-01. During the staff’s audit at the AREVA offices in Rockville, MD on June 23, 2009 of the isometric drawings of the ECCS the staff noted with concern the absence of venting and draining capability, protection against the development of loop seals and areas for gas accumulation. Gas accumulation can cause water hammer, gas binding in pumps, and inadvertent relief valve actuation that may damage pumps, valves, piping, and supports and may lead to loss of system operability. Most recently this has been addressed by GL 2008-01.

AREVA personnel in attendance at the audit stated that the design of the ECCS has not been completed and that additional design provisions would be added to the ECCS system in the final design stage to address the staff’s concerns expressed above to assure compliance with GDC 4 and GL 2008-01. In addition, the applicant should address the following questions:

Have potential pathways for gas intrusion in the ECCS (CS/RHR) system been evaluated? If so, identify the pathways. What design features are present in the EPR which prevents or controls gas accumulation to acceptable levels to ensure CS/RHR system operability? Does the design include any means of detecting unacceptable levels of gas accumulation? Describe the ITAAC test conditions for the CS/RHR pumps, NPSH (Tier 1, Table 2.4.5-5, 8f) test. Explain why these test conditions are conservative especially with regard to gas entrainment and its effect on NPSH.

06.03-13

Surveillance Requirement

Surveillance Requirement (SR) of FSAR Chapter 16 – SR 3.5.2.2 requires verification every 31 days that the ECCS is full of water, an NPSH and water hammer issue. During the staff's audit on June 10, 2009 of AREVA's engineering evaluation of the NPSHA versus NPSHR for the ECCS pumps the staff asked about the design features of the ECCS that accommodate the verification process of SR 3.5.2.2 related to GDC 4. Please confirm the current features of the ECCS that allow the verification of SR 3.5.2.2 during all modes of plant operations to assist in compliance with GDC 4.

06.03-14

NPSH

During the staff's audit on June 10, 2009 of AREVA's engineering evaluation of the NPSHA versus NPSHR for the ECCS pumps AREVA NP, Inc. AREVA Document No. 32-9017755-004 Calculation Summary Sheet: "US EPR Safety Injection System Analysis for Design Certification" was used by the staff to reach certain conclusions and understandings related to AREVA's methodology for NPSH calculations. Information contained in this document partial supports the bases of the staff's regulatory decisions on the determination of adequate NPSHA for the pumps of the ECCS. This document is "Proprietary" to AREVA and the staff requests that it be submitted on the US EPR™ Design Certification Application Docket No. 05200020 as a potential reference in the staff's Final Safety Evaluation Report.

In addition, please confirm that the bases of the NPSH calculational results reported in the above AREVA document are unique to the US EPR™ (and were not developed for similar, but different designs such as the Finish design at OL-3) as presented in other information already on Docket No. 05200020.

In the NPSH analysis, NPSH values were calculated assuming 212°F; however, in Figure 6.3-7, "IRWST LOCA Temperature Response," the maximum temperature is approximately 230°F about 3 hours into the event. Provide a discussion to support your assumption of 212°F instead of the maximum temperature. Include all assumptions made to support your NPSH analysis.