ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Thursday, March 11, 2010 4:25 PM
To: 'usepr@areva.com'
Cc: Budzynski, John; Lu, Shanlai; Donoghue, Joseph; Carneal, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 367 (4369), FSAR Ch. 4 OPEN ITEM
Attachments: RAI_367_SRSB_4369.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on February 4, 2010, and discussed with your staff on February 24, 2010, and March 4, 2010. Draft RAI Questions 04.06-14 was modified as a result of those discussions. The question in this RAI is an OPEN ITEM in the safety evaluation report for Chapter 4 for Phases 2 and 3 reviews. As such, the schedule we have established for your application assumes technically correct and complete responses prior to the start of Phase 4 review. For any RAI that cannot be answered prior to the start of Phase 4 review, it is expected that a date for receipt of this information will be provided so that the staff can assess how this information will impact the published schedule.

Thanks,

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 1228

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From: Tesfaye, Getachew

Created By: Getachew.Tesfaye@nrc.gov

Recipients:
"Budzynski, John" <John.Budzynski@nrc.gov>
Tracking Status: None
"Lu, Shanlai" <Shanlai.Lu@nrc.gov>
Tracking Status: None
"Donoghue, Joseph" <Joseph.Donoghue@nrc.gov>
Tracking Status: None
"Carneal, Jason" <Jason.Carneal@nrc.gov>
Tracking Status: None
"Colaccino, Joseph" <Joseph.Colaccino@nrc.gov>
Tracking Status: None
"ArevaEPRDCPEm Resource" <ArevaEPRDCPEm.Resource@nrc.gov>
Tracking Status: None
"'usepr@areva.com'" <usepr@areva.com>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

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Request for Additional Information No. 367(4369), Revision 1

3/11/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 04.06 - Functional Design of Control Rod Drive System
Application Section: 04.06

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

04.06-14

OPEN ITEM:

In general terms of the U.S. EPR Tier 2 FSAR Subsections 4.4.2.9.5, 4.4.4.3, 4.4.4.5.3, 4.4.4.5.4, 4.4.6.1, 4.4.6.4, and 4.4.6.5, the applicant provides a brief description of the fixed in-core SPND neutron flux measurements in relationship to the two types of in-core trips with regard to uncertainties in the calculations, influence of power distributions, high linear power density functions, low DNBR I&C functions, and analysis of steady and transient conditions. In these subsections, the applicant refers to the topical report ANP-10287P, "In-core Trip Setpoint and Transient Methodology for the U.S. EPR Topical Report" for a more detail discussion.

However, after review of these subsections and the topical report, the staff has determined that more information is necessary to determine how the methods described in ANP-10287P will be implemented and verified in regard to instrumentation and control systems.

Therefore, the staff requests that the applicant provide a description on how the methodologies contained in ANP-10287P will be implemented and verified for the U.S. EPR design relating to instrumentation and control systems. In particular, define what will be checked and verified by COL applicants prior to the first cycle core loading and as part of reload analysis to satisfy the following approval limitations stated in the SE for ANP-10287P:

1. LIMITATION NO. 1 – MIXED CORES

Section 4.8 contains an evaluation of the applicability of the U.S. EPR setpoint methodology to mixed core configurations. The following limitation applies to the application of ANP-10287P, Revision 0:

The setpoint methodology documented in ANP-10287P, Revision 0 [1] is only acceptable to cores that consist entirely of hydraulically compatible fuel assemblies, i.e, a single package of assembly specific CHF correlation.

2. LIMITATION NO. 2-CYCLE SPECIFIC UNCERTAINTY VALUES

Since the actual uncertainties and setpoint values are not part of this review and are not available to the staff, any transient analyses taking credit for the in-core setpoint system can only be approved when actual values of these uncertainties and setpoints are conservatively

applied following this methodology, or it has been demonstrated that the uncertainties can be conservatively bounded. The following limitation applies to the application of ANP-10287P, Revision 0:

Applications of the setpoint methodology documented in ANP-10287P, Revision 0 [1] must include a review of the applicable uncertainty values used to generate the setpoint values used in the analyses.

3. APPLICATION SPECIFIC ITEM PRIOR TO THE FIRST CYCLE OPERATION

The methodology to confirm that the static setpoint values provide adequate protection during transient events described in Section 9 of Topical Report ANP-10287P depends on identifying and characterizing the limiting transient. The limiting transient is defined as the event that results in the minimum difference between uncompensated DNBR and LPD results and the SAFDLs. The following limitation applies to the application of ANP-10287P, Revision 0:

Prior to the first cycle operation, confirmatory evaluation has to be performed for every AOO using the procedure described in Section 9 of Topical Report ANP-10287P to identify the limiting transient of the plant as built. Based on the confirmatory evaluation results, analyses have to be performed for AOOs that have significant differences between the assumed input conditions and the as-built conditions, if the differences can not be conservatively bounded by the assumed uncertainty values. For the most limiting transient that relies on in-core trip for protection, the applicant shall provide for staff review the analysis results demonstrating that the uncompensated DNBR and LPD satisfies SAFDL with a 95/95 assurance.

4. APPLICATION SPECIFIC ITEM FOR RELOAD ANALYSIS

The methodology described in Section 9 of Topical Report ANP-10287P is vague on which transient events are used to confirm that the static setpoint values provide adequate protection during transient events. Therefore, the following limitation applies to the application of ANP-10287P, Revision 0:

During reload analysis, it has to be confirmed and appropriately documented using the methodology described in Section 9 of ANP-10287P that the static setpoint value provides adequate protection for at least the three most limiting AOOs identified by Item 3 above.