January 15, 2009

Mr. Ronnie L. Gardner
AREVA NP Inc.
3315 Old Forest Road
P.O. Box 10935
Lynchburg, VA 24506-0935

SUBJECT: SECOND REQUEST FOR ADDITIONAL INFORMATION REGARDING ANP-10287P, "INCORE TRIP SETPOINT AND TRANSIENT METHODOLOGY FOR U.S. EPR TOPICAL REPORT" (TAC NO. Q00013)

Dear Mr. Gardner:

By letter dated November 27, 2007, which can be accessed through NRC's Agencywide Documents Access and Management System (ADAMS) Accession Number (ML073410584), AREVA NP (AREVA) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report (TR) ANP-10287P, "Incore Trip Setpoint and Transient Methodology for U.S. EPR Topical Report."

The NRC staff review has determined that some areas of this report require additional information in order to complete the review. The specific information requested is addressed in the enclosure to this letter, and is substantially the same as the draft that was provided to your staff via electronic mail on November 26, 2008 and discussed during a telephone conference on December 2, 2008. AREVA has agreed to provide a response within 45 days of receipt of this letter.

If you have any questions regarding this matter, I may be reached at 301-415-3361.

Sincerely,

/RA/
Getachew Tesfaye, Sr. Project Manager
EPR Projects Branch
Division of New Reactor Licensing
Office of New Reactors
Project No. 733

Enclosure: Request for Additional Information

cc: DC AREVA - EPR Mailing List

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SECOND ROUND REQUEST FOR ADDITIONAL INFORMATION (RAI)

ANP-10287P, "INCORE TRIP SETPOINT AND TRANSIENT

METHODOLOGY FOR U.S. EPR TOPICAL REPORT"

(TAC NO. Q00013)

DOCKET NUMBER 52-020

RAI-15. Describe the impact on power distribution uncertainty of the AMS measurement Provide an uncertainty analysis that considers the effectiveness of the AMS to assess margin to relevant operating and safety limits based on inputs to various computer models and core instrument gains. The analysis should address the influence on the AMS measurement of the following:

a. Signal to noise,
b. Activated aeroball impurities,
c. Contaminated or activated aeroball tubing,
d. Aeroball transit time,
e. Sensitivity to calibration techniques and intervals,
f. Equipment environmental conditions,
g. Neutron/gamma transport models or correlations, and
h. Sensitivity changes that are duty related.

RAI-16. Section 3.2.1 of ANP-10287P indicates that RCCA position, SPND imbalance, and 3-loop operation signals are input to provide protective capability against asymmetric events. The RCCA inputs and SPND imbalance signals are discussed in Section 3.2.4 and shown in Figure 3-2. The function of the 3-loop operation signal is not discussed in detail in ANP-10287P, nor is the signal identified in any topical report figures. Provide a detailed discussion of the 3-loop operation signal and identify how this signal interacts with the RCCA and SPND imbalance signals to influence the $DNBR_{IMB/RD}$ trip.

RAI-17. Section 2.0 of ANP-10287P indicates that Section 4.2.II.2(e) of Reference 2 [NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition),” Nuclear Regulatory Commission, March, 2007 revision] stipulates that fuel centerline melting is not permitted for AOOs in order to preclude fuel failure. It appears that the actual citation from Reference 2 should be Section 4.2.II, SRP Acceptance Criteria, 1.B.IV. Correct or address

RAI-18. Page A-5 of Appendix A to ANP-10287P references equations A-7 and A-8 at the bottom of the page; “The distinctions between Equation (A-7) and (A-8)…” These equations do not exist. Correct or address.

RAI-19. Page E-4 of Appendix E to ANP-10287P contains a note to “see Section 4.2 of Ref. 5” It appears this should refer to Ref 6. Correct or address.

RAI-20. In response to RAI #3, the SPND decalibration between AMS measurement periods of 15 days has been identified for DNBR and LPD. Is this source of uncertainty included in the peak power uncertainty?

RAI-21. Provide a summary of representative technical specifications on the AMS system. Specifically, address what actions are taken if the AMS system becomes unavailable for longer than 15 days after the last calibration measurement.

RAI-22. The topical report specifies that the on-line DNBR algorithm produces a “fault” if the enthalpy iterations do not converge. How is the fault treated in the reactor protection system?

RAI-23. The article noted in ANP 10287P, Reference 14 is listed as being extracted from Reliability Engineering and System Safety Journal, Volume 91. The actual collection should be Reliability Engineering and System Safety Journal, Volume 87. Correct or address.

RAI-24. The Introduction to ANP 10287P notes that setpoints are established for multiple functions, including the low DNBR limitation function. The low DNBR limitation function appears in Table 3-2, but it is not described in Chapter 3, nor is it described elsewhere in the Topical Report. Discuss the DNBR limitation function purpose and the establishment of the DNBR limitation setpoints.

RAI-25. The P2 interlock is not shown in Figures 3-1, 3-2, and 3-3, though it is discussed in Section 3.2.7. It is not clear from the text that the P2 interlock applies to all cases of generating a low DNBR trip signal. As appropriate, the P2 interlock should be included in Figures 3-1, 3-2, and 3-3 for clarity. Figure 6-1 illustrates a similar link to the P2 interlock.

RAI-26. Figure 6-1 and 7-1 show 72 SPND inputs into each protection division. The text in Section 6.2.3 indicates that the SPNDs are apportioned among the four divisions, which would seem to indicate only 18 SPND outputs are processed by each division. Clarify in the text and the figures the actual SPND inputs to each division. If the output of all 72 SPNDs is input into each protection division, discuss the independence between divisions with respect to the high LPD LSSS trip and LCO actions.

RAI-27. In a separate staff RAI, a possible mechanism is proposed to fail 25% of the core SPNDs (18) if RAU1 is taken out of service for testing and a single failure occurs in RAU2 within the same division. The failed-SPND logic for the in-core setpoint methodology (ANP-10287P) assumes that failures of 5 or more SPNDs are covered by the same 5-failed-SPND setpoint. It is not clear from the document that this methodology would cover such a large number of failures (18). The staff notes that, since the 18 failures are deterministic (a complete division) and their location is known and homogeneously distributed around the core, the 5+ failed-SPND setpoint could indeed be conservative.Demonstrate by analysis of one particular example that the 5+ failed-SPND setpoint is conservative if all 18 SPNDs in a division fail.

RAI-28. In response to RAI #1, AREVA states that “Mixed core methodology is not being proposed for the U.S. EPR; therefore, AREVA NP is not requesting NRC review and

approval of this methodology for use for mixed cores." Please confirm the intention of AREVA to design EPR allowing only one type of fuel to be used in the core.

RAI-29. The response to RAI #14 does not provide any experimental data for pin powers that is sufficient to justify the use of the quoted pin power uncertainty for exposed fuel. The only data provided thus far consists of predictions of measurements of fresh fuel which is not applicable to exposed fuel. Therefore, please supplement your existing database by providing fuel pin gamma scans (or equivalent) to justify the application of the pin power uncertainty to both fresh and exposed fuel.

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