August 7, 2008

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-10286P, "US EPR ROD EJECTION ACCIDENT METHODOLGY TOPICAL REPORT"

Dear Mr. Gardner:

By letter dated November 20, 2007, which can be accessed through NRC'S Agencywide Document Access and Management (ADAMS) Accession No. ML073310620, AREVA NP submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report ANP-10286P, "Rod Ejection Accident Methodology." The staff is reviewing the topical report and has determined that additional information is required. Our questions are provided in the enclosure.

A draft of the second request for additional information (RAI) was provided to you on June 25, 2008 (ADAMS Accession No. ML081850297), and discussed with your staff in a post submittal telephone conference on July 2, 2008. As a result of that discussion, the staff agreed to delete the last draft RAI question and renumber the remaining questions for consistency with the first set of RAI.

In addition, AREVA NP requested and the staff agreed that AREVA NP will provide responses to the RAIs within 60 days of the date 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

Docket No. 52-020

Enclosure:
Request for Additional Information

cc: DC AREVA – EPR Mailing List

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ADAMS Accession Number.: ML081990273

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SECOND REQUEST FOR ADDITIONAL INFORMATION (RAI)

ANP-10286P, "U. S. EPR ROD EJECTION ACCIDENT

METHODOLOGY TOPICAL REPORT"

DOCKET NO. 52-020

RAI-3 Section 2.1.1 – Please provide the basis (e.g. experimental, mechanistic, etc.) for the oxide buildup model referred to in the report.

RAI-4 Section 2.3 – Please provide a more detailed discussion concerning TFGR and FGRF.

RAI-5 Section 4.1.4 – (Table 4-1) The knowledge ratio (KR) for fuel feedback is given as 96. Doppler feedback is generally ± 10 percent at best. Please explain how the uncertainty in the DTC is determined throughout the burnup range?

RAI-6 Table 4-1 – Please explain what method is used to determine β_{eff} and the associated uncertainty.

RAI-7 Section 4.1.6 – Please elaborate on the last sentence in Section 4.1.6 to explain how and why the sensitivity of the trip reactivity to "at power" events determines the level of conservatism of the trip reactivity.

RAI-8 Section 4.1.10 – Please clarify whether there is a provision to account for direct heating of the coolant due to the increase in neutron and gamma ray flux during the transient.

RAI-9 Section 4.2.8 – When MDNBR is exceeded, the topical report stated that static heat transfer, CHF, and failure are conservatively assumed. Please provide justification for this position.

RAI-10 Section 6.2.1 – Please clarify whether the lead time constant and the lagged signal time constant are consistent with the reactor design. Provide their respective values.

RAI-11 Section 6.2.3 – Please provide a typical magnitude of the adjustment factors used in sensitivity analyses.

RAI-12 Section 6.2.4 – Does NEMO-K calculate the temperatures, or are they calculated by LYNXT and passed to NEMO-K? If they are passed to NEMO-K, is the connection a dynamic one? Has the relationship developed for T_{eff} been validated against another method? If another method has been used, please describe it and discuss the accuracy of that method.

RAI-13 Section 6.3.2 – Is there a case in which the power profile within the pellet changes during the transient? If there is no provision for this change in profile, what is the effect of not allowing the change?

RAI-14 Section 6.3.3.1 – The CG/TDP model was validated for BOL conditions against various methods. Has this same validation also been carried out for EOL conditions, or is the validation at EOL conditions limited to only a comparison with COPERNIC?

RAI-15 Section 6.3.3.2 – Table 6-3 summarizes the comparison between LYNXT and COPERNIC. Please elaborate on how the results are determined.

RAI-16 Section 6.3.4 – Is there a standard set of data for the thermal properties of the fuel and clad, gap conductance, and radial power profile that are used as input to these analyses, or are they calculated as needed by one of the detail codes? If there is a standard set please list them or give appropriate references.

RAI-17 Section 7.0 – To what do the uncertainties in Table 7-1 refer? REA analysis values seem to be further from PRISM range values than uncertainties. Please provide proper references and explanations.

RAI-18 Section 7.1.3 – Is the value DTC uncertainty of ± 10 percent equally valid for BOL and EOL conditions? Please explain its burn-up dependency.

RAI-19 Section 7.1.7 – Are combinations of the uncertainties listed in Table 7-3 evaluated when performing uncertainty analyses? If so, please explain what combinations are evaluated.

RAI-20 Section 7.2.1 – Have sensitivity calculations been carried out using different node selections? If so, explain the node sensitivity analysis results.

RAI-21 Section 7.2.4 – Please clarify whether NEMO-K and LYNXT use the same nodal distribution.

RAI-22 Section 7.2.5 – In Fig 7-10 the no-gadolinia case does not bound the gadolinia cases over the entire time span, which appears to be contradictory to statements in Section 7.2.5. Please explain this discrepancy.

RAI-23 Section 8.5 – Please provide more information as to why no fuel rod failures are reported. For example, is it due to: a reactor trip terminating the transient, negative feedback reversing the trend, thermal inertia in the system reducing the temperatures, all of the above, etc.?

RAI-24 Please list the model assumptions used to generate the LYNXT to COPERNIC transient model comparison.

RAI-25 Supply and describe a flowchart on code and data process linkages that explain the analysis flow path for the REA event.

RAI-26 Provide an event timeline and description for various REA events (include events that trip and events that don't trip the plant) to explain the parameter responses. Additionally, please explain the process by which the incore DNBR trip time estimates were made.

RAI-27 Provide a description of the thermal properties tables' inputs to LYNXT.

RAI-28 Please provide an example to describe the process by which the failed fuel rod census is performed using the transient pin to static pin power ratios.

RAI-29 Provide an explanation about the calibration for the high rate flux trip and provide a sample response of the rate lagged filter. (Section 6.2.1, 6.2.1.2, Table 8-1).

RAI-30 Section 7.2.4 – Please explain why the assembly pin power radial power distribution in LYNXT is conservative for the assumed power distribution within the fuel assembly of interest.

RAI-31 Please provide an explanation for the discontinuities of the LYNXT results relative to the COPERNIC temperature transients in Figures 6-23 and 6-27.

RAI-32 Please explain why the BOC HZP was not analyzed in LYNXT in Sections 8.1 and 8.3.