March 7, 2017

Mr. Gary Peters, Director
Licensing and Regulatory Affairs
AREVA Inc.
3315 Old Forest Road
Lynchburg, VA 24501

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING AREVA INC. TOPICAL REPORT BAW-10179P, REVISION 9, "SAFETY CRITERIA AND METHODOLOGY FOR ACCEPTABLE CYCLE RELOAD ANALYSES" (CAC NO. MF8167)

Dear Mr. Peters:

By letter dated April 15, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16106A286), AREVA Inc. (AREVA) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review and approval Topical Report BAW-10179P, Revision 9, "Safety Criteria and Methodology for Acceptable Cycle Reload Analyses." Upon review of the information provided, the NRC staff has determined that additional information is needed to complete the review. On January 27, 2017, Jerry Holm, AREVA Product Licensing Manager, and I agreed that the NRC staff will receive the response to the enclosed request for additional information (RAI) questions within 30 days from the date of this letter.

If you have any questions regarding the enclosed RAI questions, please contact me at 301-415-4053.

Sincerely,

/RA/

Jonathan G. Rowley, Project Manager
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 728

Enclosure:
RAI Questions (Non-Proprietary)

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING AREVA INC. TOPICAL REPORT BAW-10179P, Revision 9, "SAFETY CRITERIA AND METHODOLOGY FOR ACCEPTABLE CYCLE RELOAD ANALYSES" (CAC No. MF8167) DATED: March 7, 2017

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ADAMS Accession No.: ML17054D195; *concurred via email **NRR-106**

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REQUEST FOR ADDITIONAL INFORMATION
RELATED TO TOPICAL REPORT BAW-10179P, REVISION 9
"SAFETY CRITERIA AND METHODOLOGY FOR ACCEPTABLE CYCLE RELOAD ANALYSES"
AREVA INC.
PROJECT NO. 728
CAC NO. MF8167

RAI-1

Step 2 of the process delineated on page 1-5 of Topical Report (TR) BAW-10179, Revision 9, "Safety Criteria and Methodology for Acceptable Cycle Reload Analyses" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16106A285) appears not to reflect the practice used most recently between the U.S. Nuclear Regulatory Commission (NRC) and AREVA Inc. (AREVA) in two noteworthy respects. First, the NRC has provided separate safety evaluations (SEs) approving BAW-10179 revisions and new methodology TRs. In addition, Revision 7 incorporated all material that had previously been included in appendices. Revision 9, presently under review, also incorporates appendices into the main body of the TR. Please consider revised wording for Step 2 to incorporate this recent practice.

RAI-2

In Section 4.2.5.1 of the TR, additional clarification regarding AREVA's approach to satisfying the American National Standards Institute/American Nuclear Society (ANSI/ANS) 57.5, "Light Water Reactors Fuel Assembly Mechanical Design and Evaluation," event classification scheme is warranted.

First, the NRC staff observed that the methods in the TR take a specific approach to the ANSI/ANS-57.5 event classification scheme that is inconsistent with the final, revised criterion in Section 4.2.5.1. Specifically, page 2-2 of the TR states, "AREVA assures compliance with the NRC regulations by requiring the limiting Condition III transient to meet the acceptance criteria for Condition II events." However, the criteria for stress levels **[**
] in Section 4.2.5.1 of the TR.

Furthermore, the discussion in Section 4.7, "Fuel Rod Mechanical Fracturing," of the SE approving BAW-10227P-A, "Evaluation of Advanced Cladding and Structural Material (M5®) in PWR Reactor Fuel" (ADAMS Accession No. ML15162B043), appears to relate more to design criteria applicable specifically to Condition IV events, discussing the process used to evaluate postulated accidents. Note that, in Figure 2-1 of the TR, the majority of overlap between the NRC's accident classification occurs with the ANSI/ANS-57.5 Condition IV event. Also, the unrevised criterion, in discussing solely a faulted condition, appears more consistent with the discussion in Section 4.7 of the BAW-10227 SE, which discusses accident conditions. This is reflected also in the Revision 8 and earlier wording in Section 4.1.2.1 of the TR, which stated that the limits for fuel rods applied to Condition IV only.

Finally, the discussion in Section 4.7 of the SE approving BAW-10227P-A refers to Revision 3 of BAW-10179 for acceptance criteria, stating that these are unchanged and previously approved. This reference appears circular, and absent further explanation, does not properly justify the proposed revision to the acceptance criterion.

Therefore, for several reasons, this proposed revision appears inadequately justified and inconsistent with referenced, supporting documentation. Please provide additional information to explain, and consider proposing a revision that rectifies the noted inconsistencies. For example, explain whether fuel rod performance under Condition III event conditions is evaluated by applying limiting conditions associated with the less frequent, but more severe, Condition IV events.

RAI-3

Regarding the allowable stress intensity, for which a distinction between Zircaloy and M5® and stainless steel and Inconel is proposed to be made, the allowable membrane stress intensity for stainless and Inconel does not indicate that the limit at room temperature must be the least of 2/3 S_y (minimum yield stress) or 1/3 S_u (ultimate stress). Given the difference in wording, and the use of the phrase "whichever is less at room temperature" in the Zircaloy and M5 limits, please provide a justification for applying different, and apparently less restrictive, criteria to stainless and Inconel.

RAI-4

In Section 4.1.9.2 of the TR, proposed changes appear to remove specificity from, and relax requirements in, the reload licensing document. The prior revisions state that the combined seismic and loss-of-coolant accident (LOCA) loads must be within **[ ]**, whereas the proposed revision states that that maximum load must be within the limit defined in BAW-10133P-A, "Mark C Fuel Assembly LOCA – Seismic Analysis," and supplements. In addition, this paragraph (on page 4-9 of the TR) changes a stated requirement so that it now appears as a logical conclusion. Previously, the TR stated, "**[ ]**" The statement is now changed to conclude, "**[ ]**" Please clarify which limits, specifically, are referenced in BAW-10133 and supplements, and explain whether the requirement related to **[ ]**. If so, provide a basis for doing so.

RAI-5

In Section 4.2.9.2 of the TR, the revised text will shift the reload safety analysis method from one in which the **[ ]**. Please provide a basis for this change.