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U.S. Nuclear Regulatory Commission
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11555 Rockville Pike
Rockville, MD 20852

Request for NRC Concurrence Regarding the Applicability of Topical Report BAW-2149A "Evaluation of Replacement Rods in BWFC Fuel Assemblies" to Cores Containing Fresh Fuel Assemblies With Stainless Steel Rods

AREVA Inc. (AREVA) requests NRC concurrence (by letter) that the topical report BAW-2149A (Reference 1) is applicable to cores containing fresh fuel assemblies containing stainless steel rods as well as reconstituted fuel assemblies. Following receipt of a letter from the NRC, indicating concurrence that the topical report BAW-2149A is applicable to fresh fuel assemblies, AREVA plans to submit a revision to BAW-10179PA (Reference 2), reflecting the NRC concurrence letter.

BAW-2149A was created to address GL 90-02 Supplement 1, which was related to reconstituted fuel assemblies. BAW-2149A requires that a plant/cycle specific evaluation be performed for the reconstituted fuel assembly. The topical report identifies the plant/cycle specific analyses that are required for the revised design and demonstrates that the approved methods are applicable to the revised design.

Generic Letter GL 90-02 and its supplement (References 3 and 4), were issued to provide guidance on changes to the technical specifications to allow the use of replacement rods to replace failed fuel rods in burnt fuel (an action termed reconstitution). The replacement rods addressed were fuel cladding containing an inert material, solid stainless steel rods or open water channels. GL 90-02 states "The substitution of filler rods or open water channels for fuel rods is acceptable when justified by cycle-specific reload analyses using an NRC-approved methodology." GL 90-02 Supplement 1 was issued to revise the acceptable wording in the technical specifications because some licensees were using configurations of replacement rods without justifying that the NRC-approved methodology was applicable to the replacement rod configuration. GL 90-02 supplement 1 states: "The U.S. Nuclear Regulatory Commission (NRC) is issuing this supplement to Generic Letter (GL) 90-02 to clarify the limitations on the application of currently NRC-approved analytical methods to withdraw and replace the model technical specifications (TS) which were recommended by GL 90-02, to be consistent with the realistic reconstitution configurations."

AREVA INC.

3315 Old Forest Road, Lynchburg, VA 24501
Tel.: 434 832 3000 - www.aveva.com

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The key argument presented in BAW-2149A (and approved by the NRC) is that the CHF correlation is applicable to cores containing fuel assemblies with replacement rods based on the limiting fuel rod sub-channel in the core or affected fuel assembly and not based on the non-limiting fuel rod sub-channel adjacent to the replacement rod. This requires a cycle specific evaluation to demonstrate that the fuel rod sub-channels next to the replacement rods are not limiting. The CHF correlation may not be applicable to the fuel rod sub-channels next to the stainless steel replacement rods due to the creation of a configuration not represented by the CHF tests. This is the case if two or more stainless steel rods are adjacent to each other creating a fuel rod sub-channel with two unheated walls. The justification for the use of the CHF correlations for cores containing stainless steel rods is not limited to fuel reconstitution (which occurs in irradiated fuel assemblies) and is equally applicable to cores containing fresh fuel assemblies with stainless steel rods.

The technical content of BAW-2149A is applicable to fresh fuel, but AREVA did not request that the NRC approve it for this use because the topical report was submitted in response to GL 90-02 Supplement 1.

The motivation to use stainless steel rods in fresh fuel assemblies is to improve plant safety. Plant safety is improved through the placement of the stainless steel rods on the periphery of select fresh fuel assemblies that will be loaded in specific locations adjacent to the reactor baffle. This positions the stainless steel rods in locations that may be susceptible to fuel rod failure due to mechanical interaction with the baffle. These fuel assemblies may also be located in interior core positions during their time in the reactor.

In summary, AREVA requests NRC concurrence (by letter) that the topical report BAW-2149A (Reference 1) is applicable to cores containing fresh fuel assemblies containing stainless steel rods as well as reconstituted fuel assemblies. AREVA would appreciate it if the NRC could respond by the end of 2016.

There is one commitment within this letter. Following receipt of a letter from the NRC, indicating concurrence that the topical report BAW-2149A is applicable to cores containing fresh fuel assemblies with stainless steel rods, AREVA will reflect the NRC concurrence letter in the next revision to BAW-10179PA (Reference 2).

If you have any questions related to this information, please contact Ms. Gayle F. Elliott, (Product Licensing Manager) by telephone at 434-832-3347, or by e-mail at Gayle.Elliott@areva.com.

Sincerely,



Gary Peters, Director
Licensing & Regulatory Affairs
AREVA Inc.

cc: J. G. Rowley
Project 728

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- Ref. 1: BAW-2149A, "Evaluation of Replacement Rods in BWFC Fuel Assemblies", September 1993
- Ref. 2: BAW-10179PA Revision 8, "Safety Criteria and Methodology for Acceptable Cycle Reload Analyses", May 2010
- Ref. 3 : Generic Letter 90-02, "Alternative Requirements for Fuel Assemblies in Design Features Section of Technical Specifications", February 1, 1990
- Ref. 4 : Generic Letter 90-02 Supplement 1, "Alternative Requirements for Fuel Assemblies in Design Features Section of Technical Specifications", July 31, 1992