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March 23, 2012

Mr. Pedro Salas, Manager
Site Operations and Regulatory Affairs
AREVA NP Inc.
3315 Old Forest Road
Lynchburg, VA 24501

SUBJECT: NUCLEAR FUEL THERMAL CONDUCTIVITY DEGRADATION EVALUATION
FOR LIGHT WATER REACTORS USING AREVA CODES AND METHODS
(TAC NO. ME5178)

Dear Mr. Salas:

The U.S. Nuclear Regulatory Commission (NRC) has concerns regarding the use of historical fuel thermal conductivity models in the safety analysis of operating reactor plants. This issue has been documented in NRC Information Notice (IN) 2009-23 (Agencywide Document Access and Management System Accession No. ML091550527), dated October 8, 2009. Following the issuance of IN 2009-23, the NRC staff completed a preliminary review of the impact of fuel thermal conductivity models on the reactor safety analysis codes by the major fuel vendors. The enclosure to this letter provides the assessment of the AREVA NP Inc. (AREVA) models and computer codes used for light water reactors.

The NRC staff has determined through this review that several currently approved analysis methods provide results that are less conservative than previously understood. The NRC staff has recently been presented with information by Westinghouse Electric Company that shows the inclusion of an updated thermal conductivity degradation model in the safety analysis could cause compliance issues with the regulations of Title 10 of the *Code of Federal Regulations* Section 50.56 (10 CFR 50.46). It is incumbent upon AREVA to inform all licensees using AREVA evaluation models of any analytical changes resulting from the information contained in the attached assessment report that could affect the licensees' compliance with the regulations of 10 CFR 50.46.

In addition to informing licensees about possible impacts on 10 CFR 50.46 compliance, the NRC staff requests that AREVA evaluate the magnitude of the effect of fuel thermal conductivity degradation on the relevant parameters of interest outlined in the enclosure (e.g., fuel centerline temperature, peak cladding temperature, rod internal pressure), and determine whether the specified acceptable fuel design limits for any licensing basis analysis using AREVA models and codes are exceeded if the thermal conductivity degradation as a function of burnup is included in the analysis. The NRC staff anticipates that AREVA will enter this issue into its corrective action program.

Enclosure 1 transmitted herewith contains proprietary information. When separated from Enclosure 1, this document is decontrolled.
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AREVA's cooperation in providing information detailing the fuel thermal conductivity model(s) that AREVA is currently using in the safety analyses of operating reactors and a list of the operating reactors that are currently using AREVA thermal-hydraulic and fuel performance models and codes will assist the NRC staff in resolving this issue. The NRC staff requests a telephone conference after receipt of this letter to discuss AREVA's plan forward.

The NRC staff anticipates receiving your written response to the stated concerns within 30 days of receipt of this letter. Based on the information received from AREVA, the NRC staff will be able to better plan any future actions on this issue.

The NRC staff has issued NRC IN 2011-21, "Realistic Emergency Core Cooling System Evaluation Model Effects Resulting From Nuclear Fuel Thermal Conductivity Degradation" (ADAMS Accession No. ML113430785), dated December 13, 2011. This IN addresses the potential for thermal conductivity degradation to cause errors in realistic emergency core cooling system evaluation models. On February 16, 2012, the NRC staff issued letters pursuant to 10 CFR 50.54(f) to several licensees that use Westinghouse-furnished realistic emergency core cooling system evaluation models to request additional information regarding the effects of the error associated with thermal conductivity degradation. Additionally, the NRC staff will also issue an update to IN 2009-23 to communicate to licensees the concerns stated in this letter. If you have any questions regarding the enclosed document, please contact Mr. Anthony Mendiola at 301-415-1053.

Sincerely,

/RA/

Timothy J. McGinty, Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 728

Enclosures:

1. Staff Assessment of AREVA Codes and Methods with Regard to Thermal Conductivity Degradation - Proprietary
2. Staff Assessment of AREVA Codes and Methods with Regard to Thermal Conductivity Degradation - Non-Proprietary

P. Salas

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ADAMS Accession Nos.: ML120580690 (Cover Letter); ML120580716 (Package); ML120580710 (Enclosure 1); ML120740363 (Enclosure 2); *via e-mail

NRR-106

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