

March 23, 2012

Mr. Jerald G. Head
Senior Vice President, Regulatory Affairs
GE-Hitachi Nuclear Energy Americas, LLC.
P.O. Box 780, M/C A-18
Wilmington, NC 28401-0780

SUBJECT: NUCLEAR FUEL THERMAL CONDUCTIVITY DEGRADATION EVALUATION
FOR LIGHT WATER REACTORS USING GE-HITACHI NUCLEAR ENERGY
CODES AND METHODS (TAC NO. ME6598)

Dear Mr. Head:

The U.S. Nuclear Regulatory Commission (NRC) has concerns regarding the use of historical fuel thermal conductivity models in the safety analyses 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 GE-Hitachi Nuclear Energy's (GEH's) 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 50.46 (10 CFR 50.46). It is incumbent upon GEH to inform all licensees using GEH 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 GEH 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 GEH models and codes are exceeded if the thermal conductivity degradation as a function of burnup is included

Enclosure 1 transmitted herewith contains proprietary information. When separated from Enclosure 1, this document is decontrolled.

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in the analysis. The NRC staff anticipates that GEH will enter this issue into its corrective action program.

GEH's cooperation in providing information detailing the fuel thermal conductivity model(s) that GEH is currently using in the safety analyses of operating reactors and a list of the operating reactors that are currently using GEH 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 GEH'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 GEH, 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 301-415-1054.

Sincerely,

/RA/

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

Project No. 710

Enclosures:

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

cc w/encl 2 only: See next page

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ADAMS ACCESSION NOS.: Package: ML120680599; Enclosure 2 (Non-Proprietary): ML120750001;
Enclosure 1 (Proprietary): ML120680592; Letter: ML120680571

NRR-106

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GE-Hitachi Nuclear Energy Americas
cc:

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Mr. James F. Harrison
GE-Hitachi Nuclear Energy Americas LLC
Vice President - Fuel Licensing
P.O. Box 780, M/C A-55
Wilmington, NC 28401-0780
james.harrison@ge.com

Ms. Patricia L. Campbell
Vice President, Washington Regulatory Affairs
GE-Hitachi Nuclear Energy Americas LLC
1299 Pennsylvania Avenue, NW
9th Floor
Washington, DC 20004
patriciaL.campbell@ge.com

Mr. Andrew A. Lingenfelter
Vice President, Fuel Engineering
Global Nuclear Fuel–Americas, LLC
P.O. Box 780, M/C A-55
Wilmington, NC 28401-0780
Andy.Lingenfelter@gnf.com

Edward D. Schrull
GE-Hitachi Nuclear Energy Americas LLC
Vice President - Services Licensing
P.O. Box 780, M/C A-51
Wilmington, NC 28401-0780
Edward.schrull@ge.com