

May 16, 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: REQUEST FOR ADDITIONAL INFORMATION RE: GE-HITACHI NUCLEAR  
ENERGY AMERICAS TOPICAL REPORT (TR) NEDE-33147P, REVISION 3,  
“DSS-CD TRACG APPLICATION” (TAC NO. ME5406)

Dear Mr. Head:

By letter dated January 27, 2011 (Agencywide Documents Access and Management System Accession No. ML110270072), GE-Hitachi Nuclear Energy Americas submitted for U.S. Nuclear Regulatory Commission (NRC) staff review TR NEDE-33147P, Revision 3, “DSS-CD TRACG Application.” Upon review of the information provided, the NRC staff has determined that additional information is needed to complete the review. On March 30, 2012, James F. Harrison, Vice President - Fuel Licensing, and I agreed that the NRC staff will receive your response to the enclosed Request for Additional Information (RAI) questions by May 31, 2012. If you have any questions regarding the enclosed RAI questions, please contact me at 301-415-2365 or [Stephen.Philpott@nrc.gov](mailto:Stephen.Philpott@nrc.gov).

Sincerely,

*/RA/*

Stephen S. Philpott, Project Manager  
Licensing Processes Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Project No. 710

Enclosures:

1. RAI questions (Non-Proprietary)
2. RAI questions (Proprietary)

cc w/encl 1 only: See next page

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REQUEST FOR ADDITIONAL INFORMATION  
BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
NEDE-33147P, REVISION 3  
“DSS-CD TRACG APPLICATION”  
GE-HITACHI NUCLEAR ENERGY AMERICAS, LLC  
PROJECT NO. 710

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed Revision 3 to GE-Hitachi Nuclear Energy Americas (GEH) Licensing Topical Report (LTR) NEDE-33147P and NEDO-33147, “DSS-CD [Detect and Suppress Solution – Confirmation Density] TRACG [Transient Reactor Analysis Code – GEH proprietary version] Application” and identified the following additional information needed to complete its review.

RAI-1      Approved Code Versions

NEDE-33147P, Revision 3, states that “Best-estimate analyses performed with TRACG have been approved by the NRC to support licensing applications in different areas, including specific T-H [thermal-hydraulic] instability performance and Anticipated Operational Occurrence (AOO) transients.” Please provide a reference to the most recent versions of the approved (“-A”) TRACG LTRs for those topics, if different from References 4-6 of NEDE-33147P. Which version of the TRACG code is approved?

RAI-2      Applicability of DSS-CD TRACG04 Methodologies to Other Designs

NEDE-33147P, Revision 3, Section 1.3, states that “GEH requests approval of the TRACG04 code for the application to the analysis of BWR [boiling water reactor]/3-6 plants employing the DSS-CD stability solution.” The Economic Simplified Boiling Water Reactor (ESBWR) is expected to use DSS-CD as a backup solution. Will the TRACG04-based DSS-CD methodology also be applicable to ESBWR?

RAI-3      Applicability to the Advanced Boiling Water Reactor (ABWR)

Assuming DSS-CD was approved for use in ABWR, what process would be required to use TRACG04 methodology in that application?

RAI-4 Code Scaling, Applicability and Uncertainty (CSAU) Applicability to non-LOCA Events

NEDE-33147P, Revision 3, Section 2.2, states that "While the CSAU methodology was developed for application to Loss-of-Coolant Accident (LOCA) scenarios, there are no technical reasons that prevent CSAU methodology from being applied to other event scenarios, such as stability." Please provide references of "-A" LTRs in which the CSAU methodology has been used for non-LOCA events.

RAI-5 TRACG04 Version

NEDE-33147P, Revision 3, Section 2.2.1, states that "A frozen code version (TRACG04P) has been used in this evaluation." What quality assurance level is version P? Please provide additional details (e.g., compilation date, etc.) to further define the version of TRACG04 used in this evaluation.

RAI-6 Bypass Boiling

How do TRACG calculations account for bypass boiling? Please provide a very short description of how the bypass is modeled, and how it handles feedback of the cross-sections during the transient calculation. Is the hot-channel bypass modeled in TRACG04, or only an average bypass region? How do bypass region results compare with ISCOR (a BWR steady-state thermal hydraulic methodology) calculations?

RAI-7 Control Rod Patterns to Excite Regional Mode

Section 4.2.6 states that [

] Please provide some examples of [ ]

RAI-8 Solution Uniqueness

Section 4.2.7, "Instability Solution Uniqueness," does not seem to address the issue of uniqueness. Please describe the purpose of this section and/or provide additional uniqueness information.

RAI-9 Scram Time for Example in Figure 8-5

Section 8.1, "Best Estimate TRACG Simulation," states [ ] Please indicate the time of scram in Figure 8-5 to show graphically the final critical power ratio (CPR).

## RAI-10      Uncertainty Values

Table 8-1 provides the [ ] Please provide the actual results of the statistical analysis in terms of percent minimum CPR (MCPR) per sigma.

## RAI-11 Figure 8-23 Labels

The labels in Figure 8-23 are not clear. Please explain the meaning of “Statistical CSAU SLMCPR [safety limit MCPR]” and “Nominal SLMCPR.” Please add this explanation to the text of the LTR.

## RAI-12 Process for Implementing [ ]

Please describe the process used to calculate the [ ] curve in Figure 8-23. How is the calculation performed?

## RAI-13 TRACG04 Configuration Options

Please specify the required TRACG04 configuration options for stability calculations (e.g., full-core channel mapping, axial nodalization, semi-implicit method, etc.).

## RAI-14 Dryout Correlation Applicability to Oscillatory Conditions

Please provide a reference and/or a short description of the justification of the applicability of GEH CPR correlations under oscillatory flow conditions.

## RAI-15 Process to implement Future Dryout Correlations

Please define the process to be used to implement future CPR correlations in the DIVOM or DSS-CD calculation procedure. Specify what criteria will be used to evaluate whether a new CPR correlation needs to be benchmarked against oscillatory dryout rewet data.

GE-Hitachi Nuclear Energy Americas

cc:

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