HITACHI

GE Hitachi Nuclear Energy

James F. Harrison

GE Hitachi Nuclear Energy Americas LLC
Vice President, Fuels Licensing, Regulatory Affairs
P.O. Box 780, M/C J-70
Wilmington, NC 28401 USA

T 910.819.6604
james.harrison@ge.com

MFN 08-807
October 29, 2008

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: NEDC-33075P-A Detect and Suppress Solution - Confirmation Density (DSS-CD) Analytical Limit (TAC No. MD0277)

By Reference 1, the NRC approved the DSS-CD stability solution LTR, NEDC-33075P (Reference 2). During a call on September 8, 2008, GEH discussed with the NRC its interpretation of the Technical Evaluation Report (TER) accompanying the NRC's Safety Evaluation. GEH concluded that the NRC recognized that DSS-CD is intended to protect the fuel design limits consistent with other long-term stability solutions such as Option III, Option I-D, Option II and Enhanced Option I-A, and that the DSS-CD methodology uses the safety limit minimum critical power ratio (SLMCPR) only as an analytical basis to determine safety margins. The NRC agreed with GEH's interpretation of its review.

Specifically, page 5 of the TER states:

> "Because DSS-CD does not require a setpoint calculation, GENE demonstrates compliance with the SAFDLs [Specified Acceptable Fuel Design Limits] by 'example.'"

GEH interpreted that sentence as recognition that DSS-CD is designed to protect the fuel design limits. GEH explained that the discussions regarding the SLMCPR protection in the DSS-CD LTR documents the DSS-CD methodology use of the SLMCPR as an analytical limit to determine safety margins. Section 2.1 of NEDC-33075P states:

> "In addition, conservatism is introduced in the design philosophy by selecting the SLMCPR to demonstrate protection of fuel cladding integrity for anticipated stability events. The SLMCPR is a conservative limit for this application because the fuel and clad responses to stability related oscillations are relatively mild even if the critical power ratio falls below the SLMCPR. The DSS-CD initiated control rod insertion assures that the hot bundle only experiences a few oscillations prior to scram. If a fuel rod actually experienced boiling transition, the cyclic nature of the event would result in clad rewet

> approximately every two seconds. A few oscillations in which the clad rewets would result in a negligible cladding temperature transient. This has been demonstrated in the assessment of Reference 4, showing that, as long as the clad rewets between cycles, the clad temperature increase is typically less than 100°F for oscillations up to 200% of rated power. Therefore, use of the SLMCPR as the acceptance criterion is conservative in protecting the fuel."

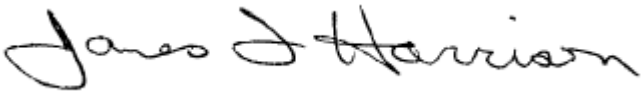
During the discussions, GEH noted that the TER accompanying the NRC Safety Evaluation for NEDC-32465P, regarding long-term stability solutions Option III and Option I-D (Reference 3) states:

> "We [the NRC] find that the use of a "fairly-conservative" delta-CPR correlation in conjunction with a statistical distribution of operation conditions results in a high-likelihood that fuel integrity will not be compromised for the likely instability events. We [the NRC] must note, however, that this statistical approach allows for a 5% probability that the CPR limit will be reached during an instability event. The consequences of this, however, should be minor given the oscillatory nature of the power, where periodic cladding rewet is expected if the oscillations are suppressed promptly."

The TER for Option III and Option I-D document that the CPR limit could be reached during a stability event and that the fuel integrity is the objective of the protection. During the discussions, GEH and the NRC agreed that, due to the nature of the stability oscillations, a similar interpretation applied to DSS-CD. Therefore, the TER for NEDC33075P documents that the SAFDLs are used to establish compliance consistent with the DSS-CD LTR.

If you have any questions, please contact Mike Lalor at (408) 925-2443 or me.

Sincerely,



James F. Harrison
Vice President, Fuels Licensing
Regulatory Affairs
GE Hitachi Nuclear Energy

Project No. 710

References:

1. NRC Letter, H.K Nieh (NRC) to R.E. Brown (GEH), "Final Safety Evaluation for General Electric Nuclear Energy (GENE) Licensing Topical Report (LTR) NEDC-33075P, Revision 5, General Electric Boiling Water Reactor Detect and Suppress Solution - Confirmation Density, dated November 27, 2006 (MFN 06-496).
2. NEDC-33075P-A, "General Electric Boiling Water Reactor Detect and Suppress Solution - Confirmation Density," Revision 6, January 2008.
3. NRC Letter, R.C Jones (NRC) to R.A. Pinelli (BWROG), "Acceptance for Referencing of Topical Report NEDC-32465, 'BWR Owners Group Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology and Reload Applications," dated March 4, 1996.

cc: JG Head, GEH/Wilmington
AK Chung, GEH/San Jose
MJ Colby, GEH/Wilmington
PT Tran, GEH/Vallecitos
MA Lalor, GEH/San Jose
RE Brown, GEH/Wilmington
MC Honcharik, NRC
SS Philpott, NRC
eDRF 0000-0004-3311

Document Components:
001 MFN 08-807 Letter.pdf