



**HITACHI**

**GE Hitachi Nuclear Energy**

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Subject: **Response to Portion of NRC Request for Additional  
Information Letter No. 147 - Related to ESBWR Design  
Certification Application – RAI Number 21.6-111**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by the Reference 1 NRC letter. GEH response to RAI Number 21.6-111 is addressed in Enclosure 1.

If you have any questions or require additional information, please contact me.

Sincerely,

James C. Kinsey  
Vice President, ESBWR Licensing

DO68  
NRC

Reference:

1. MFN 08-095, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 147 Related to the ESBWR Design Certification Application*, dated January 31, 2008.

Enclosure:

1. MFN 08-504 – Response to Portion of NRC Request for Additional Information Letter No. 147 - Related to ESBWR Design Certification Application – RAI Number 21.6-111

cc: AE Cubbage      USNRC (with enclosure)  
GB Stramback      GEH/San Jose (with enclosure)  
RE Brown          GEH/Wilmington (with enclosure)  
DH Hinds          GEH/Wilmington (with enclosure)  
eDRF                0000-0085-9866

**Enclosure 1**

**MFN 08-504**

**Response to Portion of NRC Request for**

**Additional Information Letter No. 147**

**Related to ESBWR Design Certification Application**

**RAI Number 21.6-111**

**NRC RAI 21.6-111**

*Describe the process for accounting for the void history bias in the TRACG04 nodal void reactivity coefficient.*

TRACG internally models the response surface for the void coefficient biases and uncertainties for known dependencies due to the relative moderator density and exposure on a nodal basis. Section 2.8.7 of the Vermont Yankee extended power uprate (EPU) safety evaluation report (Reference 1) reviewed the impact of the void history bias on the safety analyses. RAI SRXB-A-68 response (Reference 2) quantified the void history bias and discussed its impact. Section 2.2.2.2, Treatment of Fuel Parameter Uncertainties, of Reference 3 also addressed the void history bias. Based on the quantified void history bias typical for the fuel designs typical of the EPU and the maximum extended load line limit analysis plus (MELLLA+) operating domain, modify the TRACG methodology to account for void history bias. The void history bias can be incorporated into the response surface known bias or through changes in lattice physics/core simulator methods for establishing the instantaneous cross-sections. Including the void history bias in the methodology negates the need for ensuring that each plant-specific application has sufficient margin available to account for the impact of the void history bias. Revise the nodal void reactivity coefficient biases and uncertainties and incorporate the void history biases. Provide sufficient technical details for the NRC staff to assess that the void history bias applied on a nodal level will conservatively bound the non-conservatisms in the current assumptions for nodes depleting at high void conditions.

**References**

1. Vermont Yankee Nuclear Power Station - Draft Safety Evaluation for the Proposed Extended Power Uprate (TAC No. MC0761), October 21, 2005. (ML052910200)
2. BVY 05-088 Letter, J. Thayer (Vermont Yankee) to NRC, Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263, Supplement No. 35, Extended Power Uprate - Response to Request for Additional Information, September 28, 2005. (ML052770039)
3. NEDC-33173P, Applicability of GE Methods to Expanded Operating Domains, February 2006. (ML060720281)

**GEH Response**

This RAI is a duplicate of RAI #30 tracked under TAC # MD2569 for NEDE-32906P, Supplement 3: "Migration to TRACG04/PANAC11 from TRACG02/PANAC10 for TRACG AOO and ATWS Overpressure Transients". The process used to account for void history in the TRACG04 nodal void reactivity coefficient has been described in the response to RAI #30 transmitted via MFN-08-483 under TAC # MD2569 and will not be repeated here.

**DCD Impact**

No DCD changes will be made in response to this RAI.

LTR NEDE-32906P, Supplement 3 will be revised to incorporate the materials from the response to RAI #30. This item is handled under TAC # MD2569 since it is not specific to the ESBWR.