

January 10, 2008

Mr. Robert E. Brown
Senior Vice President, Regulatory Affairs
GE-Hitachi Nuclear Energy Americas LLC
3901 Castle Hayne Road MC A-45
Wilmington, NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 137
RELATED TO ESBWR DESIGN CONTROL DOCUMENT REVISION 4

Dear Mr. Brown:

By letter dated August 24, 2005, GE-Hitachi Nuclear Energy Americas, LLC (GEH) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

Pursuant to 10 CFR 2.390, we have determined that the enclosed RAI contains proprietary information. We have prepared a non-proprietary version of the RAI (Enclosure 1) that does not contain proprietary information. The proprietary information is indicated in brackets and underlined in Enclosure 2. We will delay placing this document in the public document room for a period of ten (10) working days from the date of this letter to provide you with the opportunity to comment on the proprietary aspects only. If you believe that any additional information in the enclosure is proprietary, please identify such information line by line and define the basis pursuant to the criteria of 10 CFR 2.390 before the public release date.

To support the review schedule, you are requested to provide the requested additional information within 45 days of the date of this letter.

ENCLOSURE 2 CONTAINS SENSITIVE PROPRIETARY INFORMATION

R. Brown

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If you have any questions or comments concerning this matter, you may contact me at 301-415-6715 or bmb2@nrc.gov or you may contact Amy Cubbage at 301-415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Bruce Bovol, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-010

Enclosure:

1. Request for Additional Information (Non-Proprietary)
2. Request for Additional Information (Proprietary)

cc: See next page (w/o enclosure 2)

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Sincerely,

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Bruce Baval, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

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ENCLOSURE 2 CONTAINS SENSITIVE PROPRIETARY INFORMATION

Supplemental Request for Additional Information (RAI)

RAI number	Reviewer	Summary	Full Text
4.2-15	Thomas G Van Wert C Gilmer J	Tier 2* designation for fuel bundle and control blade design, and associated core design and methods specific to GE14E fuel	<p>Please designate the following references as Tier 2* information in DCD, Revision 5:</p> <p>4.2-4 GE Nuclear Energy, "GE14 for ESBWR Fuel Assembly Mechanical Design Report", NEDC-33240P, Class III (proprietary), January, 2006.</p> <p>4.2-5 GE Nuclear Energy, "GE14 for ESBWR Fuel Rod Thermal-Mechanical Design Report", NEDC-33242P, Class III (proprietary), Revision 1, February, 2007.</p> <p>4.2-8 GE Nuclear Energy, "ESBWR Marathon Control Rod Mechanical Design Report", NEDC-33244P, Class III (proprietary), Revision 1, November, 2007.</p> <p>4.2-9 GE Nuclear Energy, "ESBWR Marathon Control Rod Nuclear Design Report", NEDE-33243P, Class III (proprietary), Revision 1, November, 2007.</p> <p>4.3-8 Global Nuclear Fuel, "GE14 for ESBWR Nuclear Design Report", NEDC-33239-P, Class III (Proprietary), Revision 2, April, 2007, NEDO-33239, Class I (Non proprietary), Revision 2, April, 2007.</p> <p>4.4-12 GE Nuclear Energy, "GE14 for ESBWR-Critical Power Correlation, Uncertainty, and OLMCPR Development", NEDC-33237P, Revision 2, Class III (proprietary), April, 2007.</p> <p>4.3-10 Global Nuclear Fuel, "GE14E for ESBWR Initial Core Nuclear Design Report", NEDC-33326P, Class III (Proprietary), Revision 0, July, 2007, NEDO-33326, Class I (Nonproprietary), Revision 0, July, 2007.</p>

Enclosure 1

4.3-11	Yarsky P	Provide additional details regarding the initial core shutdown margin calculation	<p>The initial core nuclear design includes a calculation of the shutdown margin (SDM). The shutdown margin prediction is based on a prediction of the [[]].</p> <p>The staff requires additional details regarding the [[]]. Please provide (1) the technical basis for the [[]], and (2) qualification of the [[]] based on relevant operating experience with similar fuel designs for fresh initial or predominantly fresh restart cores.</p>
4.4-68	Yarsky P	Verify the R-factor method	Verify that the initial core R-factors are calculated consistent with the nodal void conditions.
4.6-38	Yarsky P	Compliance with General Design Criterion 28, reactivity limits	<p>Provide the results of a control rod drop accident analysis for the <u>initial core</u> to demonstrate compliance with GDC 28.</p> <p>In RAI 4.6-23 S02 staff requested that a control rod drop accident analysis be performed for the ESBWR equilibrium core.</p> <p>From the review of LTR NEDC-33326 staff requests that the same analysis be performed for the initial core. It is sensitive to banked position withdrawal sequence (BPWS), core design, and rod worth. These are core/cycle dependent parameters. It would not be possible to draw conclusions regarding the initial core from the equilibrium core analysis.</p>

7.2-59 S02	Yarsky P	Additional information required to review Automatic Fixed In-Core Probe (AFIP) application to transient core monitoring	<p>This RAI pertains to the GEH Licensing Topical Report NEDC-33197P, Gamma Thermometer (GT) System for LPRM and Power Shape Monitoring.</p> <p>The response to RAI 7.2-59 S01 indicates that GEH is pursuing approval of the [[]] model to use the AFIPs to monitor core power evolutions during “slow” transients.</p> <p>The staff has been reviewing the application for the use of AFIP to replace the Transverse In-Core Probe (TIP) system for core power shape measurement and Local Power Range Monitor (LPRM) calibration. The staff has not been reviewing this application for direct core monitoring.</p> <p>GDC 13 requires instrumentation be provided to monitor variables (such as core power level and distribution) over their normal operating range. The LPRMs fulfill the requirements of GDC 13 by providing local indications that are directly proportional to local flux and are regularly calibrated.</p> <p>The use of AFIPs to monitor core power during transient conditions requires [[]]. The [[]] is calculated by assuming a [[]].</p> <p>In response to RAI 7.2-59 GEH stated that “If GTs are chosen as AFIPs for the ESBWR and the [[]] is utilized, its uncertainties will be factored into the total uncertainty analysis.”</p> <p>The staff finds that without consideration of the [[]] the GTs cannot meet the requirements of GDC 13 because they [[]].</p>
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			<p>Therefore, the staff cannot begin review of the use of the [[]] until GEH uses all applicable experimental data to:</p> <ul style="list-style-type: none"> (1) clearly and concretely define what is meant by the term “slow,” (2) assess the uncertainties in the [[]] model for the stipulated conditions in (1), and (3) include an Operating Limit Minimum Critical Power Ratio (OLMCPR) penalty that is demonstrated to be adequately conservative to protect 99.9% of the fuel rods from boiling transition <p>The staff must clarify that the use of GT signals to automatically initiate safety systems will not meet the requirements of GDC 20. The GTs do not [[]], as required by GDC 20.</p>
15.0-30	Thomas G	Appendix 4B.5	<p>15.0 Analytical Approach, First paragraph</p> <p>Reference is made to Appendix 4B.5, but Appendix 4B.5 is deleted in Revision 4. Please provide the correct reference.</p>

DC GE - ESBWR Mailing List

(Revised 01/29/2008)

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