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Proprietary Notice
This letter forwards proprietary information in accordance with 10CFR2.390. Upon the removal of Enclosure 1, the balance of this letter may be considered non-proprietary.

MFN 07-347

Docket No. 52-010

June 21, 2007

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

Subject: Response to Portion of NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application – RAI Numbers 21.6-65 and 21.6-85

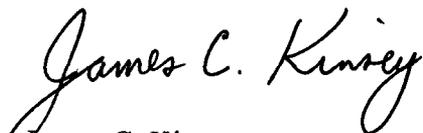
Enclosure 1 contains GHNEA's response to the subject NRC RAIs transmitted via the Reference 1 letter.

Enclosure 1 contains GHNEA proprietary information as defined by 10 CFR 2.390. GHNEA customarily maintains this information in confidence and withholds it from public disclosure. A non-proprietary version is provided in Enclosure 2.

The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GHNEA. GHNEA hereby requests that the information of Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,



James C. Kinsey
Project Manager, ESBWR Licensing

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NRS

Reference:

1. MFN 06-377, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 66 Related to the ESBWR Design Certification Application*, October 10, 2006

Enclosures:

1. MFN 07-347 – Response to Portion of NRC Request for Additional Information Letter No. 66 – Related to ESBWR Design Certification Application –RAI Numbers 21.6-65 and 21.6-85 – GE Proprietary Information
2. MFN 07-347 – Response to Portion of NRC Request for Additional Information Letter No. 66 – Related to ESBWR Design Certification Application –RAI Numbers 21.6-65 and 21.6-85 – Non-Proprietary Version
3. Affidavit – James C. Kinsey – dated June 21, 2007

cc: AE Cabbage USNRC (with enclosures)
DH Hinds GHNEA Wilmington (with enclosures)
BE Brown GHNEA Wilmington (with enclosures)
eDRF 0000-0062-7039 and 0000-0068-8407

Enclosure 2

MFN 07-347

Response to Portion of NRC Request for

Additional Information Letter No. 66

Related to ESBWR Design Certification Application

RAI Numbers 21.6-65 and 21.6-85

Non-Proprietary Version

This is a non-proprietary version of Enclosure 1 of MFN 07-347, which has the proprietary information removed. Portions of the document that have been removed are indicated by white space inside open and closed bracket as shown here [[]].

NRC RAI 21.6-65

Page 4-32 in Section 4.4.2 of NEDC-33083P-A states "The adequacy of the nodalizations has been demonstrated and is supported by sensitivity studies. Standard nodalizations for modeling of ESBWR reactor vessels and other components have been presented in the TRACG Qualification for SBWR [24]."

A. The staff was unable to locate any sensitivity studies in your reference pertaining to the radial channel grouping and azimuthal nodalization of the VESSEL component for the transient analysis. It appears that this nodalization is the same as that presented in NEDC-33083P Supplement 1 TRACG Application for ESBWR Stability Analysis. Confirm if this is true. Provide additional information discussing that this nodalization scheme is adequate for the transient analysis. Discuss how it is adequate to model the various transients.

B. The staff understands that you are not using the CHAN nodalization described in your reference 24 (TRACG Qualification for SBWR). The staff understands that the nodalization that you are using appears to be the same as that described in NEDC-33083P Supplement 1 TRACG Application for ESBWR Stability Analysis. Confirm if this is true. Provide a basis explaining that this nodalization is adequate for performing the transient analysis.

C. Provide diagrams illustrating the VESSEL axial, radial and azimuthal noding and channel grouping. Provide diagrams with nodalizations of all of the components connected to the VESSEL (such as the ICS, CHAN and steamlines) and show how (which nodes) these are connected to the VESSEL.

D. Update your documentation to identify and describe in the same manor any other components that are nodalized differently than what is described in the TRACG Qualification for SBWR report.

GE Response

Part A:

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The vessel axial nodalization used for the ESBWR AOO, and Infrequent Event analysis in [[

]] The AOO, and Infrequent Event analysis in the Chapter 15 of ESBWR DCD Tier 2 also has twenty-four axial levels. The remainder of the discussion of this RAI response will refer to the vessel nodalization, channel nodalization, and channel grouping used for AOO, and the Infrequent Event analysis in the ESBWR DCD Tier 2.

The nodalization diagrams are included in response to Part C of this RAI. [[

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Table 21.6-65-1 Vessel Axial Level Elevations

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]] The results for the base case are available in Chapter 15 of DCD Tier 2.

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DCPR/ICPR Comparison - Load Rejection with Total Bypass Failure (LRNBP)

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Table 21.6-65-2: Channel Grouping for the 40 Channel Group Sensitivity Case

CHAN Group	VSSL Cell #	Number of Bundles	Radial Power Peaking
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Table 21.6-65-3: Channel grouping description for the 28 Channel Group base Case (ESBWR DCD Tier 2).

CHAN Group	VSSL Cell	Number of Bundles	Radial Power Peaking
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The regions in the tables 21.6-65-2 and 21.6-65-3 above correspond to:

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Figure 21.6-65-1a: 40-Channel Group Core map (left-half of the core)

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Figure 21.6-65-1b: 40-Channel Group Core Map (right half of the core)

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Figure 21.6-65-2: Comparison of key parameters between the detailed 40-Channel Group Case and the 28-Channel Group (DCD Tier 2) base case

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Part B:

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Part C:

The sketches describing the nodalization are included in Figures 21.6-65-3 through 21.6-65-5.

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**Figure 21.6-65-3: Azimuthal Nodalization in the vessel.
(Four Rings and Six Asymmetric Azimuthal Sectors)**

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Figure 21.6-65-4: Nodalization Steamlines, IC, DPV, and associated Piping.

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Figure 21.6-65-5: TRACG ESBWR Vessel Nodalization

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Part D:

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[[]] to obtain the design conditions required for the ESBWR licensing compared to SBWR.

References

1. TRACG Application for ESBWR Stability Analysis, NEDC-33083P Supplement 1.
2. TRACG Application for ESBWR Anticipated Transient Without Scram Analyses, NEDC-33083P Supplement 2,
3. TRACG Qualification, NEDE-32177P Revision 2, January 2000.
4. TRACG Qualification for SBWR, NEDC-32725P, Rev.1, Vol.1 and 2, September. 1997.
5. TRACG Application for ESBWR, NEDC-33083-PA, March 2005
6. MFN 04-109, Letter from Robert E. Gamble to U.S. Nuclear Regulatory Commission, Section 4.7, "Demonstration Calculations for ESBWR AOOs," of NEDC-33083P, "TRACG Application for ESBWR"

Affected Documents

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

No changes to the subject LTR will be made in response to this RAI.

NRC RAI 21.6-85

Question Summary: Procedure for generating PANACEA Wrap-up file.

Reviewer Summary: Describe the computational procedure used to generate a PANACEA Wrap up file for use with TRACG as applied in NEDC-33239P. Specifically explain what calculations are performed with PANAC11 and how these results are captured numerically in the PANACEA Wrap up file.

GE Response

TRACG04 requires a PANAC11 wrapup only when running the 3D neutron kinetics model. The PANAC11 wrapup that is typically used with TRACG04 is [[
]] Creation of this wrapup is performed under the overall guidance of AG-0013.02 (Reference 1). The detailed technical procedure for producing the PANAC11 RLP wrapup is TDP-0004 (Reference 2). The NRC staff reviewed these two references during their audit December 11-15 and 19-20, 2006.

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To ensure consistency, TRACG04 contains the kernel of the PANAC11 neutron kinetics model. The components of this model are described in Chapter 9 of the *TRACG Model Description LTR* (NEDE-32176P, Rev. 3) together with the interfaces between the neutronics and hydraulics models.

The contents of the wrapup from PANAC10 were described in detail in response to RAI 21-d transmitted via Reference 3. PANAC10 generated a binary file so TRACG02 had to read the entire contents to obtain the specific inputs that were needed. PANAC11 creates a CEDAR file so TRACG04 can obtain the quantities that it needs without reading the entire file. Nevertheless, the relevant quantities from PANAC10 that are required by TRACG02 and the quantities from PANAC11 that are required by TRACG04 are essentially the same. Exactly what these quantities are for TRACG04/PANAC11 are easily determined from the ECRET and ECRETC calls contained in subroutines DEFINE_VARDIM and ICOREP of the TRACG04 source code that was provided to the NRC. For convenience, these quantities are summarized in Table 21.6-85.1. Those quantities that are read from DEFINE_VARDIM define the variable dimensions for the problem. The second set that is read from ICOREP contains control and tracking information as well as the physical quantities that are required by the PANAC11 kernel routines that are

References

1. Analysis Guide: Reference Loading Pattern – PANAC11, AG-0013.02, Rev 5, January 2002.
2. Technical Design Procedure: Reload Core Loading Pattern, TDP-0004, Rev 7, February 2002.
3. GE Transmittal Letter, MFN-01-043, dated August 21, 2001, Subject: Response to July 26, 2001 NRC Staff Request for Additional Information on General Electric Nuclear Energy Licensing Topical Report NEDE-32906P.

Affected Documents

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

No changes to the subject LTR will be made in response to this RAI.

Enclosure 3

MFN 07-347

Affidavit

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, **James C. Kinsey**, state as follows:

- (1) I am Project Manager, ESBWR Licensing, GE-Hitachi Nuclear Energy Americas LLC (“GHNEA”), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in enclosure 1 of GHNEA’s letter, MFN 07-347, Mr. James C. Kinsey to U.S. Nuclear Energy Commission, entitled “*Response to Portion of NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application – RAI Numbers 21.6-65 and 21.6-85*”, dated June 21, 2007. The proprietary information in enclosure 1, which is entitled “*Response to Portion of NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application – RAI Numbers 21.6-65 and 21.6-85 – GHNEA Proprietary Information*”, is delineated by a [[dotted underline inside double square brackets.^{3}]] Figures and large equation objects are identified with double square brackets before and after the object. In each case, the superscript notation ^{3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.
- (3) In making this application for withholding of proprietary information of which it is the owner or licensee, GHNEA relies upon the exemption from disclosure set forth in the Freedom of Information Act (“FOIA”), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for “trade secrets” (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of “trade secret”, within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:
 - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GHNEA's competitors without license from GHNEA constitutes a competitive economic advantage over other companies;
 - b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;
 - c. Information which reveals aspects of past, present, or future GHNEA customer-funded development plans and programs, resulting in potential products to GHNEA;

- d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b. above.

- (5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GHNEA, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GHNEA, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GHNEA. Access to such documents within GHNEA is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GHNEA are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information identified in paragraph (2) above is classified as proprietary because it contains details of GHNEA's evaluation methodology.

The development of the evaluation process along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GHNEA asset.

- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GHNEA's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GHNEA's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GHNEA.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GHNEA's competitive advantage will be lost if its competitors are able to use the results of the GHNEA experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GHNEA would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GHNEA of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 21st day of June 2007.



James C. Kinsey
GE-Hitachi Nuclear Energy Americas LLC