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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 12-046 Revision 1

Docket number: 05200010

June 5, 2012

Attn: David Misenhimer
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: NRC Requests for Additional Information Related to the Audit of the Economic Simplified Boiling Water Reactor (ESBWR) Steam Dryer Design Methodology Supporting Chapter 3 of the ESBWR Design Control Document – RAI 3.9-272

In regard to the Requests for Additional Information transmitted in your May 1, 2012 Letter, Reference 1, to support the NRC ESBWR Steam Dryer Methodology Audit conducted March 21–23, 2012, Docket 05200010, please find attached the response for RAI 3.9-272.

Enclosure 1 contains proprietary information. The proprietary information is contained within brackets [] and designated in red and dotted underline text, to assist in identification. This RAI contains proprietary information identified by GE-Hitachi Nuclear Energy, Americas LLC, and should be protected accordingly. Enclosure 2 contains the response with the proprietary information redacted and is acceptable for public release. The affidavit provided in Enclosure 3 sets forth the basis for requesting that information identified in Enclosure 1 be withheld from the public.

If you have any questions concerning this letter, please contact Peter Yandow at 910-819-6378.

JDG
HLO

I declare under penalty of perjury that the foregoing information is true and correct to the best of my knowledge, information, and belief.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Head for".

Jerald G. Head
Senior Vice President, Regulatory Affairs

Commitments: None

Reference:

1. MFN 12-037 Letter from USNRC to Jerald G. Head, GEH, Subject: Requests for Additional Information Letter NO. 414 Related to ESBWR Design Certification Application (DCD) Revision 9, received May 1, 2012

Enclosures:

1. Response to RAI 3.9-272 - Proprietary version
2. Response to RAI 3.9-272 – Non-Proprietary version
3. Affidavit

cc: Glen Watford, GEH
Peter Yandow, GEH
Patricia Campbell, GEH
Mark Colby, GEH
eDRF Section: 0000-0147-3933

Enclosure 2

MFN 12-046, Revision 1

Response to RAI 3.9-272

NON-PROPRIETARY VERSION

This is a non-proprietary version of Enclosure 1, from which the proprietary information has been removed. Portions of the document that have been removed are identified by white space within double brackets, as shown here [[]].

IMPORTANT NOTICE REGARDING CONTENTS OF THIS DOCUMENT

Please Read Carefully

The information contained in this document is furnished solely for the purpose(s) stated in the transmittal letter. The only undertakings of GEH with respect to information in this document are contained in the contracts between GEH and its customers or participating utilities, and nothing contained in this document shall be construed as changing that contract. The use of this information by anyone for any purpose other than that for which it is intended is not authorized; and with respect to any unauthorized use, GEH makes no representation or warranty, and assumes no liability as to the completeness, accuracy, or usefulness of the information contained in this document.

RAI 3.9-272

GEH is requested to submit the performance and results of the ongoing strain gage calibration studies, with adjustments to the bias errors and uncertainties for strain gages. Accordingly, GEH is requested to specify applicable ESBWR Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) to confirm the accuracy of the strain gages prior to plant startup.

GEH Response

RAI Response Summary

As a result of testing performed at the strain gage manufacturer's facility in Japan, GEH has determined [[

]] The final stress table will be included in the Power Ascension Test Plan (PATP) and will be used in determining the acceptance limits for the startup. No changes are proposed for the DCD or referenced LTRs.

1. Review of the Installation Procedure

In response to Round 5 RAI 09 (the response to EMCBS-GGNS1-SD-4-RAI-09 provided in Reference 2), the following action was defined by GEH: [[

]]

GEH visited the strain gage manufacturer's facility (Kyowa) in Japan to review vendor recommended installation procedures for welding the strain gages to the steam dryer. GEH reviewed with the manufacturer the installation instructions and best practices for ensuring consistent installation of the strain gages, including taking part in an exercise to weld "dummy" strain gages onto test surfaces while under the manufacturer's oversight. Applicable lessons learned were incorporated into the GEH welding procedure specification. Furthermore, knowledge was passed to the welders

Enclosure 2

by holding pre-job briefs and discussing the proper technique for applying the gages, emphasizing the uniform placement of spot welds at approximately 0.7 – 0.8 mm intervals. Afterwards, the welders practiced on shims until peel tests were successfully completed. Quality Control personnel were present to accept the weld process.

GEH also reviewed with Kyowa the calibration process used to establish the Gage Factors (GF) for the strain gages. For each strain gage order, Kyowa fabricates five additional gages for the purpose of GF measurement. This testing is performed on the sample strain gages prior to the attachment of the Mineral-Insulated (MI) and soft cables, such that just the sensor portion (flange and capsule) is tested. The GF is tested in accordance with NAS942 standards at room temperature. The capsule gage is welded in tension in the middle of the test beam to get a positive (+) output. A displacement sensor on top of the apparatus measures the displacement of the beam. A bending strain of 1000×10^{-6} is then applied to the test beam and the gage output is measured. This is done for each of the five strain gages. The individual GFs are then calculated from the mechanical strain of the test apparatus and the strain gage output. The GF value assigned to the lot is based on these five measured gages. Since the finished strain gages include the MI cable, soft cable and compensation resistors, the GF is adjusted to reflect this configuration and is included on the calibration sheets supplied with the gages along with information on the temperature dependence of the gage factor.

To demonstrate that [[

]]

Table 1
Comparison of [[

]]

The differences in Table 1 range from approximately [[

]]

2. Review of the Prototype Strain Gage Measurements

To assess the impact of the [[

]]

Because of the variability in the manufacturing of strain gages, [[

]]

¹ [[

]]

Table 2

Comparison of [[

]]

3. Impact of the [[

]]

5. ESBWR Applicability

The ESBWR FE model will incorporate the same bias and uncertainty considerations as discussed above. This will be determined during the new benchmark being performed to address RAI 3.9-269.

6. Applicable ITAAC and Tier 2 References

Section 3L.4.6, "Instrumentation and Startup Testing", on the DCD discusses the ESBWR Steam Dryer startup tests specifically state *"Strain gages and accelerometers are used to monitor the structural response during power ascension."* And *"The steam dryer startup test and monitoring power ascension limits are developed on a similar basis as the monitoring limits used for recent extended power uprate replacement steam dryers."* Therefore the lessons learned from ongoing EPU projects will be used during the ESBWR PBLE methodology implementation. That section further states *"The strain gages, accelerometer and pressure transducers are field calibrated prior to data collection and analysis."*

Section 2.1.1, Reactor Pressure Vessel and Internals, of DCD Tier 1, Items (12), (13) and (14) all describe the strain gauges installed on the Steam Dryer. ITAAC 12, and 13 are the specific ITAAC related to the strain gauges. Section 3.9.2.3, which is designated as Tier 2*, describes the performance criteria of the strain gauges. Section 3.9.2.4 further amplifies the Initial Startup testing requirements including a discussion of the process, using the guidance of Regulatory Guide 1.20, for analyzing and using the information from these strain gauges.

In addition Section 3.9.2.4 of the DCD, Tier 2 states *"The Combined License (COL) Applicant will classify its reactor per the guidance in RG 1.20 and provide a milestone for submitting a description of the inspection and measurement programs to be performed (including measurement locations and analysis predictions) and the results of the vibration analysis, measurement and test program (COL 3.9.9-1-A)."* COL item **3.9.9-1-A Reactor Internals Vibration Analysis, Measurement and Inspection Program** states:

The COL Applicant will classify its reactor per the guidance in RG 1.20 and provide a milestone for submitting a description of the inspection and measurement programs to be performed (including measurement locations and analysis predictions) and the results of the vibration analysis, measurement and test program (Subsection 3.9.2.4). This description of the inspection includes analysis predictions and the results of the tests which would address accuracy of the strain gauges.

Enclosure 2

7. ITAAC Closure Plan

The ESBWR Design-Centered Working Group will develop an ITAAC Closure Plan (also referred to as an ITAAC Completion Plan). As defined in NEI 08-01, this Plan will address how to execute and document each ITAAC, including the methods to be used to perform required inspections, tests, and analyses, and the documentation necessary to demonstrate that specified acceptance criteria are met. Through this process, each ITAAC will be reviewed, activities necessary to complete the ITAAC will be identified, and the types of documentation that will need to be created will be listed. In addition, a schedule will be developed that will identify pre-cursor activities that relate to an ITAAC or must be completed before certain actions can be taken. Through this process, relationships between different ITAAC will become evident. For example, as discussed in response to this RAI, it is clear that Section 2.1, ITAACs 12 and 13 are the specific ITAAC related to the strain gauges use and calibration. Section 3L.4.6 requires these instruments to be calibrated prior to use.

Further discussion on the regulatory process associated with the ITAAC-related activities and COL information items is included in the introduction section of GEH responses to RAIs 3.9-289, 3.9-290 and 3.9-291 and therefore is not repeated here.

9. Conclusion

In conclusion, the above statements provide a design basis process to document the calibration of these instruments.

10. DCD and LTR Impact

No changes will be made to the DCD or applicable LTRs.

11. References:

1. NEDC-33601P, Engineering Report – Grand Gulf Replacement Steam Dryer Fatigue Stress Analysis Using PBLE Methodology, Class III, Revision 1, February 2012.
2. Entergy Operations, Inc., letter to the NRC (GNRO-2012/00009), Response to NRC Request for Additional Information Regarding Extended Power Uprate, February 15, 2012.

Enclosure 3

MFN 12-046 Revision 1

Affidavit

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, **Edward D. Schrull**, PE, state as follows:

- (1) I am the Vice President, Regulatory Affairs of GE-Hitachi Nuclear Energy Americas LLC (GEH), 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 GEH's letter MFN 12-046, Revision 1, J. Head (GEH) to D. Misenhimer (NRC), "NRC Requests for Additional Information Related to the Audit of the Economic Simplified Boiling Water Reactor (ESBWR) Steam Dryer Design Methodology Supporting Chapter 3 of the ESBWR Design Control Document – RAI 3.9-272," dated June 5, 2012. The GEH proprietary information in Enclosure 1 of MFN 12-046, Revision 1 is identified by a dotted underline inside double square brackets. [[This sentence is an example.⁽³⁾]] 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 and determination of proprietary information of which it is the owner or licensee, GEH 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 qualifies 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, 975 F2d 871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F2d 1280 (DC Cir. 1983).
- (4) The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a and (4)b. Some examples of categories of information that 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 GEH's competitors without license from GEH constitutes a competitive economic advantage over GEH and/or other companies.
 - b. Information that, if used by a competitor, would reduce their expenditure of resources or improve their competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.

- c. Information that reveals aspects of past, present, or future GEH customer-funded development plans and programs, that may include potential products of GEH.
 - d. Information that discloses trade secret and/or potentially patentable subject matter for which it may be desirable to obtain patent protection.
- (5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to the NRC in confidence. The information is of a sort customarily held in confidence by GEH, 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 GEH, not been disclosed publicly, and not been made available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary and/or confidentiality agreements that provide for maintaining the information in confidence. The initial designation of this information as proprietary information and the subsequent steps taken to prevent its unauthorized disclosure are as set forth in the following paragraphs (6) and (7).
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, who is the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or who is the person most likely to be subject to the terms under which it was licensed to GEH. Access to such documents within GEH is limited to 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 GEH 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 and/or confidentiality agreements.
- (8) The information identified in paragraph (2) above is classified as proprietary because it communicates sensitive business information regarding commercial communications, plans, and strategies associated with future actions related to GEH's extensive body of technology, design, and regulatory information.
- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH'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

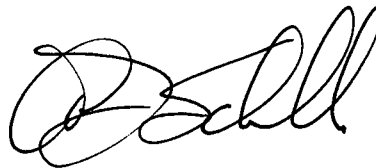
evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH. 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. GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH 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 GEH 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 GEH 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 5th day of June 2012.

A handwritten signature in black ink, appearing to read 'E. Schrull', with a stylized, cursive script.

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