ENCLOSURE 3

GE-MNGP-AEP-3306, ENCLOSURE 2

GEH RESPONSE TO MELLLA+ EICB RAI

NON-PROPRIETARY

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ENCLOSURE 2

GE-MNGP-AEP-3306

GEH Response to MELLLA+ EICB RAI

Non-Proprietary Information- Class I (Public)

NON-PROPRIETARY NOTICE

This is a non-proprietary version of Enclosure 1 of GE-MNGP-AEP-3306 which has the proprietary information removed. Portions of the document that have been removed are indicated by an open and closed bracket as shown here [[ ]].

EICB RAI

The use of common software for normal and backup stability can lead to a condition where both functions could become disabled due to a common-cause software failure. Thus, the U.S. Nuclear Regulatory Commission (NRC) staff requests the following supplemental information:

The NRC Staff Requirements Memorandum (SRM) on SECY-93-087 (ADAMS Accession No. ML003708056), dated July 21, 1993, describes the position of NRC regarding Diversity and Defense-In-Depth (D3). This SRM states that applicants using digital or computer based technology shall assess the defense-in-depth and diversity of the proposed instrumentation and control system to demonstrate that vulnerabilities to common mode failures have been adequately addressed. The SRM also states: "in performing the assessment, the vendor or applicant shall analyze each postulated common-mode failure for each event that is evaluated in the accident analysis section of the safety analysis report (SAR) using best estimate methods. The vendor or applicant shall demonstrate adequate diversity within the design for each of these events."

The NRC staff notes that the OPRM DSS-CD safety function is credited in the Monticello USAR Chapter 14, "Plant Safety Analysis," for mitigation of a ***plant instability event****. This event is analyzed in Section 14.6, "Plant Stability Analysis," of the Monticello USAR. It remains apparent that a postulated common-mode failure of the NUMAC OPRM could disable the safety trip function performed by the DSS-CD algorithms. Therefore, a diverse means of performing either the same function (Reactor Trip) or a different function is required.*

Please identify what this diverse means is (i.e. High Reactor Pressure Trip, Manual Operator Action, or ATWS) and provide a documented basis that the diverse means is unlikely to be subject to the same common-mode failure that would disable the DSS-CD safety function.

Response

The diverse means for the safety trip function performed by the Detect and Suppress Solution – Confirmation Density (DSS-CD) algorithms at the Monticello Nuclear Generating Plant (MNGP) for a postulated common-mode failure of the Nuclear Measurement Analysis and Control (NUMAC) Oscillation Power Range Monitor (OPRM) is Manual Operator Action. The basis that the diverse means is unlikely to be subject to the same common-mode failure that would disable the DSS-CD safety function is documented below.

The OPRM system (supporting either DSS-CD or Option III solution) is designed to automatically detect and suppress anticipated power oscillations. The postulated Common Cause Failure (CCF), assumed to result in comprehensive loss of Power Range Neutron Monitoring System (PRNMS) functionality, would also disable the OPRM system (i.e., Confirmation Density Algorithm (CDA) for DSS-CD and Period Based Detection Algorithm (PBDA) for Option III). The loss of PRNMS functionality would also disable the Automatic Backup Stability Protection (ABSP) function of DSS-CD because the Average Power Range Monitor (APRM) system would no longer be available.

As described in Section 7 and in the Technical Specification (TS) changes documented in the approved DSS-CD Licensing Topical Report (LTR) NEDC-33075P-A, Revision 6 (Reference 1), if both the OPRM system is inoperable and the ABSP function cannot be implemented or is inoperable, the licensed stability solution becomes the Manual Backup Stability Protection (BSP) Regions with the BSP Boundary, which is manually implemented through administrative actions. This is essentially the same backup approach utilized in Option III for the PBDA algorithm. In the Option III solution there is only one BSP Option, which is provided by the Manual BSP Regions and associated operator actions.

The postulated CCF in the PRNMS results in the system providing valid indications of plant conditions until the stability transient occurs, at which time they become anomalous. In the case of power oscillations, PRNMS indications of power and flow would track consistently with other plant indicators as they change to a state point where the potential exists for high growth-rate power oscillations (i.e., the upper left corner of the power/flow map), but fail to provide any protection when large amplitude oscillations begin to occur.

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MNGP operators are procedurally required to insert a manual scram in the event indication of a two recirculation pump trip is received in the control room . This immediate action is uncomplicated and is completed by simultaneously depressing two reactor scram push buttons that are located at the C-05 panel directly in front of the control room operator. Confirmation that the manual scram is successful is unambiguous and provided by the control rod display on C-05 within a few seconds. This manual action can be completed well [[

]] Given timely completion of the manual scram action, the SLMCPR is not exceeded throughout this event, and the acceptance criteria provided in BTP 7-19 are met.

The manipulation of these manual pushbuttons results in an immediate actuation of a reactor scram via the failsafe Reactor Protection System. This portion of the Reactor Protection System is fully independent of a digital or software-based CCF of the PRNMS.

There are multiple diverse control room indications of a dual recirculation pump trip that are fully independent from the effects of the postulated PRNMS CCF described above. In addition, all of these affirming indications are readily available to the control room operators as panels C-

04 and C-05 are located adjacent to one another within the Monticello control room and would be present within a few seconds of the initiating event. The control room indications include the following:

Recirculation System Flow Status

- Recirculation Pump differential pressure (DP) indicators on C-04
- Control Room Annunciators due to Recirculation Drive Motor Trips (various initiating conditions)
- Recirculation pump speed reducing as indicated by the Recirculation Speed Controller on C-04
- Other pump status control room indications available to the control room operator (depending on the pump trip failure mode) are the drive motor breakers or field breakers open, and amperage and voltage indications

Core Flow Status

- Total Core Flow Recorder on C-04
- Loops A and B Jet Pump Flow Indication on C-04

In the event that operators fail to depress these pushbuttons or the scram push buttons are ineffective, the acceptance criteria of BTP 9-17 will still be met in the event of stability event with a PRNMS CCF. If a manual scram does not occur, the conditions for an ATWS event will have been created. The manual operator actions for an ATWS event provide a secondary level of defense in depth for this postulated event. The ATWS manual actions are described in Section 9.3.1.2 of the MNGP MELLLA+ SAR. Given an ATWS event from MELLLA+ operating conditions, the MNGP analyses has demonstrated that the manual operator actions to mitigate an ATWS event will prevent excessive clad temperatures with significant margin, and therefore core damage will be avoided and the acceptance criteria of BTP 9-17 are met.

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The ABSP is an alternative stability solution in the event that CDA becomes inoperable. However, ABSP is designed to prevent the core from operating in regions with high potential for thermal hydraulic instability. Therefore, a postulated CCF of the ABSP would mean that the automatic scram would not occur when the reactor is operating in the BSP Scram region. The procedures for immediate action to scram the reactor as discussed above would apply. The immediate actions provide a diverse and independent method to assure reactor protection in the event of a postulated stability event with an ABSP (or PRNMS) CCF.

In summary, MNGP evaluation of the CCF for the PRNMS with DSS-CD was performed to disposition undetected power oscillations using the acceptance criteria provided in BTP 7-19. It was determined that sufficient redundancy and diversity exists so that the plant has the ability to cope with any CCF in PRNMS with Option III or DSS-CD.

References:

1) GEH Nuclear Energy, "GE Hitachi Boiling Water Reactor Detect and Suppression Solution – Confirmation Density," NEDC-33075P-A, Revision 6, January 2008.
2) USNRC Standard Review Plan, "Guidance for Evaluation of Diversity and Defense-In-Depth in Digital Computer-Based Instrumentation and Controls Systems," BTP 7-19 (NUREG-0800), Revision 6, July 2012.
3) GE Nuclear Energy, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC PRNM) Retrofit Plus Option III Stability Trip Function," NEDC-32410P-A, Supplement 1, November 1997.

ENCLOSURE 4

GENERAL ELECTRIC – HITACHI AFFIDAVIT FOR WITHHOLDING PROPRIETARY INFORMATION

GE-MNGP-AEP-3306, ENCLOSURE 3

3 pages follow

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Linda C. Dolan, state as follows:

(1) I am the Manager of Regulatory Compliance, 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 letter, GE-MNGP-AEP-3306, "GEH Response to MELLLA Plus EICB Request for Additional Information," dated December 18, 2013. The GEH proprietary information in Enclosure 1, which is entitled "GEH Response to MELLLA+ EICB RAI," 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 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 U.S.C. Sec. 552(b)(4), and the *Trade Secrets Act*, 18 U.S.C. 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 F.2d 871 (D.C. Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F.2d 1280 (D.C. 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 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, resulting in potential products to GEH;

d. Information that discloses trade secret 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 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 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 or confidentiality agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it contains the detailed GEH methodology for stability analysis for the GEH Boiling Water Reactor (BWR). These methods, techniques, and data along with their application to the design, modification, and analyses associated with the DSS-CD were achieved at a significant cost to GEH.

The development of the evaluation processes along with the interpretation and application of the analytical results is derived from the extensive experience databases that constitute a major GEH asset.

(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 18th day of December 2013.

Linda C. Dolan
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