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Enclosure 1 contains **PROPRIETARY** information

GNRO-2014/00051

August 14, 2014

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Response to Request for Additional Information Regarding Maximum
Extended Load Line Limit Plus Amendment Request, dated 7/2/2014.
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCES: 1 Electronic Request for Additional Information Regarding "Maximum
Extended Load Line Limit Plus" Amendment Request Dated 7/2/2014
(TAC MF2798)

2 Entergy Letter, "Maximum Extended Load Line Limit Analysis Plus
(MELLLA+) License Amendment Request," GNRO-2013/00012, dated
September 25, 2013 (ADAMS Accession No. ML13269A140).

Dear Sir or Madam:

Entergy Operations, Inc. is providing in the Enclosures a response to the Reference 1 Request for Additional Information (RAI).

Enclosure 1 contains proprietary information as defined by 10 CFR 2.390. General Electric-Hitachi (GEH), as the owner of the proprietary information, has executed the enclosed affidavit, which identifies that the enclosed proprietary information has been handled and classified as proprietary, is customarily held in confidence, and has been withheld from public disclosure. The proprietary information was provided to Entergy in a GEH transmittal that is referenced by the affidavit. The proprietary information has been faithfully reproduced in the enclosed such that the affidavit remains applicable. GEH hereby requests that the enclosed proprietary information be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. Information that is not considered proprietary is provided in Enclosure 2. Enclosure 3 contains an affidavit which identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GEH. On behalf of GEH, Entergy requests that Enclosure 1 be withheld from public disclosure in accordance with 10 CFR 2.390(b)(1).

**When Enclosure 1 is removed from this letter, the entire document is
NON-PROPRIETARY**

This letter contains no new commitments. If you have any questions or require additional information, please contact Mr. James Nadeau at 601-437-2103.

I declare under penalty of perjury that the foregoing is true and correct; executed on August 14, 2014.

Sincerely,



KJM/ras

Enclosures:

- 1 GEH-GGNS-AEP-641 Proprietary Responses to the Request for Additional Information
- 2 GEH-GGNS-AEP-641 Non-Proprietary Responses to the Request for Additional Information
- 3 GEH Affidavit for Enclosure 1
- 4 GGNS Response to RAI-1 and 5

cc: with Enclosures

U.S. Nuclear Regulatory Commission
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Enclosure 2 to

GNRO-2014/00051

GEH-GGNS-AEP-641 Non-Proprietary Responses to the Request for Additional Information

ENCLOSURE 2

GEH-GGNS-AEP-641

**Responses to SCVB RAIs 2, 3, 4, and 6 in Support of GGNS
MELLLA+ LAR**

Non-Proprietary Information - Class I (Public)

INFORMATION NOTICE

This is a non-proprietary version of Enclosure 1 of GEH-GGNS-AEP-641 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 [[]].

RAI-2

The proposed revised wetwell airspace volume (as a part of the overall wetwell volume) is an input parameter to the following analyses:

- (a) Long term containment pressure and temperature response,*
- (b) Long term suppression pool temperature response for net positive suction head (NPSH), and*
- (c) NPSH analysis for residual heat removal (RHR) and core spray (CS) pumps which is impacted by (b). Please describe the impact of the increase in the wetwell air space volume on these analyses, and provide results.*

GEH Response

In the maximum extended load line limit analysis plus (MELLLA+) analyses, only the volume below the hydraulic control unit (HCU) floor was increased; the corresponding change was not made in the containment volume. This additional volume below the HCU floor is less than 1% of the containment volume, and any effect of the long term analyses is small.

The long term analyses model the containment (volume outside the drywell) [[

]] It can be deduced from the first law of thermodynamics that a higher pressure and higher temperature will result if the containment volume is decreased for the same mass and energy added to the air space from a break. Therefore, ignoring the additional free volume in the existing long term containment pressure and temperature calculations is conservative with respect to the pressure and air space temperature calculations.

Although the effect may be very small, overpredicting the containment pressure also results in a more conservative suppression pool temperature due to less evaporation than actual.

The conservatism in the long term containment pressure does not have an adverse effect on the available net positive suction head (NPSH) because the Grand Gulf Nuclear Station (GGNS) NPSH analyses do not take credit for containment overpressure.

RAI-3

Assuming the overall containment volume is the same as in the current analysis; the proposed increase in the wetwell air space volume by 13,192 ft³ should result in one or both of the following:

- (a) Decrease in the suppression pool volume by 13,192 ft³ or less, which would impact its heights at low and high level and vent submergence.*
- (b) Decrease in the containment volume above hydraulic control unit (HCU) floor level by 13,192 ft³ or less.*

Please describe the impact of the changes in above parameters on the containment analyses which use them as inputs, and provide results.

In case the overall containment volume has increased, please provide reasons and its impact on the analyses which uses it as input and provide results.

GEH Response

- (a) The increase in the free wetwell volume is due to using a more accurate HCU floor thickness and affects only the air space volume below the HCU floor. There is no change in the suppression pool volume or level.
- (b) The containment volume did not change in the MELLLA+ analyses; only the air space volume below the HCU floor increased. The presence of the HCU floor is accounted for in a conservative manner in the short term analyses. [[

]]

Given this feature of the method, the reduction in the volume above the HCU floor does not enter into the calculations. Because the containment volume remains the same, the short term results are not affected by the reduction in the volume above the HCU floor.

RAI-4

It appears that the current short term containment pressure and temperature response are impacted by (i) revised M&E release under MELLLA+ operation, and (ii) the increase in the wetwell air space volume which is not related with MELLLA+ operation.

- (a) What are the parameters other than (i) and (ii) that have impacted the short term containment pressure and temperature response?*
- (b) Provide containment pressure and temperature response results (peak values and profiles) assuming revised M&E release under MELLLA+ operation and with all other assumptions and input parameters including wetwell air space volume same as in AOR.*

GEH Response

- (a) The following parameters are different in the MELLLA+ analysis as compared to the extended power uprate (EPU) analysis in addition to the change in volume below the HCU floor: the main steam line flow limiter area and the HCU floor area.
- (b) The most limiting power/flow point during MELLLA+ operation is the same as during CLTP operation. Therefore, the differences shown in Table 4-3 between the CLTP and MELLLA+ results are due solely to the refinements in the inputs, not due to MELLLA+ operation. The results for MELLLA+ operation would be the same as those in the analysis of record (AOR), with all other assumptions and input parameters, including wetwell air space volume, the same as in the AOR.

RAI-6

Refer to Reference 2, Section 4.1.2, since the increase in the wetwell air space volume is not MELLLA+ related, please provide the following information

- (a) Section 4.1.2.1; does the LOCA loads remain bounding under MELLLA+ operation without the change in the wetwell air space volume?*
- (b) Section 4.1.2.4; does the SRV containment dynamic loads remain bounding under MELLLA+ operation without the change in the wetwell air space volume?*

GEH Response

- (a) The limiting MELLLA+ power/flow point is the same as the limiting EPU power/flow point. Therefore, the loads evaluations performed for the most limiting point in the current licensing basis without a change in the containment volume are applicable to the MELLLA+ operation and remain bounding.
- (b) The SRV loads are not affected by MELLLA+ operation as stated in Section 4.1.2.4. Therefore, the SRV containment dynamic loads remain bounding under MELLLA+ conditions without the change in the wetwell airspace volume.

Enclosure 3 to

GNRO-2014/00051

GEH Affidavit for Enclosure 1

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, **James F. Harrison**, state as follows:

- (1) I am the Vice President, Regulatory Affairs, Fuel Licensing, 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, GEH-GGNS-AEP-641, "GEH Responses to MELLLA+ SCVB Requests for Additional Information 2, 3, 4, and 6," dated July 22, 2014. The GEH proprietary information in Enclosure 1, which is entitled "Responses to SCVB RAIs 2, 3, 4, and 6 in Support of GGNS MELLLA+ LAR," is identified by a dotted underline inside double square brackets. [[This sentence is an example.^{3}]] Figures and large 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, 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.

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- (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.
- (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 details of GEH methodology. These methods, techniques, and data along with their application to the design, modification, and analyses 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

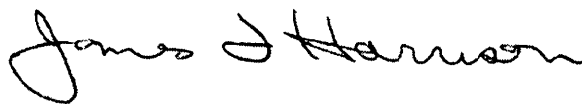
GE-Hitachi Nuclear Energy Americas LLC

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 is true and correct.

Executed on this 22nd day of July 2014.

A handwritten signature in black ink, reading "James F. Harrison". The signature is fluid and cursive, with the first name "James" and last name "Harrison" clearly legible.

James F. Harrison
Vice President, Fuel Licensing
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Enclosure 4 to
GNRO-2014/00051
GGNS Response to RAI-1 and 5

RAI-1

Reference 2, Table 4-1 indicates the wetwell airspace volume in the proposed analysis is increased by 13,192 ft³ (149,978 ft³ minus 136,786 ft³) from the current analysis. Please provide the following information:

- (a) Is the change in wetwell air space volume correction of an error?
- (b) In case the change is not correction of an error, please describe the changes in the containment configuration that provides additional air space volume in the wetwell.

GGNS Response

- a. The change in wetwell airspace volume was not the correction of an error but was due to a refinement of the containment inputs to mitigate the short-term pressure spike driving the Pa value.
- b. As described below, the additional air space volume is associated with an additional 2 feet of airspace height in the wetwell below the HCU floor.

The peak containment accident pressure, Pa, was calculated to be 14.8 psig as part of the GGNS Extended Power Uprate (EPU). The calculated peak pressure occurs during a very short pressure spike associated with compression of the drywell air emerging from the suppression pool in the localized region under the HCU floor. In Reference 1, Entergy provided the basis for why this spike need not be considered for Pa; however, the NRC staff disagreed and this spike became the basis for the GGNS Pa value of 14.8 psig in Tech Spec 5.5.12. This pressure left little margin to the containment design pressure of 15 psig.

The short-term pressurization of the containment was re-analyzed as part of the MELLRA+ project. In order to gain additional margin to the design limit, the important inputs applied in the analysis were reviewed in detail for any potential to mitigate this pressure transient. This review identified a GEH assumption that the thickness of the HCU floor was 3 feet, while the floor was actually only 1-foot thick. The MELLRA+ analysis consequently credited the additional 2 feet of elevation below the HCU floor, thereby increasing the wetwell airspace volume in the model. Considering the outer and inner containment radii of 41.5 and 62 feet, the additional volume is over 13,300 cu.ft.

1. Reference: GNRO-2011/00052, dated June 23, 2011

RAI-5

Reference 2, Section 3.9.3 states:

“Consequently, suppression pool suction is more limiting for RCIC NPSH. GGNS calculations demonstrate that the RCIC pump would have adequate NPSH and low suction pressure trip margins given a suppression pool water temperature of 140°F.”

- (a) What is the RCIC pump NPSH margin when the suppression pool temperature is 140°F?
- (b) What happens when the RCIC pump trips on a low suction pressure or inadequate NPSH margin, i.e., is the pump allowed to trip or suction is transferred to a different source before the suction pressure reaches the trip setpoint?

GGNS Response

(a) At a suppression pool temperature of 140 degrees F, the NPSH available at minimum pool level is 24 feet which is equal to the NPSH required. At this pool temperature and level, there is no additional NPSH margin.

(b) The preferred suction source for RCIC is always the Condensate Storage Tank (CST) and RCIC is normally lined up to the CST. Although RCIC trips on low suction pressure, suction is automatically transferred to the suppression pool from the CST based on Suppression Pool level well before low suction pressure occurs.