HITACHI

GE Hitachi Nuclear Energy

Proprietary Notice

This letter transmits proprietary information in accordance with 10CFR2.390. Upon the removal of Enclosures 1 and 3, the balance of the letter may be considered non-proprietary.

James F. Harrison

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MFN 09-681
November 4, 2009

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

Subject: Response to NRC's Data Request to Support Confirmatory ATWS Calculations Regarding MELLLA Plus

By Reference 1, the NRC requested data to support confirmatory ATWS calculations to support its review of plant-specific MELLLA Plus applications. Enclosed is the response to the NRC's request. In addition to the responses, GEH has also enclosed a compact disk containing native files to facilitate the transfer of data.

Enclosures 1 and 3 contain proprietary information of the type that GEH maintains in confidence and withholds from public disclosure. The affidavit contained in Enclosure 4 is applicable to the information provided in Enclosures 1 and 3 and identifies that the information contained in Enclosures 1 and 3 has been handled and classified as proprietary to GEH. GEH hereby requests that the information in Enclosures 1 and 3 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. Enclosure 2 is a non-proprietary version of Enclosure 1. The information in Enclosure 3 is completely proprietary and a non-proprietary version is not available.

If you have any questions, please contact Mike Lalor at (408) 925-2443 or me.

Sincerely,

James F. Harrison
Vice President, Fuel Licensing
Regulatory Affairs
GE Hitachi Nuclear Energy

D065
NRR

Project No. 710

Reference:

1. NRC Letter, M. Honcharik (NRC) to R. Brown (GEH), "Data Request to Support U.S. Nuclear Regulatory Commission (NRC) Staff Confirmatory Maximum Extended Load Line Limit Analysis Plus (MELLLA+) Anticipated Transient Without Scram (ATWS) Calculations," MFN 08-166, dated February 6, 2008.

Enclosure
1. Response to NRC Data Request - NEDC-33006P – GEH Proprietary Information
2. Response to NRC Data Request - NEDC-33006P - Non-Proprietary Information
3. Compact Disk – GEH Proprietary Information
4. Affidavit

cc: JG Head, GEH/Wilmington
SS Philpott, NRC
MA Lalor, GEH/San Jose
eDRF 0000-0090-7578
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ENCLOSURE 1

MFN 09-681

Response to NRC Data Request - NEDC-33006P

GEH Proprietary Information

PROPRIETARY INFORMATION NOTICE

This enclosure contains proprietary information of General Electric Hitachi Nuclear Energy Americas LLC (GEH) and is furnished in confidence solely for the purpose(s) stated in the transmittal letter. No other use, direct or indirect, of the document or the information it contains is authorized. Furnishing this enclosure does not convey any license, express or implied, to use any patented invention or, except as specified above, any proprietary information of GEH disclosed herein or any right to publish or make copies of the enclosure without prior written permission of GEH.

The header of each page in this enclosure carries the notation "GEH Proprietary Information." GEH proprietary information 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 the enclosed affidavit provided in Enclosure 4, which provides the basis for the proprietary determination. Specific information that is not so marked is not GEH proprietary.

ENCLOSURE 2

MFN 09-681

Response to NRC Data Request - NEDC-33006P

Non-Proprietary Information

IMPORTANT NOTICE

This is a non-proprietary version of Enclosure 1 to MFN 09-681, from which the proprietary information has been removed. Portions of the enclosure that have been removed are indicated by an open and closed bracket as shown here [[ ]]

ENCLOSURE 3

MFN 09-681

Compact Disk

GEH Proprietary Information

PROPRIETARY INFORMATION NOTICE

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The entirety of the enclosed compact disk is proprietary. Therefore, the disk in this enclosure carries the notation "GEH Proprietary Information$^{\{3\}}$." The superscript notation$^{\{3\}}$ refers to Paragraph (3) of the affidavit provided in Enclosure 4, which documents the basis for the proprietary determination.

ENCLOSURE 4

MFN 09-681

Affidavit

GE-Hitachi Nuclear Energy Americas LLC
AFFIDAVIT

I, James F. Harrison state as follows:

(1) I am Vice President, Fuel Licensing, Regulatory Affairs, GE-Hitachi Nuclear Energy Americas LLC ("GEH"), 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 Enclosures 1 and 3 of MFN 09-681, James F. Harrison (GEH) to Document Control Desk (USNRC), *Response to NRC's Data Request to Support Confirmatory ATWS Calculations Regarding MELLLA Plus*, dated November 4, 2009. The proprietary information in Enclosure 1, *Response to NRC Data Request - NEDC-33006P* , is identified by a single dotted underline within double square brackets. [[This sentence is an example.{3}]] The entirety of the information in Enclosure 3, Compact Disk, is considered proprietary and the disk itself is marked as, "GEH Proprietary Information{3}." In all cases, 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, 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 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 General Electric's competitors without license from General Electric 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 General Electric customer-funded development plans and programs, resulting in potential products to General Electric;

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 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, 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. Access to such documents within GEH 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, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, 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 agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it contains detailed analysis used in the evaluation of GEH's Abnormal Transient Without Scram (ATWS) instability analysis which supports the regulatory acceptability for the expanded power/flow operating domains including Maximum Extended Load Line Limit Analysis Plus (MELLLA+) domains for a GE BWR. The supporting detailed analysis utilizes analytical models and methods, including computer codes, which GE has developed, obtained NRC approval of, and applied to perform evaluations in the GE Boiling Water Reactor ("BWR"). The development and approval of these system, component, and thermal hydraulic models and computer codes was achieved at a significant cost to GEH.

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 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 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 4th day of November 2009.

James F. Harrison
Vice President, Fuel Licensing,
Regulatory Affairs
GE-Hitachi Nuclear Energy Americas LLC

ENCLOSURE 2

MFN 09-681

Response to NRC Data Request - NEDC-33006P

Non-Proprietary Information

IMPORTANT NOTICE

This is a non-proprietary version of Enclosure 1 to MFN 09-681, from which the proprietary information has been removed. Portions of the enclosure that have been removed are indicated by an open and closed bracket as shown here [[ ]]

Information Request 1

GE14 bundle and core design data corresponding to MELLLA+ operation. The information will be used to generate cross section(s).

GEH Response

Figure 1 provides the lattice and axial elevations of the bundle design EDB# 3058. Figure 2 provides the corresponding rod definitions and elevations of enrichment changes. Figure 3 provides the bundle enrichment splits and weights. Figure 4 provides the BOC core loading exposure distribution.

The fission rate distribution and power distribution for the power-shaping zone, lattice 7991, are also extracted using the Output option of IBNDL01V for the higher exposures (5, 15, 30, 45 and 60 GWd/ST) at 0, 40, and 70 voids. The files identified below are provided on the enclosed compact disk,

Lattice	**Data Filename**
Fission Rate Distribution	
7991	3058_7991_FRR.txt
Power Distribution	
7991	3058_7991_RPR.txt

[[

]]

Figure 1-1 Bundle Design 3058: Lattice and Axial Elevation

[[

]]

Figure 1-2 Bundle Design 3058: Rod-by-Rod Enrichment/Gadolinia Detail

[[

]]

Figure 1-3 Bundle Design 3058: Enrichment Splits and Weights

[[

]]

Figure 1-4 BOC Core Loading Exposure Distribution

Information Request 2

Core nodal exposure and void history information corresponding to the statepoints used for the ATWS analyses supporting NEDC-33006P, Revision 2 (LTR and GEH responses to NRC staff requests for additional information (RAI)). This information will allow the NRC staff to ensure that our initial conditions are as close as possible to those assumed by GEH in its analyses of the events.

GEH Response

Panacea 3D nodal exposures, nodal void history, and nodal powers for BOC, PHE, and EOC are provided in the following Excel Spreadsheet files. For each file there is a tab representing an axial elevation. Slice 1 represents the bottom of the core. Slice 25 represents the top of the core. The files identified below are provided on the enclosed compact disk.

Cycle Exposure	**Data Filename**
3D Nodal Exposures	
BOC (0 MWd/ST)	3D_Nodal_Exposure_BOC.xls
PHE (10000 MWd/ST)	3D_Nodal_Exposure_PHE.xls
EOC (18677 MWd/ST)	3D_Nodal_Exposure_EOC.xls
3D Nodal Void History	
BOC (0 MWd/ST)	3D_Nodal_Void_Hist_BOC.xls
PHE (10000 MWd/ST)	3D_Nodal_Void_Hist_PHE.xls
EOC (18677 MWd/ST)	3D_Nodal_Void_Hist_EOC.xls
3D Nodal Powers	
BOC (0 MWd/ST)	3D_Nodal_Power_BOC.xls
PHE (10000 MWd/ST)	3D_Nodal_Power_PHE.xls
EOC (18677 MWd/ST)	3D_Nodal_Power_EOC.xls

Information Request 3

Isolation ATWS (MSIVC) design inputs for the GEH analysis which will contain system actuation setpoints and timing information, and operator action timing information (safety relief valve (SRV) setpoints, standby liquid control system (SLCS) timing, water level control).

GEH Response

Typical design inputs (Actions/Timing) used in the MSIVC ATWS analysis of a large BWR are shown in Table 3-1 for the case in which the RPV water level (WL) was reduced to TAF.

SLCS data are shown in Table 3-2.

SRV setpoints are shown in Table 3-3.

Note:
The TRACG base deck Deck.INP for the above referenced MSIVC ATWS case is provided in the enclosed compact disk.

Table 3-1

Event	**Action**	**Timing sec**
MSIV closure	-	0.0
WL to TAF	WL setpoint to -4.995 m	120.0
Boron injection[1)]	Initiation	124.0
Emergency blowdown	Initiation	600.0
Feed water	Trip[2)]	601.0
WL to normal	WL setpoint to 0.0 m	2170.0
End of calculation	-	2500.0

[1)] Additionally, the analysis assumed 30 sec SLCS transit delay and 60 sec 3-D delay.
[2)] Trip at 601 s is intended to simulate restricted sources of the make-up water.

Table 3-2

SLCS Parameter	*Value*
Boron	Natural
Boron concentration kg/cum	23.517
Flow kg/sec	5.416

Table 3-3

SRV #	**Opening Pa**	**Closing Pa**
1	7.936E+06	7.618E+06
2	7.986E+06	7.667E+06
3	8.036E+06	7.715E+06
4	8.074E+06	7.751E+06
5	8.105E+06	7.781E+06
6	8.112E+06	7.787E+06
7	8.161E+06	7.835E+06
8	8.173E+06	7.846E+06
9	8.181E+06	7.854E+06
10	8.242E+06	7.913E+06
11	8.249E+06	7.919E+06
12	8.318E+06	7.985E+06

Information Request 4
Boron mixing assumptions.

GEH Response
The TRACG boron mixing coefficients are based on NUREG-5951 data (UCSB boron mixing tests). The boron mixing is complete at [[ ]] The boron re-mixing coefficients are based on test data obtained in the GE Vallecitos 1/6 mixing rig. (Additional information is in the March 10, 2004 GE Response to RAIs re: GE Boiling Water Reactor Maximum Extended Load Limit Analysis Plus.)

The TRACG boron mixing coefficients are listed in Tables 4-1 and 4-2:

The TRACG capability to track boron in liquid of each model cell is used in modeling the upper plenum boron injection. TRACG boron tracking assumes that boron is perfectly mixed in the liquid.

Consequently, no other thermal-hydraulic modeling effort has been introduced for simulation of boron injection into the upper plenum.

Table 4-1
Boron mixing coefficients for lower plenum injection

TRACG	
Core Flow (%)	Mixing Coef.
[[	
	]]

Table 4-2
Boron re-mixing coefficients for lower plenum injection

TRACG	
Core Flow (%)	Re-mixing Coef.
[[	
	]]

Information Request 5

Non-isolation ATWS (TTWB) design inputs for a large BWR (764 bundle core) used for GEH analysis which will contain system actuation setpoints and timing information, and operator action timing information (SRV setpoints, SLCS timing, water level control).

GEH Response

Design inputs for non-isolation ATWS (TTWB) with GE14 fuel used in the calculations supporting NEDC-33006P are available in accordance with the request in Item 7.

The TRACG base deck for the MELLA+ state-point 120%P/80%F core-wide oscillations analysis is provided in the enclosed compact disk as part of Item 6 (see Folder M+ TTWB ATWS).

There has been no SRV actuation. The single operator action assumed was activation of SLCS at 120 sec into the TTWB transient.

SLCS Parameter	Value
Boron	Natural
Boron concentration kg/m^3	23.517
Flow kg/sec	5.41
Boron initiated sec	120.0
Boron full sec[1)]	180.0

[1)] Linearly ramped up

Note:
Information on the SLCS injection pipe and fill available in accordance with the request in Item 7.

Information Request 6
TRACG deck used for GEH ATWS calculations.

GEH Response
The following TRACG base case decks with GE 14 fuel, which support the NEDC-33006P calculation analysis, are provided in the enclosed compact disk. They are:

TTWB ATWS

12080_8400_ROD_CW_UP_BORON.INP

MSIVC ATWS

Deck.INP

Information Request 7

Design Record File sections discussing the GEH ATWS calculations for NEDC-33006P, Revision 2 (LTR and RAI Responses), to be made available at the local GEH office.

GEH Response

The Design Record File sections discussing the GEH ATWS calculations for NEDC-33006P, Revision 2 (LTR and RAI Responses) are available and will be placed in GEH offices in Washington, DC.