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GE Proprietary Information

MFN 05-032
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U.S Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Attention: Alan Wang, Project Manager, Section 2
Project Directorate IV

Subject: Request For Additional Information – Licensing Topical Report NEDC-33006P, Revision 1, "General Electric Boiling Water Reactor Maximum Extended Load Line Limit Analysis Plus (MELLLA+)" (TAC No. MB6157)

In Reference 1, the NRC issued a request for additional information (RAI) regarding the subject Licensing Topical Report. The NRC also afforded GE the opportunity to review the RAIs and identify if any information therein that is considered proprietary. GE has reviewed the subject RAIs and concluded that they contain specific GE proprietary information.

Enclosure 1 identifies the specific information that is considered proprietary using GE's standard proprietary marking. Only those RAIs of Reference 1 that contain proprietary information are included in Enclosure 1. Information that is not so marked or is not included in Enclosure 1 is not considered proprietary. Enclosure 2 provides a non-proprietary version of those RAIs contained within Enclosure 1.

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

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

Sincerely,

George Stramback
Manager, Regulatory Services

Project No. 710

Reference:

1. MFN 05-031, Letter from Alan Wang (NRC) to Louis Quintana (GE), April 11, 2005, Request For Additional Information – Licensing Topical Report NEDC-33006P, Revision 1, "General Electric Boiling Water Reactor Maximum Extended Load Line Limit Analysis Plus (MELLLA+)" (TAC No. MB6157)

Enclosures:

1. Extracted RAIs - Proprietary
2. Extracted RAIs - Non-Proprietary
3. Affidavit

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ENCLOSURE 1

MFN 05-032

Extracted RAIs

GE Proprietary Information

PROPRIETARY INFORMATION NOTICE

This enclosure contains proprietary information of the General Electric Company (GE) 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 GE disclosed herein or any right to publish or make copies of the enclosure without prior written permission of GE. The header of each page in this enclosure carries the notation "GE Proprietary Information."

GE proprietary information is identified by a double underline inside double square brackets. In each case, the superscript notation{3} refers to Paragraph (3) of the affidavit provided in Enclosure 3, which documents the basis for the proprietary determination. [[This sentence is an example.{3}]] Specific information that is not so marked is not GE proprietary.

ENCLOSURE 2

MFN 05-032

Extracted RAIs

Non-Proprietary Version

IMPORTANT NOTICE

This is a non-proprietary version of Enclosure 1 to MFN 05-032, which has the proprietary information removed. Portions of the enclosure that have been removed are indicated by an open and closed bracket as shown here [[ ]]

Introduction

The following RAIs containing proprietary information were extracted from MFN 05-031, Letter from Alan Wang (NRC) to Louis Quintana (GE), April 11, 2005. Only those RAIs of MFN 05-031 that contain proprietary information are included. Information that is not marked proprietary or is not included in Enclosure 1 is not considered proprietary.

From Page 1 of Enclosure to MFN 05-031

PART I: Benchmarking the Accuracy of GENE's Analytical Method for the Current Operating Strategies and Fuel Designs

In accordance with the standard industry practice and GENE's safety limit minimum critical power ratio (SLMCPR) methodology (NEDC-32601P-A and NEDC-32694P-A), core tracking and gamma scan data are used to establish the uncertainties and biases of key calculational parameters (e.g., bundle power, σ P4B, [[ ]], and pin power peaking) that are used in your safety analyses. Tests and measurements are also done to validate the analytical models that simulate physical phenomena such as void fraction, dryout, and pressure drops. Since it is not possible to measure all the key parameters that affect the fuel and core response and that are used in the safety analyses (e.g., void coefficient, SLMCPR, delta maximum critical power ratio (MCPR), peak-clad temperature, peak pressure response), code-to-code comparisons and propagation of error analysis provide the additional means to establish the biases and uncertainties errors in the prediction of the analytical methods.

From RAI 25 of Enclosure to MFN 05-031

25-2. Provide plant-specific information for each set of core follow data (the plant type, whether the power level has been uprated, power density, operating domain, fuel type, cycle length, etc.). For each TIP reading, give the cycle state point, the operating power/flow state point, and the corresponding calculated thermal margin available. Evaluate the plant-specific data, including whether the core follow data indicates that the code is less accurate for higher in-channel void conditions. Explain any trends in the data in terms of operation at higher operating domain, cycle length, uprate and high-density plants. Demonstrate that the current uncertainties and biases used in the NRC-approved analytical method (e.g., bundle power, σ P4B, [[ ]], and pin power peaking, etc.) remain valid and applicable.

From RAI 28 of Enclosure to MFN 05-031

28. Gamma Scan Benchmarking: The standard industry practice is to do bundlewise and pinwise gamma scans for new fuel designs to benchmark the analytical methods used to predict the bundle and pin power peaking and distribution. GENE's SLMCPR methodologies [e.g., Sections 3.1.1, 3.1.4, (page 3 -4) and 4.0 (page 4-2) of NEDC-32601P-A and Section 3.1 (pages 3-1 and 3-2) of NEDC-32694P-A)] require that the [[

]] and pin power peaking for each bundle in a four-bundle core cell and the pin power peaking be determined through gamma scans.

From RAI 30 of Enclosure to MFN 05-031

30-1. Section 2.1.1 (Figures 2-1 to 2-11) and Section 2.1.2 (Figures 2-12 to 2-21). Section 2.1.2 provides a TGBLA/MCNP instantaneous cross-section comparison [[

]] For different lattices, supplement the current plots with absolute cross-section comparisons between TGBLA and MCNP with exposure. Use the lattice physics data calculated and extrapolated to 90 percent void conditions. Some of the lattices may not experience high-void conditions (>90 percent) during steady-state operation. However, during transients (anticipated operational occurences) and accidents, the lower part of the bundles may experience high-void conditions. Therefore, it is reasonable to evaluate the performance of TGBLA-generated data at high-void conditions for all lattices. For the lattices that represent the upper part of the bundle, use the 90 percent void fraction for the TGBLA history calculations and use 90 percent void fraction isotopic concentrations instead of 40 percent void fraction isotopic concentrations in the MCNP calculation. The objective of these plots is to evaluate the exposure dependence of the cross-sections for lattices representing different zones of the bundle.

30-2. Section 2.1.2 (Figures 2-22 to Figures 2-27). [[

]] Provide plots of the changes in error with voids and exposure for the various different lattices.

30-3. Section 2.1.2 (Figure 2-28) and Section 2.1.3 (Figure 2-29). [[

]] However, the data provided is averaged for all lattices, making trending difficult. Plot the pin power differences between TGBLA and MCNP at the 90 percent calculated or an extrapolated void fraction for various lattices at various different exposures. Evaluate these results.

30-4. Section 2.1.4, "Historical Water Density Cross-Section Fit Adequacy" (Figures 2-30 to 2-38). [[

]] To account for the dependency of the isotopic chains on spectral differences due to depletion at different void conditions, GENE used a developmental lattice physics transport code (LANCER). The staff understands that the data presented in Section 2.1.4, "Historical Water Density Cross-section Adequacy," is [[

]] the staff finds that using a developmental code (LANCER)

as sensitivity evaluation acceptable for assessing TGBLA's depletion capability (provided GENE's response to RAI 3-2 is acceptable). Provide plots of TGBLA/LANCER cross-section data versus void for various exposures for different lattices. Provide similar plots using the LANCER/TGBLA RMS pin power difference for each void condition for all of the exposure points. Evaluate the plots and explain the trends.

30-5. Section 2.1.2 benchmarks the accuracy of TGBLA's instantaneous water density cross-sections against MCNP. [[

]] Identify the key parameters in which MCNP/TGBLA code-to-code benchmarking is used to determine the uncertainties and biases (e.g., void coefficient, pin powers). Explain how exposure dependency and historical effects are taken into account in establishing the uncertainties when the standard MCNP/GENE code-to-code benchmarking is used.

From RAI 31 of Enclosure 1 to MFN 05-031

31. R-Factor: The R-factor methodology is described in NEDC-32505P, "An R-Factor Calculation Method for GE11, GE12, and GE13 Fuel," dated July 1999. Evaluate the R-factor methodology to ensure that the key assumptions in the R-factor methodology remain applicable to the EPU/MELLLA+ conditions. Also, evaluate the pin peaking factors used in the R-factor calculation for operation at high-void conditions. Amend the topical report accordingly, and amend the RAI responses for operation at the EPU/MELLLA+ conditions. RAIs 31-1 through 31-4 pertain to several features of the R-factor calculation, [[

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31-1. RAI 5 (Attachment B) and RAI 4 (Attachment D) of NEDC-32505P-A address the methods used to calculate the R-factor [[

]] Provide updated responses to these RAIs.

[[

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31-2. [[

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From RAI 34 of Enclosure 1 to MFN 05-031

34. Progression-of-Error Analysis (TGBLA/PANAC11). This RAI clarifies what the staff is looking for in Methods RAI 2-7. The progression-of-error analysis is intended to determine the propagation of errors in the lattice physics code (TGBLA04) and the core simulator code (PANAC) for the high-void conditions characteristic of EPU/MELLLA+ operation operating with the current fuel designs (GE14). The sources of error in the

[[

]] GENE methods, Enclosure 4, provides analyses of each kind of error. However, Enclosure 4 did not address the impact of these errors on core behavior predictions.

From RAI 36 of Enclosure 1 to MFN 05-031

36. Void Coefficient Calculations and Benchmarking: Section 5.0, "Modeling Uncertainties and Biases," of NEDE-32906P-A discusses how the void coefficient uncertainties and biases were determined. [[

]] The following questions pertain to applicability of the current void coefficient uncertainties and biases for the EPU/MELLLA+ operation.

36-2. What fuel designs did the [[ ]] lattices used to establish the generic uncertainties and biases represent? State if the lattices representing the current fuel designs (GE14) would be bounded by the [[ ]] lattices.

ENCLOSURE 3

MFN 05-032

Affidavit

General Electric Company

AFFIDAVIT

I, George B. Stramback, state as follows:

(1) I am Manager, Regulatory Services, General Electric Company ("GE") 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 to GE letter MFN 05-032, George Stramback to Alan B. Wang (NRC), *REQUEST FOR ADDITIONAL INFORMATION – LICENSING TOPICAL REPORT NEDC-33006P, REVISION 1, "GENERAL ELECTRIC BOILING WATER REACTOR MAXIMUM EXTENDED LOAD LINE LIMIT ANALYSIS PLUS (MELLLA+)" (TAC NO. MB6157),* dated April 21, 2005. The proprietary information in Enclosure 1, *Extracted RAIs,* is delineated by a double underline inside double square brackets. 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, GE 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 GE, 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 GE, 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 GE 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 GE 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 about GE methods and codes in support of evaluations of the safety-significant changes necessary to demonstrate the regulatory acceptability for the expanded power/flow range of MELLLA+ for a GE BWR, utilizing analytical models and methods, including computer codes, which GE has developed, obtained NRC approval of, and applied to perform evaluations of transient and accident events 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 GE, on the order of several million dollars.

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 GE asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE'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 GE.

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.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE 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 GE 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 GE 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 20th day of April 2005.

George B. Stramback

George B. Stramback
General Electric Company