

ENCLOSURE 2

MFN 06-535

Presentation for December 14, 2006, NRC Meeting Regarding GE Analytical Methods - Non-proprietary

Non-Proprietary Version

IMPORTANT NOTICE

This is a non-proprietary version of Enclosure 1 to MFN 06-535, 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 [[]].

Non-proprietary Version

Void Correlation Methods LTR NEDC-33173P

December 14, 2006

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Agenda

- 1:00-1:15 Introduction and meeting objective
- 1:15-2:00 Power Prediction vs. Gamma Scan Data
- 2:00-2:45 Pressure Drop Prediction vs. Data
- 2:45-3:00 Review Schedule and Conclusion

Meeting Objective

To obtain NRC feedback:

- Removal of the operating limit restriction (OLMCPR) with new confirmatory data
- Define the review process and schedule

Background

NRC review of Methods LTR nearing completion

- Lack of void quality qualification data for updated fuels and new operating domain
- Draft SE contains void quality restriction:

Void Quality Correlation Restriction 1

“For applications involving PANCEA/ODYN/ISCOR/TASC for operation at EPU and MELLLA+, an additional 0.01 will be added to the limiting OLMCPR until such time that GE expands the experimental database supporting the Findlay-Dix void quality correlation, including the projected January 2007 low-flow data, demonstrates the accuracy, and performance of the void quality correlation based on experimental data representative of the current fuel designs and operating conditions during steady state, transient and accident conditions.”



Proposed Plan / Options

New submittal:

- Provide new confirmatory data for 10x10 fuel
 - Gamma scan data
 - ΔP
- Compare between measured vs. predicted power, & measured vs. predicted ΔP
- Confirm current uncertainties

Audit also an option

Void Correlation vs. Power & ΔP

Void fraction predictions based on Findlay-Dix

- Void fraction \rightarrow neutron flux \rightarrow power
- Void distribution $\rightarrow \Delta P$

Good match between

1. Predicted vs. measured power and
2. In-channel ΔP

Indicates good void prediction

Basis for removal of penalties

Gamma Scan Data

TIP information provided in RAI responses

Gamma scans also provide confirmation of power predictions

2002 Cofrentes gamma scan data

- GE12 10x10 fuel
- GE11 9x9 fuel
- In pool 4 bundle corner Ba140 at multiple axes & elevation
- Stretch power uprate with MELLLA

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Cofrentes Cycle 13 (2002)

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Power & Flow History for Cofrentes

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Results

Measured vs. predicted power agreement

- 10x10 fuel – well predicted
- Power distribution uncertainties confirmed
- Nodal power agreement excellent
- Data does not indicate any trends with void fraction or bundle power level

Data does not indicate that there is a concern for EPU or MELLLA+ conditions

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A GE12 (10x10) Comparison

(Excerpt from Report)

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Summary Predicted vs. Measured

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Error Versus Bundle Power

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Error versus Axial Position

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Conclusions

Cofrentes Bundle Gamma Scan (2002)

Good comparison between measured and predicted power

- Approved uncertainty confirmed
- Indicates good void prediction
 - Validates Findlay-Dix correlation



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10x10 Fuel Product ΔP Data

Void Fraction Confirmatory Data



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Full-Scale Tests [[

ATLAS and Stern Labs

- Critical power
- Pressure drop

GNF2 and GE14 tested

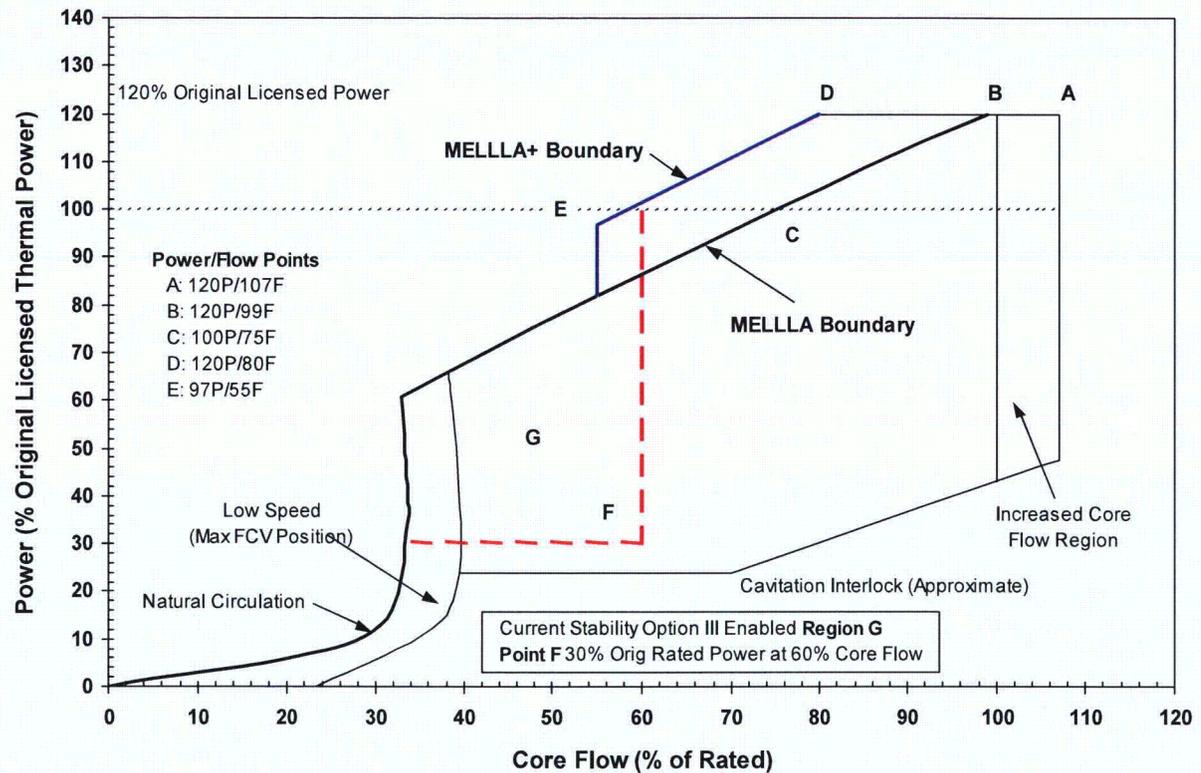
Range of Tests

Power range: 0 to 8 MWt

- Max approaches critical power

Flow range: 0.1 to 1.5 Mlbm/hr-ft²

- Natural circulation to ICF region



Broad test range to cover the BWR fleet

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GE14 and GNF2

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Two geometries for 10x10

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ΔP Test Data Summary

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GE14 ΔP [[

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GE14 ΔP

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GNF2 ΔP
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GNF2 ΔP

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Comparison to Findlay-Dix

Preliminary & Unverified

Conclusions

- GE14 & GNF2 tests – geometry represents current fuel designs

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Final Conclusion

Preliminary & Unverified

Good match between

- Predicted vs. measured power and
- Predicted and measured ΔP
- Indicates good void prediction

Current void prediction error is consistent with original database

No additional OLMCPR restriction for the void correlation is needed

No safety concerns identified. Uncertainties properly accounted for in limits.



Current Commitments

MNF 06-435

- Jan 2007 GE14 Pressure Drop data and analysis
- Dec 2007 COBRAG LTRs to provide additional benchmarking for void fraction predictions

Proposal to Remove Void Quality Restriction

Sufficient bases to remove restriction

- GE10x10 Fuel Pressure Drop
 - Jan. 2007 submittal commitment
- Results of the 2002 Cofrentes Gamma scans for GE 9x9 and 10x10 fuels
 - Available now

Proposed Review Schedule

January 2007

- 2002 Cofrentes gamma scan (available now)
- GE10x10 Pressure Drop

Feb 2007

- Delete restriction from the generic SE

Feb 2007

- ACRS sub-committee for Methods SE

March 2007

- ACRS full-committee for Methods SE

April 2007

- Final SE for Methods LTR without OLMCPR restriction

ENCLOSURE 3

MFN 06-535

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 06-535, Robert E. Brown to U.S Nuclear Regulatory Commission, *Presentation for NRC Meeting Regarding GE Analytical Methods*, dated December 19, 2006. The Enclosure 1 (*Presentation for December 14, 2006, NRC Meeting Regarding GE Analytical Methods*) proprietary information 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 sidebars and 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 data and conclusions regarding GE Methods, pertaining to NEDC-33137P, *Applicability of GE Methods to Expanded Operating Domains*, which supports evaluations of the safety-significant changes necessary to demonstrate the regulatory acceptability for the expanded power/flow operating domains, including Extended Power Uprates, Constant Pressure Power Uprates, and the MELLLA+ domain, 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.

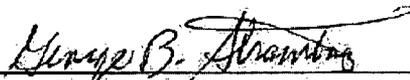
The precise value of the expertise to devise an evaluation process, and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

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 19th day of December 2006.



George B. Stramback
General Electric Company