



GE Nuclear Energy

Nuclear Services
175 Curtner Ave. M/C 747
San Jose, CA 95125
(408) 925-1913, Fax (408) 925-6710
E-mail: george.stramback@gene.ge.com

MFN 03-118
October 31, 2003

U.S Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20852-2738

Attention: Chief, Information Management Branch
Program Management
Policy Development and Analysis Staff

Subject: **DSS-CD Licensing Topical Report - Harmonic Modes of the Neutron Flux (TAC No. MB5705)**

By Reference 1, GE submitted the Detect and Suppress - Confirmation Density (DSS-CD) Licensing Topical Report (LTR), NEDC-33075P, Revision 2 for NRC review and approval. During subsequent discussions, the NRC staff requested information on the PANACEA Harmonic calculation describing the approach used to generate the harmonic modes of the neutron flux distribution. Enclosed is the requested information.

Enclosure 1 contains proprietary information as defined by 10CFR2.790. GE customarily maintains this information in confidence and withholds it from public disclosure. A non-proprietary version of the response to the NRC's request is provided in Enclosure 2.

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 of Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.790 and 9.17.

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

Sincerely,

George Stramback
Manager, Regulatory Services
GE Nuclear Energy
(408) 925-1913
george.stramback@gene.ge.com

D065

Project No. 710

Reference:

1. MFN 02-087, Letter from George Stramback (GE) to the NRC, *Submittal of GE Proprietary Licensing Topical Report NEDC-33075P, Revision 2, General Electric Boiling Water Reactor Detect and Suppress Solution - Confirmation Density*, November 2002, dated November 6, 2002,

Enclosures:

1. GE Letter dated April 4, 1989, C. Martin (GE) to B. Shiralkar (GE), *"Harmonic Modes of the Neutron Flux"* – Proprietary Information
2. GE Letter dated April 4, 1989, C. Martin (GE) to B. Shiralkar (GE), *"Harmonic Modes of the Neutron Flux"* – Non-Proprietary Information
3. Affidavit by George B. Stramback, dated October 31, 2003

cc: AB Wang (NRC)
JF Klapproth (GE/San Jose)
MA Lalor (GE/San Jose)
Tony Nakanishi (GE/San Jose)
I Nir (GE/San Jose)
PT Tran (GE/San Jose)

Enclosure 2

MFN 03-118

Harmonic Modes of the Neutron Flux

Non - Proprietary Information

NUCLEAR OPERATION
San Jose, California

April 4, 1989

cc: JGM Andersen
KC Chan
SP Congdon
JK Garrett
F. Rahnema
JC Shaug
RC Stirn
GA Watford

TO: B. S. Shiralkar, Manager
Safety & Thermal Hydraulic Methods

SUBJECT: Harmonic Modes of the Neutron Flux

A special version of PANACEA has been developed to support current research into BWR stability. This special version, which is a variant of PANAC07, has the ability to generate harmonic modes of the neutron flux distribution. [[

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The executable code for this special PANACEA is located on the file FDM::DISK2:[MARTIN.T]PANA.EXE. This code has not been verified and is not suitable for any use other than calculating harmonic modes, as described herein.

A sample input file is listed in Table 1. In this example there are six PANACEA cases. [L

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Figures 1 through 5 show the flux distribution obtained from the sample problem. Figure 1 is the fundamental mode flux distribution.

[[

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Figure 2 shows the first harmonic of the neutron flux distribution.

[[

]] This represents well over one dollar of reactivity.

The second harmonic of the flux is shown in Figure 3. This mode is very similar to the first harmonic, except that the line separating the positive from the negative regions stretches from the upper left in the figure to the lower right. [[

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The third harmonic of the flux is shown in Figure 4. [[

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The fifth and final figure shows the fourth harmonic. [[

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Warnings

Since this code is not a production version, several warnings to the prospective User are appropriate:

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Theoretical Discussion

[[

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The eigenfunctions of this operator form a complete orthonormal set.
Therefore,

[

]

Any function ψ may be expanded in terms of ϕ_i :

[

]

Suppose that the eigenfunctions are ordered such that

[

]]

The usual convergence parameter

[[

]]



C. L. Martin, Technical Leader
Fuel Design Methods

CLM/dlp
Attachment

Table 1.

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Figure 1.

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Figure 2.

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Figure 3.

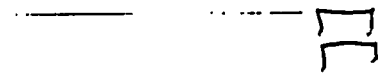


Figure 4.

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Figure 5.



ENCLOSURE 3

MFN 03-118

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 2 to GE letter MFN 03-118, George Stramback to NRC, *DSS-CD Licensing Topical Report – Harmonic Modes of the Neutron Flux (TAC No. MB5705)*, dated October 31, 2003. The proprietary information in Enclosure 1, *Harmonic Modes of the Neutron Flux* is delineated by a double underline inside double square brackets. 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 2.790(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 2.790 (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 detailed information supporting the previous proprietary submittal of NEDC-33075P, Revision 2, *General Electric Boiling Water Reactor Detect and Suppress Solution – Confirmation Density*, which describes results of analytical models, methods and processes, including computer codes, which GE has developed, and applied to perform stability evaluations using the detection and suppression capability of the confirmation density algorithm for the BWR.

The development of the detection and suppression capability of the confirmation density algorithm for the BWR was achieved at a significant cost, in excess of ¼ million dollars, to GE.

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.

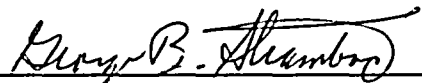
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

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 31st day of October 2003.



George B. Stramback
General Electric Company