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*GE Proprietary Information*

MFN 05-022
March 31, 2005

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

Attention: Herbert Berkow, Project Directorate IV
Program Manager

Subject: Responses to RAIs - **Methods Interim Process (TAC No. MC5780)**

In Reference 1, GE document the proposed Methods Interim Process. The purpose of the Methods Interim Process is to allow the NRC to issue Safety Evaluations (SE) for the MELLLA + LTR and the future interim Methods LTR pending final NRC resolution of the NRC's request for additional information regarding GE's methods (Methods RAIs). GE committed in Reference 1 to a schedule to provided the responses to those Methods RAIs required to judge the viability of, and ultimately approve, the Methods Interim Process.

Enclosure 1 provides the responses to the first set of Methods RAIs regarding the viability of the Methods Interim Process: 2-6, 3-1, 21-2, and 28. The response to the remaining viability Methods RAIs are scheduled to be issued on April 8, 2005. Non-proprietary versions of these responses are 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 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

George Stramback

Project No. 710

References:

1. MFN 05-0.50, Letter from George Stramback (GE) to NRC, March 25, 2005, *Methods Interim Process (TAC No. MC5780)*

2. MFN 04-111, Letter from Alan Wang (NRC) to James Klapproth (GE), October 1, 2004, *Request for Additional Information - Global Nuclear Fuel's Analytical Methods Used to Support Operation in the MELLLA+ Domain, Licensing Topical Report NEDC-33006P, Revision 1, "General Electric Boiling Water Reactor Maximum Extended Load Limit Analysis Plus" (TAC No. MB6157)*

Enclosures:

1. GE Reponses to RAIs 2-6, 3-1, 21-2, and 28 - Proprietary
2. GE Reponses to RAIs 2-6, 3-1, 21-2, and 28 - Non-proprietary
3. Affidavit

cc: M Harding (GNF/Wilmington)
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# ENCLOSURE 1

# MFN 05-022

# GE Responses to RAIs 2-6, 3-1, 21-2, and 28

## 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 05-022

# GE Responses to RAIs 2-6, 3-1, 21-2, and 28

## Non-proprietary version

**IMPORTANT NOTICE**

This is a non-proprietary version of Enclosure 1 to MFN 05-022, 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 [[ ]]

**NRC RAI 2-6, Error Acceptance Criteria**

For each fuel design change, GNF-A assesses the sensitivity of the lattice physics parameters. Provide a discussion on GNF-A's current method for establishing what is an acceptable error criteria for the lattice physics parameters. Explain which lattice parameters are these error acceptable criteria defined. For the current review, define the acceptance criteria associated with the cross sections and lattice parameters and resolve or justify the high errors.

**GE Response**

As new fuel designs and plant operating strategies evolve, it is highly desirable that the nuclear method systems provide a response that is consistent with past performance in terms of trends, biases, and uncertainties. In keeping with this desire, a "Range of Usage" assessment must be done for each nuclear method system (TGBLA, PANACEA, etc.). Maintaining consistent trends, biases, and uncertainties enables a "seamless" use of the nuclear methods in the currently allowed and the extended usage range.

Assessment of the viability of the nuclear parameters in the GE lattice physics methods is performed with a series of reviews. Reviews are conducted to assess the ability of the TGBLA nuclear geometric models to adequately represent the requested usage range extension. Reviews are conducted to assess the adequacy of any approximations that are required to accommodate the requested usage range extension. For the lattice physics system (TGBLA), comparisons to MCNP results are used to establish that the response of TGBLA in the extended usage range is consistent with responses observed in the previously defined usage range. Consistent trends and biases in the lattice physics results between the defined usage range and the extended usage range provide the basis for the allowance of the extended usage range.

The parameters in the lattice physics assessment are the lattice k-infinity and the rod-wise fission densities. These parameters are used as assessment parameters because of their global characteristics and/or due to their potential impact on the safety limit evaluations.
The definition of k-infinity in 3 groups is as follows

$$k_\infty = \left(\nu_1\Sigma_{f_1} + \nu_2\Sigma_{f_2}\frac{\phi_2}{\phi_1} + \nu_3\Sigma_{f_3}\frac{\phi_3}{\phi_1}\right) \Big/ \left(\Sigma_{a_1} + \Sigma_{s_{12}} + \Sigma_{s_{13}}\right)$$

where,

$\nu_g$ = number of neutrons per fission in energy group g
$\Sigma_{fg}$ = macroscopic fission cross section in energy group g
$\phi_g$ = neutron flux in energy group g
$\Sigma_{a1}$ = macroscopic absorption cross section in energy group 1
$\Sigma_{s1g}$ = macroscopic slowing down cross section from energy group 1 to g

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By use of k-infinity as an assessment parameter, a review of all significant cross sections and fluxes may be made.

The state-points analyzed for the lattice physics usage range assessment are generally beginning of life and selected state-points with exposed fuel isotopic concentrations. The isotopic content used by MCNP for exposed conditions is [[ ]]. Both hot and cold conditions are included as well as controlled and borated conditions.

To extend the usage range, acceptance criteria are defined to provide an initial review of the system performance. A failure to meet the acceptance criteria dictates that a more detailed review should be performed. The lattice k-infinity including a bias is expected to be within [[ ]] for all analyzed state points. A bias trend is expected for gadolinium bearing lattices of [[ ]] at beginning of life increasing to [[ ]] prior to the point of maximum reactivity and returning to [[ ]] for exposures greater than the point of maximum reactivity. The nominal bias trend for non-gadolinium lattices is [[ ]].

The rod-wise fission densities are defined as

$$F_r = V_r \sum_{g=1}^{G} \sum_{i} \Sigma_{f_r}^{g,i} \phi_r^g$$

where

$V_r$ is the volume of fuel rod r

$\Sigma_{f_r}^{g,i}$ is the macroscopic fission cross section for group g, isotope i and rod r

$\phi_r^g$ is the flux for group g and rod r

The normalized array for the rod-wise fission density is generated as follows:

$$\tilde{F}_r = F_r \Big/ \left( \frac{1}{N} \sum_{r=1}^{N} F_r \right)$$

The use of the fission density parameter allows an assessment of the uncertainty of the fuel rod fluxes. This provides an assurance that the fluxes used for fuel rod isotopic depletion are reasonable and that the uncertainty of the fuel rod flux distribution is consistent with expectations.

The state-points used for the fission density assessment are the same as the state-points used for the reactivity assessment except that only the hot uncontrolled conditions are utilized in the global weighted average assessment. The fission density uncertainty assessment is based on an average of the hot uncontrolled 0, 40, and 70% void lattice pin-wise fission density results obtained from the MCNP tallies and compared to the TGBLA results. The Hot Uncontrolled 0, 40, and 70% void state-point results are compared and the RMS of the resulting rod-wise differences is obtained. The fission density RMS comparison for individual lattices is anticipated to be less than [[ ]]. As in the k-infinity assessment, exceeding the fission density assessment criteria indicates a need for more detailed study.

Ultimately for safety limit analysis, these comparisons are performed for a representative number of lattice designs over the range of usage for TGBLA and a global weighted average over the range of 0, 40, and 70% voids is obtained and compared to the [[ }]] value used for current fuel designs in subsequent safety limit analysis (see for instance NEDE-32601P-A). This value of [[ ]] is deemed to be the minimum approved value but is subject to increase as fuel designs and other considerations evolve to maintain the desired level of conservatism in the safety limit analysis.

Closure of the "range of usage extension" study can potentially result in several different conclusions. The conclusions can be as follows:

1. The "range of usage" request is generically allowed and the stated usage range for the method is modified to include the requested usage extension.

2. The "range of usage" request is not generically allowed and system modification must be made before generic allowance is granted. The system usage remains restricted until the required modifications are completed and all required reviews are completed.

3. The "range of usage" request is not generically allowed but specific project allowance is given for use. Any future use of the system must again request the "range of usage extension" review.

4. The "range of usage" request is not allowed and a conclusion is reached that system modifications cannot be made to support this request at this time.

**NRC RAI 3-1**

In the conclusion provided in Section 2.1.2 it is stated that [[ ]] and in Section 2.1.4 it is stated that [[ ]]

a Provide an explanation of the reasons for these difficulties with TGBLA.

b New assemblies have a large number of Gd pins and therefore any inaccuracies in the Gd depletion are likely to have a larger impact on the results obtained for the higher Gd-loaded bundles. Since the previous benchmarking data was based on lower Gd loading, can these benchmarking results be applied to the current more heavily Gd loaded assemblies? Provide justification for the use of TGBLA/PANAC under the hard spectral conditions typical of the EPU/MELLLA+ operation for cores loaded with heavily Gd loaded assemblies.

**GE Response**

Response 3-1a:

The document in which this statement originally appeared is an "internal review report" of the status of PANACEA and TGBLA in support of the MELLLA+ plant operation. The Methods Enclosure included this statement directly from the design review documentation. The internal document expresses the individual opinions and concerns of all parties represented in the design review. The statement in Section 2.1.2 is a statement of opinion from the design review. The statement should read "[[ ]]".

The statement in Section 2.1.4 of the enclosure is also a statement of opinion from members of the review team, and it is correct in that TGBLA [[ ]] for Gd pellets. The other isotopes in the Gd pellets (e.g., Uranium, Plutonium, fission products, etc.) are treated [[ ]], the same as is done in the non-gadolinia bearing pellets. However, the inference that this leads to significant deficiencies is not valid. The effect of [[ ]] generated lattice average cross sections.

However, since the use of TGBLA at 90% void fractions is not required in the standard production process for generating lattice nuclear constants, usage of TGBLA has not been validated for void fractions above 70%. In response to the request for additional analyses of the PANACEA cross section fitting interpolation/extrapolation process, a "usage range extension" study has been performed to allow examination of 90% void depletion uncertainties. [[

]]

As the impact on the 0, 40, and 70% void data is minimal, this weakness does not significantly impact the fitting errors for extrapolation to void fractions higher than 70%.

<u>Response 3-1a:</u>
The results presented in Section 2 of the Methods Enclosure include a lattice with [[ ]] gadolinium bearing rods [[ ]]. This design represents one of the highest number of gadolinium bearing rod designs in current use. This design is also for the upper zone of the fuel bundle, which generally has the highest ratio of gadolinium atoms to uranium atoms due to the presence of vanished rods (regions over part length fuel rods). This type of design generally produces the highest expected sensitivity to gadolinium depletion and as such is representative of a worst case study for depletion methods.

The plant tracking data obtained over numerous cycles of operation has not indicated any correlation with increasing gadolinium concentration or number of gadolinium bearing rods. The response to RAI 25 contains data to confirm this conclusion.

As gadolinium concentrations have increased, "range of usage" studies have been performed to assess the capability of TGBLA to perform under these conditions. These studies have currently concluded that TGBLA is capable of modeling gadolinium concentrations [[ ]]. Studies to extend the range of TGBLA to greater than [[ ]] have not been performed and; therefore, the current system is limited to usage of [[ ]] pellet concentrations.

**NRC RAI RAI 21-2, SLMCPR:**

21-2 Explain the differences between the nodal TIP RMS, bundle TIP RMS, the axial TIP RMS, and the nodal RMS.

**GE Response**

Three-dimensional power shape information as recorded by the TIP instrument readings can be compared to calculated instrument readings from the simulator to determine its ability to calculate power distributions. Strings of either thermal neutron sensitive detectors (often referred to as thermal TIPs) or gamma-ray sensitive detectors (referred to as gamma TIPs) may be used to assess the normalized axial power shape along almost the entire length of the bundles within a four-bundle cell. The integrated signals may be combined to evaluate the radial power distribution within the core.

The 3D simulator models the response of the instrument to the appropriate particle species at the detector location to produce a simulated signal. For TIP comparisons, this simulated detector response is compared to the relative strength of the measured signal. TIP distributions take time to accumulate and hence are obtained periodically throughout an operating cycle. The most common interval between TIP measurements is several weeks. During the time between TIP measurements the Local Power Range Monitors are used to monitor the core power distribution. For a given TIP string, the measurement is a response to the integrated influence of the surrounding bundles. This signal strength from the fuel is primarily due to the cumulative power production of fuel rods in the four bundles surrounding the string.

The process for the TIP comparison basis is described below. The definitions of the quantities used in the calculations are:

$$P(k,j) = PCTIP(k,j)$$

$$C(k,j) = CALTIP(k,j)$$

$$I(j) = IFTIP(j)$$

$$S_j \Leftarrow j \in (I(j) = 0)$$

$$J = \#\text{ of elements in } S_j$$

$$K = Kup - Klow + 1$$

*Klow, Kup* = Node limits for axial comparison, usually 2 and 23

where

*PCTIP(k,j)* = the measured six inch average TIP reading in axial segment k of TIP string j

*CALTIP(k,j)* = the calculated six inch average TIP reading in axial segment k of TIP string j

*IFTIP(j)* = an indicator of when TIP readings are failed by the process computer, manually failed by the operator, or rejected by the core monitor for statistically poor performance

The measured and calculated TIP strings are normalized, respectively, as follows:

$$\sum_{j\in S_j}\sum_{k=Klow}^{Kup} P(k,j) = J\cdot K$$

$$\sum_{j\in S_j}\sum_{k=Klow}^{Kup} C(k,j) = J\cdot K$$

<u>Nodal Statistic</u>
The nodal RMS assesses all the predicted to measured instrument signals (for valid strings). Encompassing both radial peaking and axial structure, it is an global indicator of power shape efficacy across the core for a given statepoint.

$$R_{nod} = \sqrt{\frac{\sum_{j\in S_j}\sum_{k=Klow}^{Kup}(P(k,j)-C(k,j))^2}{J\cdot K}}$$

The nodal statistic may also be reported for a given string.

$$\Delta_{j,nod} = \sqrt{\frac{\sum_{k=Klow}^{Kup}(P(k,j)-C(k,j))^2}{K}}$$

With this form, the nodal RMS becomes the following form.

$$R_{nod} = \sqrt{\frac{\sum_{j\in S_j}\Delta^2_{j,nod}}{J}}$$

<u>Radial Statistic</u>
The radial (or bundle) RMS assesses the string average predicted to measured instrument signals. In this way, the ability to predict the four bundle average peaking as applied in the SLMCPR process is measured.

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$$R_{rad} = \sqrt{\frac{\sum_{j \in S_j} \left( \left( \frac{\sum_{k=Klow}^{Kup} P(k,j)}{K} \right) - \left( \frac{\sum_{k=Klow}^{Kup} C(k,j)}{K} \right) \right)^2}{J}}$$

The bundle statistic may be reported for a given string and may be positive or negative.

$$\Delta_{j,rad} = \left( \frac{\sum_{k=Klow}^{Kup} C(k,j)}{K} \right) - \left( \frac{\sum_{k=Klow}^{Kup} P(k,j)}{K} \right)$$

With this form, the bundle RMS may be written in the following form.

$$R_{rad} = \sqrt{\frac{\sum_{j \in S_j} \left( \Delta_{j,rad} \right)^2}{J}}$$

<u>Axial Statistic</u>

The axial RMS assesses only the axial shape component of the predicted to measured instrument signals. The radial peaking between strings is normalized out for this measurement. Thus, it is a good indicator of the axial power shape performance for the core state.

$$R_{axial} = \sqrt{\frac{\sum_{k=Klow}^{Kup} \left( \left( \frac{\sum_{j \in S_j} P(k,j)}{J} \right) - \left( \frac{\sum_{j \in S_j} C(k,j)}{J} \right) \right)^2}{K}}$$

The axial statistic may be reported for a given string if the string is first normalized unto itself.

$$P'(k,j) = \frac{\sum_{k=Klow}^{Kup} P(k,j)}{K}$$

$$C'(k,j) = \frac{\sum_{k=Klow}^{Kup} C(k,j)}{K}$$

$$\Delta_{j,axial} = \sqrt{\frac{\sum_{k=Klow}^{Kup} \left(P'(k,j) - C'(k,j)\right)^2}{K}}$$

Combining Multiple TIP Sets

For collapsing the uncertainties for two different plants or multiple TIP sets from a single plant, a weighted averaging method is used. This method is defined in NEDC-32694P-A. If there are a total of N TIP comparison sets, and the total number of TIP strings in each plant is $M_i$, the method of combining the multiple TIP sets to obtain a weighted uncertainty $R_{weighted}$ is:

$$R_{weighted} = \sqrt{\frac{\sum_{i=1}^{N}(M_i - 1)R_i^2}{(\sum_{i=1}^{N} M_i - N)}}$$

**NRC RAI 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. GNF-A's SLMCPR methodology requires that the power allocation uncertainty, σ PALj, for each bundle in a four-bundle core cell be determined through gamma scans.

28-1 Provide statistically significant gamma scan data to benchmark the bundle and pin power distribution. The objective is evaluate the accuracy of the TGBLA and PANAC codes in predicting the bundle and pin peaking and power distribution for depletion at high-void conditions. Select bundles that are once burned, twice burned, and, if necessary, thrice burned. Gamma scans should also be used to benchmark the codes' accuracy in predicting the axial power distribution and to determine whether GNF-A's code systems need any changes for depletion at high-void conditions. Your gamma scan data should therefore include high-powered bundles that have high Gd loadings and operate at high-void conditions. Most important, the gamma scan data and the corresponding calculational analysis should provide additional validatation for the statement in Section 2.1.4 of the methods enclosure (see RAI 3-1).

28-2 If gamma scan data is not available, make a commitment to do the gamma scans. Your commitment should include an action plan and a timetable for doing the gamma scans for the GE14 fuel design. Also describe your proposed future approach you incorporate new fuel designs into your licensing methodology. The proposed approach should be similar to the approach used for core follow benchmarking. Interim actions are covered in RAIs 30-7, 30-8, and 35 below.

**GE Response**
Background
Gamma scanning is a non-destructive method to determine the relative fission product inventory in nuclear fuel. Gamma scan programs vary by specification of the physical locality of the measurement, time of performing the measurement, measuring time, and number of measurements.

For example, the technique for measurements of "power" employs measurement of the 1.6 Mev gamma which accompanies beta decay of $^{140}$La with a half-life of 40.2 hours. $^{140}$La accumulates in fuel mainly from the beta decay of the fission product $^{140}$Ba which has a half-life of 12.8 days. After about 10 days or so following reactor shutdown, $^{140}$La is proportional to the $^{140}$Ba atom density and decays with the $^{140}$Ba half-life. The $^{140}$Ba distribution in fuel is characteristic of the fission distribution or integrated power history over the last 5 half-lives or so (approximately 60 days) of reactor operation. Thus the scan results can be used to determine "recent" core power distribution. The 12.8 day half life of $^{140}$Ba makes it imperative that the Gamma Scan data be

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collected as soon as possible after core shutdown, and has the possibility of interrupting refueling operations. A follow-on comparison of the measured $^{140}Ba$ distribution with predictions using the analytical tools of GE (i.e. TGBLA/PANACEA) constitute a benchmark of methods which may be used for methods licensing or determination of other licensing uncertainties. Additional target spectral lines from other isotopes may be used for determination of plenum fission gas ($^{85}Kr$) or fuel exposure ($^{137}Cs/^{144}Pr$).

The procedure of comparing GE steady-state analytical methods to gamma scan measurements was last formally documented in Reference 28-1 (TGBLA/PANAC LTR). It was then used in Reference 28-2 (NEDC-32694P-A, Power Distribution Uncertainties) in support of the revised SLMCPR uncertainties (NEDC-32601P-A, Reference 28-3). Technically, gamma scans have only been used by GE to determine [[
]]indicated on pages 3-2 and 3-4 of NEDC-32694P-A.

[[

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When the SER on the revised SLMCPR process was issued, subsequent discussions with the NRC clarified the requirements of the SER on the SLMCPR uncertainties as documented by letter in Reference 28-5. GE complied with the intent and direction of the SER for the GE14 product line as documented in 2001 through References 28-6, 28-7, and 28-8.

<u>Response 28-1</u>

GE has continued to use gamma scans for technical validation of its methods. The performance of steady-state core simulator predictions to high exposure have recently been validated. The comparison between PANAC10, PANAC11, $^{137}Cs$ gamma scan, and more accurate $^{148}Nd$ point measurements for a full length $UO_2$ rod are shown in Figure 28-1. With peak exposures exceeding [[ ]], predicted pin exposures for both codes agree very well with both measurements while agreement between PANAC11 UPINEX (reconstructed pin exposures) and the sensitive $^{148}Nd$ point measurements is extremely favorable. Figure 28-2 shows the excellent agreement for a part length rod approaching [[ ]]. The exposure prediction capability does not degrade for part length rods. Since exposure accumulation is just the integration of the power history, these measurements serve to validate the applicability of the TGBLA06/PANAC11 methodology to high burnup application as well as imply accurate power prediction throughout the life of the fuel bundle. This information partially satisfies Methods Audit RAI 24.

Response 28-2

It should be noted that gamma scans at power reactors occur at the end of an operating cycle. Current operational strategy is to perform a spectral shift design which runs the core flow at reduced core flow early in cycle to enhance conversion of $^{238}U$ in the upper regions of the core. Towards end of cycle, the core flow is increased in order to move the axial power peak up to utilize available $^{235}U$ and $^{239}Pu$. During this increased core flow period, the power/flow ratio is reduced. Since the time scale of a gamma scan extends to approximately 60 days of operation, the number of measurements of high power/flow ratio bundles will be few thus reducing the overall worth of the measurement to the questions at hand.

GE already intends to perform plenum fission gas gamma scan measurements to provide needed input to thermal-mechanical methodology qualification and determination of fuel high exposure fuel designs. Additionally, GE will continue to perform hot-cell gamma scan (and pellet mass spectrometry) measurements on rod exposure for a limited number of rods.

GE is also developing a gamma scan system capable of measuring activity of a single rod in the spent fuel pool with the ability to translate the rod axially. Besides the ability to measure exposure after a long cooling time, this system may be used for measurements of $^{140}Ba$ activity shortly after core shutdown. All bundles selected for examination will be chosen based on original isotopic enrichment, current burnup, and other operational history considerations. This will satisfy near-term analytical benchmarking needs and provide an effort consistent with the actions of other vendors.

Additional gamma scan measurements require extensive planning and site support for scheduling any outage activity as well as affecting plant operation for up to 60 days prior to shutdown, GE cannot *a priori* commit to any gamma scan program without utility partners. [[

]] GE will continue to work with our utility partners to develop an gamma scan program.

Until that time, continued verification of the SLMCPR uncertainties will be achieved through actions consistent with that already provided to the staff for the GE14 fuel design in References 28-6, 28-7, and 28-8. Particularly, if these activities (e.g. confirmation of TIP uncertainties or Monte Carlo benchmark studies) do not indicate statistically significant degradation, the [[

]] is still applicable.

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RAI 28 References

28-1 NEDE-30130-P-A, Steady State Nuclear Methods, April 1, 1985.

28-2 NEDC-32694-P-A, Power Distribution Uncertainties for Safety Limit MCPR Evaluations, August 1999.

28-3 NEDC-32601P-A, Methodology and Uncertainties for Safety Limit MCPR Evaluations, April 1999.

28-4 Letter from G.A. Watford (GE) to R. M. Pulsifer (NRC), FLN-1999-012, "Proprietary Presentation Material from GE/NRC Meeting of November 10, 1999", November 12, 1999.

28-5 Letter, Glen A. Watford (GE) to U. S. Nuclear Regulatory Commission Document Control Desk with attention to J. Donoghue (NRC), "Additional Information Associated with SLMCPR Methodology and Uncertainty Topical Reports NEDC-32601P and NEDC-32694P", MFN-002-99, March 1, 1999.

28-6 Letter from G.A. Watford (GE) to R. M. Pulsifer (NRC), FLN-2001-004, "Request for Additional Information – GE14 Review – Power Distribution Uncertainties and GEXL Correlation Development Procedure", March 27, 2001.

28-7 Letter, Glen A. Watford (GE) to U. S. Nuclear Regulatory Commission Document Control Desk with attention to R. Pulsifer (NRC), "Confirmation of 10x10 Fuel Design Applicability to Improved SLMCPR, Power Distribution and R-Factor Methodologies", FLN-2001-016, September 24, 2001.

28-8 Letter, Glen A. Watford (GE) to U. S. Nuclear Regulatory Commission Document Control Desk with attention to J. Donoghue (NRC), "Confirmation of the Applicability of the GEXL14 Correlation and Associated R-Factor Methodology for Calculating SLMCPR Values in Cores Containing GE14 Fuel", FLN-2001-017, October 1, 2001

ENCLOSURE 3

MFN 05-022

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 05-022, George Stramback to NRC, *Responses to RAIs - Methods Interim Process (TAC No. MC5780,* dated March 31, 2005. The proprietary information in Enclosure 1, *GE Reponses to RAIs 2-6, 3-1, 21-2, and 28,* 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, <u>Critical Mass Energy Project v. Nuclear Regulatory Commission,</u> 975F2d871 (DC Cir. 1992), and <u>Public Citizen Health Research Group v. FDA</u>, 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 detailed results and conclusions regarding GE Methods supporting 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 31st day of March 2005.

George B. Stramback

George B. Stramback
General Electric Company