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Proprietary Information Notice
This letter forwards proprietary information in accordance with 10CFR2.390. The balance of this letter may be considered non-proprietary upon the removal of Enclosure 1.

MFN 06-301

Docket No. 52-010

September 6, 2006

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

Subject: **Response to Portion of NRC Request for Additional Information Letter No. 31 and NRC Letter No. 57 Related to ESBWR Design Certification Application – TRACG Application for ESBWR ATWS – RAI Numbers 21.6-4, 21.6-12, 21.6-27 through 21.6-29, 21.6-36 through 21.6-38, 21.6-42, 21.6-45, 21.6-46 and 21.6-52**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the Reference 1 and 2 letters. This completes GE's response to RAI Letter No. 57.

Enclosure 1 contains proprietary information as defined in 10CFR2.390. 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 proprietary information in Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. A non proprietary version is contained in Enclosure 2.

If you have any questions about the information provided here, please let me know.

Sincerely,

Kathy Sedney for

David H. Hinds
Manager, ESBWR

D068

References:

1. MFN 06-203, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 31 Related to ESBWR Design Certification Application*, June 23, 2006
2. MFN 06-317, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 57 Related to ESBWR Design Certification Application*, September 7, 2006

Enclosures:

1. MFN 06-301 – Response to Portion of NRC Request for Additional Information Letter No. 31 Related to ESBWR Design Certification Application – TRACG Application for ESBWR ATWS – RAI Numbers 21.6-4, 21.6-12, 21.6-27 through 21.6-29, 21.6-36 through 21.6-38, 21.6-42, 21.6-45, 21.6-46 and 21.6-52 – GE Proprietary Information
2. MFN 06-301 – Response to Portion of NRC Request for Additional Information Letter No. 31 Related to ESBWR Design Certification Application – TRACG Application for ESBWR ATWS – RAI Numbers 21.6-4, 21.6-12, 21.6-27 through 21.6-29, 21.6-36 through 21.6-38, 21.6-42, 21.6-45, 21.6-46 and 21.6-52 – Non Proprietary Version
3. Affidavit – George B. Stramback – dated September 6, 2006

cc:	WD Beckner	USNRC (w/o enclosures)
	AE Cubbage	USNRC (with enclosures)
	LA Dudes	USNRC (w/o enclosures)
	GB Stramback	GE/San Jose (with enclosures)
	eDRFs	0057-2007, 0055-8370 and 0057-4126

ENCLOSURE 2

MFN 06-301

Response to Portion of NRC Request for

Additional Information Letter Nos. 31 and 57

Related to ESBWR Design Certification Application

TRACG Application for ESBWR ATWS

RAI Numbers 21.6-4, 21.6-12, 21.6-27 through 21.6-29,

21.6-36 through 21.6-38, 21.6-42, 21.6-45, 21.6-46 and 21.6-52

NON PROPRIETARY VERSION

NRC RAI 21.6-4

On Page 3-2, you state that the ATWS emergency operating procedures (EOPs) may direct the operator to depressurize the reactor during an ATWS and that this is considered in the ESBWR ATWS analysis. Explain how depressurization operations are approached during an ATWS. Discuss how the phenomena are similar to or different from that resulting from a loss of coolant accident (LOCA). Explain the approach taken to add depressurization phenomena to the phenomena identification and ranking table (PIRT) for ATWS.

GE Response

The BWR Emergency Procedures Guidelines provide a Heat Capacity Temperature Limit (HCTL) curve, which plots reactor pressure on the abscissa, and suppression pool temperature on the ordinate. When the pool temperature is above the curve, for a given reactor pressure, the EPG's direct the operator to depressurize the vessel. Several methods of depressurizing can be used. See steps RC/P-1 and RC/P-2 in section 18A.3, DCD rev 1.

The approach to developing PIRT which consider depressurization phenomenon in ESBWR was to start with the LOCA PIRT, and review the ranking of parameters, changing the ranking as appropriate for ATWS, and ranking parameters which were not included in the LOCA depressurization PIRT. The following is a discussion of how the ranking is different from the ranking in Table 2.2-3. Composite List of Highly Ranked Phenomena for ECCS/LOCA, of NEDE-33083, Supplement 0. If the PIRT was not in the LOCA table, no discussion is provided, because the ranking is unique for ATWS. The ranking for ATWS, is identical to the SBA LOCA blowdown ranking except:

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NRC RAI 21.6-12

The staff understands that the SLCS injection velocity is fixed by a time dependent "FILL" component in the TRACG model. Justify the velocity selected for this table. How is the velocity adjusted when the reactor pressure is lower than the safety relief valve (SRV) set point?

GE Response

This profile was based on the design of the SLCS accumulator. The minimum requirement was that the first half of the volume required was injected at an average velocity of 30.5 m/s. The velocity versus time was derived from the adiabatic gas expansion of N_2 in the accumulator. The following equations were used to determine the pressure of the N_2 and the expansion volume, respectively:

$$P_{j+1} = P_0 \frac{V_0^k}{V_j^k}$$

where: P is pressure; V is volume; k is the ratio of specific heats (1.41 for Nitrogen); and the time interval is represented by j := 0…t.

$$V_{j+1} = V_j + 12\frac{A}{\rho}\sqrt{2g\frac{\rho}{k}}\sqrt{P_j + h_0\frac{\rho}{144} - \left(Pv_j + \frac{H_j}{144}\right)}dt$$

where: A is the pipe area; ρ is the fluid density (66.3 lb/ft^3); h_0 is the accumulator elevation; Pv is the R`PV pressure; and H is the RPV level.

The velocity vs. time profile used was developed with a constant downstream pressure of 8.72 MPa. The typical downstream pressure just prior to injection is about 8.5 MPa and drifts down slowly. The injection velocity is not adjusted for the decreasing pressure in the reactor, which assumes lower injection velocities, which is conservative. Section 8.2.2.1 of NEDE-33083P Supplement 2 shows that a sensitivity run with 90% of the injection velocity table [[ ]].

No change to the LTR will be made as a result of this RAI.

NRC RAI 21.6-27

On Page 5-7, you evaluate the critical velocity that should prevent settling of boron into the guide tubes. You assume a temperature deficit of 10°C. Justify this assumption. What is the CRD purge flow velocity? How is this taken into consideration in your calculation? What is the actual velocity at the top of the guide tubes and how is that determined?

GE Response

As mentioned in the response to RAI 21.6-11, the maximum credible temperature deficit in the borated solution is of the order of 10°C. The higher this value, the greater the density of the boron solution and the greater the likelihood of stratification.

The CRD velocity of the purge flow is 0.001083 m/s. This is accounted for in the TRACG calculation. Velocities at the top of the guide tubes are determined by TRACG. The velocity at the top of the guide tubes during the period of boron injection ranges [[ ]]. Figure 21.6-27-1 displays the average velocity at the top of the channels versus time. The periods at the end of the transient where the velocity is slightly positive are brief and beyond the critical time of interest. As these velocities are mostly downwards, the boron in the cells feeding the guide tubes is convected down with the bulk flow. There is no need to correct for stratification effects. As demonstrated in the response to RAI 21.6-9, the purge flow turned off makes very little difference to the pool temperatures. This is due to the velocities at the top of the guide tubes being very close to zero with and without the purge flow.

No change to the LTR will be made as a result of this RAI.

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21.6-27-1 Average Axial Velocity through top cell of Guide Tubes Versus time

NRC RAI 21.6-28

On Page 5-7, you state that "In a range of velocities between zero and a critical upward velocity, boron could settle downwards due to the density difference between the borated solution and the ambient liquid in the inlet region. TRACG would not calculate this settling behavior and would therefore be non-conservative in this range of velocities." You then calculate the velocity at which this would occur and on Page 5-8 you state that [[

]] Explain exactly what adjustment will be made? What is the uncertainty on your calculated critical velocity (5 to 7 cm/s)?

GE Response

The MSIV closure ATWS transient was analyzed with TRACG and the period where bundle inlet velocities were in the range of 0- 7 cm/s was evaluated. By examining the TRACG output, a time interval over which the inlet velocities to the bundles were in the range of 0 to 7 cm /s was determined. The boron mass entering the inlet nosepiece from the bypass was integrated over this period. The amount of boron that could flow into lower plenum, through channel inlets that were in upflow, was calculated to be less than 10% of the injected boron up to the time of core shutdown. The TRACG calculation was then rerun, reducing the total amount of boron injected by this amount. A sensitivity study in Section 8.2 (Table 8.2-5) shows that the effect of this settling is negligible.

The amount of boron lost from the core (using a critical velocity of 5 to 7 cm/s) significantly overestimates the true amount by an order of magnitude. In reality, the boron solution entering the nosepiece has only a slight temperature difference (< 10 degrees C) and a corresponding density difference (< 2%). Thermal mixing will rapidly zero out these differences as the injected boron moves through the bulk fluid in the nosepiece.

NRC RAI 21.6-29

Provide a diagram of the lower tie plate, the nosepiece and the lower plenum to better illustrate the discussion on Page 5-7 about settling of boron into the lower plenum from the channel inlet nose pieces. Show the boron flow paths.

GE Response

The diagram was provided in the response to RAI 21.6-53b.

NRC RAI 21.6-36

Provide additional information regarding the uncertainty analysis described in NEDE-33083P Supplement 2 by addressing the following questions:

(a) In Section 8.3, you show figures of how each of the highly ranked phenomena effect the safety parameters on a +/-1 sigma level. Provide additional information explaining how you determined the response in the safety parameters (peak power, peak vessel pressure, peak clad temperature, etc.).

(b) Clarify the statement in Section 7.3 that states: "Section 7.6 of Reference 12 provides a statistical analysis of selected AOO events. Since there is no ATWS transient event to compare to, these events provide the best possible evaluation of TRACG's accuracy. They provide a general confirmation that the code uncertainty determined by varying PIRT parameters is consistent with the event measurements." How are the uncertainties from the AOO events used in the ATWS uncertainty evaluation?

(c) In Section 7.2 you state: [[

]] Clarify this process. GE may consider outlining this process using a table or a diagram and referencing the portions of the topical which explain each step in the process.

(d) Describe the methodology for selecting which conservatisms were selected to be included into the application methodology. In regard to the information provided on pages 8-28 to 8-33 in Sections 8.2.1 and 8.2.2, was there a threshold in change in the safety parameters that warranted inclusion of the specific phenomena as a conservatism into the application methodology?

GE Response:

(a) Figure 8.3-1 MSIVC –Peak Power Sensitivity, Figure 8.3-2. MSIVC –Peak Vessel Pressure Sensitivity, Figure 8.3-3 MSIVC –Peak Clad Temperature Sensitivity, and Figure 8.3-4 MSIVC –Peak Pool Temperature Sensitivity show the result of approximately 54 sensitivities studies conducted for the MSIVC ATWS case. The effect of the highly ranked PIRT parameters was determined by perturbing an input parameter or a model/correlation (TRACG PIRT input) to the +1 sigma or –1 sigma uncertainty level. The perturbations were made one at a time. The difference between the peak power, vessel pressure, clad temperature and suppression pool temperature versus the base (unperturbed) case is plotted on these figures.

(b) In Section 7.6 of Reference 12 TRACG predictions were compared against test data for AOOs. A Monte Carlo analysis was performed on the TRACG results and upper and lower statistical bands were developed for the calculations. These bands were shown to envelope the experimental data, providing confidence in the TRACG calculations, the values of the individual uncertainties specified and the method of combining them. As many of the parameters governing the transient response for an ATWS event are the same as for AOOs, this demonstration also provides some confidence in the use of TRACG for ATWS. The specific uncertainty values determined in the AOO events (comparison of TRACG predictions, varying PIRT parameters cross plotted against test data) are not used in the ATWS uncertainty evaluation. The +1 sigma, -1 sigma PIRT values for ATWS events are applied in the ATWS uncertainty evaluations, as stated in section 5 of the ESBWR ATWS LTR.

(c) The last paragraph will be changed to state: [[

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(d) The methodology for selecting which conservatisms were selected to be included into the application methodology is as follows:

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<u>**NRC RAI 21.6-37**</u>

On Page 5-23, you state that "the void fraction in the subcooled flow regime is quite insensitive to the magnitude of the heat transfer coefficients at the interface between the bubbles and the subcooled liquid, as long as a reasonable value is used." Does this statement mean that over a range of coefficients the void fraction is insensitive? What is the process for determining a reasonable coefficient?

<u>**GE Response:**</u>

In context, the subcooled void fraction is more sensitive to the liquid enthalpy at which net vapor generation occurs (hld), and the distribution of the surface heat flux going into vapor generation versus liquid superheat at the wall, than to the interfacial heat transfer coefficient. Over the range of estimated uncertainty, interfacial heat transfer coefficient has a less significant effect on void fraction, than subcooling for onset of net vapor generation. Therefore the uncertainty in the subcooling for onset of net vapor generation is the primary parameter in the TRACG model to study the effect of the subcooled voids on ATWS results. The interfacial heat transfer between subcooled liquid and vapor bubbles is calculated using the Lee-Ryley correlation (section 6.5.3 of the TRACG Model Report, NEDE-32176 Rev 3). The uncertainty in this parameter is estimated by a [[
]]. The sensitivity to this parameter, which also affects subcooled void collapse during pressurization is shown in Fig. 8.3-2, 3, 4 (parameter C8X).

NRC RAI 121.6-38

On Page 5-25, you state [[

]] Please explain how the uncertainties were combined and how the value of [[ ]] was selected. Comment on the range of applicability, is the approach conservative for all times in core life?

GE Response:

Dynamic gap conductance is significant in LOCA response, where the pellet power is reduced to decay heat levels during the time peak clad temperature is reached. In ATWS events the pellet heat generation remains at higher levels, and dynamic gap conductance is not as large a parameter. Based on LOCA evaluations, increasing the uncertainty in pellet centerline temperature from the static uncertainty, [[ ]]is judged to be adequate for ATWS uncertainty evaluations. The quantification of the effect pellet conductivity uncertainty (C3BX) on peak clad temperature in Figure 8.3-3 shows [[
]].

NRC RAI 21.6-42

Provide plots showing the path of boron flow through the bypass, lower plenum and core as calculated by TRACG from the time of SLCS injection. Provide boron concentrations and flow rates.

GE Response:

Figures 21.6-42-1 through 2 show the boron concentration through the lower bypass, Figures 21.6-42-3 through 6 show the boron concentration through the channels at their entrance and Figures 21.6-42-7 through 10 show the boron concentration in the channel exit in the 3 rings (peripheral orifice hole channels shown separately). Figure 21.6-42-11 shows the boron concentration in the lower plenum. The boron concentrations are displayed in terms of boron concentration of elemental boron. The concentration of B10 can be obtained by multiplying by the enrichment factor, which is 0.94 for ESBWR SLCS injection solution. The time range of interest is between just before injection and just after shutdown is shown. Figures 21.6-42-12 through 21 display the mass flow rates.

The SLCS injection velocity is shown in Figure 21.6-42-22.

It can be seen from the figures of boron concentrations, that the boron moves down Ring 3 to Level 4, then radially inward. The peripheral channels in Ring 3 carry some of the boron to the lower plenum, which returns to the channels through the lower tie plate. It can be seen in Figure 21.6-42-12 that there is some disturbance to the bypass flow at 230 seconds. At about 208 seconds, the boron begins to enter the channels in the central regions of the core. The channel power, which has been steadily decreasing, reduces very quickly at the introduction of the boron. The power decline leads to a void reduction inside the fuel channels and a decline in the void fraction in the top of the bypass (the bypass is voided at the top after the level reduction). The collapse of the voids creates a disturbance to the bypass flow at 230 seconds, which is reflected in the graphs of boron and mass flow rates in the central regions of the core (Rings 1 and 2). The channel powers at this time are quickly and steadily decreasing. The disturbance affects the bypass flows for about 30 seconds before it settles to a lower mass flow rate.

No change to the LTR will be made as a result of this RAI.

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Figure 21.6-42-1
Boron Concentrations in Bypass of Axial Level 4

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Figure 21.6-42-2
Boron Concentrations in Bypass of Axial Level 5

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Figure 21.6-42-3
Boron Concentrations at the Entrance to Channels of Ring 1

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Figure 21.6-42-4
Boron Concentrations at the Entrance to Channels of Ring 2

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Figure 21.6-42-5
Boron Concentrations at the Entrance to Interior Channels of Ring 3

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Figure 21.6-42-6
Boron Concentrations at the Entrance to Peripheral Channels of Ring 3

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Figure 21.6-42-7
Boron Concentrations at Channel Exit of Ring 1

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Figure 21.6-42-8
Boron Concentrations Channel Exit of Ring 2

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Figure 21.6-42-9
Boron Concentrations at the Interior Channel Exit of Ring 3

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Figure 21.6-42-10
Boron Concentrations at Peripheral Channel Exit of Ring 3

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Figure 21.6-42-11
Boron Concentrations in the Lower Plenum (Axial Level 3)

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Figure 21.6-42-12
Axial Mass Flow Rate in Bypass of Level 4

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Figure 21.6-42-13
Axial Mass Flow Rates in Bypass of Level 5

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Figure 21.6-42-14
Axial Mass Flow Rates at the Entrance to Channels of Ring 1

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Figure 21.6-42-15
Axial Mass Flow Rates at the Entrance to Channels of Ring 2

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Figure 21.6-42-16
Axial Mass Flow Rates at the Entrance to Interior Channels of Ring 3

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Figure 21.6-42-17
Axial Mass Flow Rates at the Entrance to Peripheral Channels of Ring 3

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Figure 21.6-42-18
Axial Mass Flow Rates at the Exit of Channels of Ring 2

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Figure 21.6-42-19
Axial Mass Flow Rates at the Exit of Channels of Ring 1

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Figure 21.6-42-20
Axial Mass Flow Rates at the Exit of Interior Channels of Ring 3

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Figure 21.6-42-21
Axial Mass Flow Rates at the Exit of Peripheral Channels of Ring 3

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Figure 21.6-42-22
SCLS Injection FILL Velocity Versus Time Table

NRC RAI 21.6-45

On Page 8-34, you describe the ATWS Stability Study. Please provide information about the methodology you used to perform this study. How is this different from your topical report that describes the methodology for calculating stability margins for ESBWR using TRACG (NEDE-33083P Supplement 1)?

GE Response:

The ATWS stability evaluation includes these key features of the NEDE-33083P Supplement 1 method:

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]].

The ATWS stability analysis was different, in that it did not involve a perturbation to determine a decay ratio, instead the case was run through the complete ATWS scenario with [[ ]], to determine whether density wave instabilities caused higher PCT. However, two additional cases were run in which the inlet liquid velocities in the channels were perturbed (increased) by 5%. The perturbation was introduced in a TRACG restart, starting at points where the power to flow ratio was high but fairly constant. These perturbations were damped out and did not result in growing oscillations. In the ATWS stability the acceptance criteria is peak clad temperature (PCT). In NEDE-33083P Supplement 1 method, the acceptance criteria is decay ratio. In no case did the PCT exceed the acceptance criteria.

<u>NRC RAI 21.6-46</u>

On Page 8-34, you use the MSIVC model to determine if there are any power instabilities set in during the ATWS transient. Justify the use of this model. Explain why this is the bounding event for ATWS instability analysis.

<u>GE Response:</u>

MSIVC scenario is justified for evaluation of ESBWR stability, based on the increased power and reduced subcooling in this event. Note, an RAI subsequent to this one 21.6-51, requested an analysis for specific events, refer to the response to that RAI.

NRC RAI 21.6-52

On February 14, 2006, you submitted Revision 2 of NEDE-32906P, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses." In this submittal you correct an error in the quantification of the accuracy of the void coefficient. Explain if this is also being corrected for the ESBWR TRACG methodologies described in NEDE-33083P "Chapter 4, Transient Analysis," NEDE-33083P Supplement 1 "TRACG Application for ESBWR Stability Analysis," and NEDE-33083P Supplement 2, "TRACG Application for ESBWR Anticipated Transient Without Scram Analyses." If this is not being corrected for the ESBWR TRACG methodologies, explain what measures are being taken to ensure that the accuracy of the void coefficient is conservative. How does this error impact the result of the analyses performed using these methodologies? Have you updated the analyses in Chapter 15 and Chapter 4 of the DCD to account for this error?

GE Response:

The error described in Revision 2 of NEDE-32906P in quantifying the accuracy of the void coefficient was corrected early in the development of TRACG04. Hence all the analyses referred to in the RAI already accounted for the correction. These analyses specifically are:

- Analyses in Chapter 4.7 of NEDE-33083 as revised in MFN-04-109 of 10/8/2004
- Analyses in NEDE-33083P Supplement 1
- Analyses in NEDE-33083P Supplement 2
- Analyses in DCD Rev.1

No changes or updates are required to the above analyses to account for the correction.

ENCLOSURE 3

MFN 06-301

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 of GE letter MFN 06-301, David H. Hinds to NRC, *Response to Portion of NRC Request for Additional Information Letter No. 31 and NRC Letter No. 57 Related to ESBWR Design Certification Application – TRACG Application for ESBWR ATWS – RAI Numbers 21.6-4, 21.6-12, 21.6-27 through 21.6-29, 21.6-36 through 21.6-38, 21.6-42, 21.6-45, 21.6-46 and 21.6-52,* dated September 6, 2006. The proprietary information in Enclosure 1, *Response to Portion of NRC Request for Additional Information Letter No. 31 and NRC Letter No. 57 Related to ESBWR Design Certification Application – TRACG Application for ESBWR ATWS – RAI Numbers 21.6-4, 21.6-12, 21.6-27 through 21.6-29, 21.6-36 through 21.6-38, 21.6-42, 21.6-45, 21.6-46 and 21.6-52,* 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 2.790(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 2.390 (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 the results of TRACG analytical models, methods and processes, including computer codes, which GE has developed, and applied to perform ATWS evaluations for the ESBWR. GE has developed this TRACG code for over fifteen years, at a total cost in excess of three million dollars. The reporting, evaluation and interpretations of the results, as they relate to ATWS evaluations for the BWR was achieved at a significant cost, in excess of one quarter million dollars, to GE.

The development of the testing and 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 6th day of September 2006.

George B. Stramback
George B. Stramback
General Electric Company