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The Detroit Edison Company
One Energy Plaza, Detroit, MI 48226-1279

DTE Energy
Detroit Edison

10 CFR 52.79
10 CFR 2.390
10 CFR 9.17

April 27, 2011
NRC3-11-0012

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

References:
1) Fermi 3
   Docket No. 52-033
2) Letter from Jerry Hale (USNRC) to Jack M. Davis (Detroit Edison), "Request for Additional Information Letter No. 31 Related to the SRP Section 10.02.03 for the Fermi 3 Combined License Application," dated April 28, 2010
3) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Request for Additional Information Letter No. 31," NRC3-10-0045, dated October 5, 2010
4) Letter from Jerry Hale (USNRC) to Jack M. Davis (Detroit Edison), "Request for Additional Information Letter No. 53 Related to the SRP Section 10.02.03 for the Fermi 3 Combined License Application," dated March 28, 2011

Subject: Detroit Edison Company Response to NRC Request for Additional Information Letter No. 53

In Reference 2, the NRC requested additional information to support the review of certain portions of the Fermi 3 Combined License Application (COLA). The responses to the Requests for Additional Information (RAIs) in Reference 2 related to the turbine rotor integrity were provided in Reference 3.

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In Reference 4, the NRC requested further additional information to support the review of the Fermi 3 Combined License Application (COLA) related to SRP Section 10.02.03. The responses to the RAIs in Reference 4 contain GE proprietary information, and as such, both proprietary and non-proprietary versions of the response are provided. Non-proprietary responses are provided as Enclosures 1 through 5 of Attachment 1. The proprietary versions of the responses are provided as Enclosures 1 through 5 of Attachment 3. Proprietary information within these responses is indicated by double brackets.

As noted above, Attachment 3 contains GE proprietary information as defined by 10 CFR 2.390. An affidavit is included in Attachment 2 that identifies the information contained in Attachment 3 as proprietary to GE. Detroit Edison and GE request that the information contained in Attachment 3 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 10 CFR 9.17.

If you have any questions, or need additional information, please contact me at (313) 235-3341.

I state under penalty of perjury that the foregoing is true and correct. Executed on the 27th day of April 2011.

Sincerely,

Peter W. Smith, Director
Nuclear Development – Licensing and Engineering
Detroit Edison Company

Attachments:
1) Response to RAI Letter No. 53 (Questions No. 10.02.03-1 through -5) [Public Version]
2) Affidavit of Damodar Padhi (GE), dated April 25, 2011 [Public]
3) Response to RAI Letter No. 53 (Questions No. 10.02.03-1 through -5) [Non-Public Version]

cc: Adrian Muniz, NRC Fermi 3 Project Manager
Jerry Hale, NRC Fermi 3 Project Manager
Bruce Olson, NRC Fermi 3 Environmental Project Manager (w/o attachments)
Fermi 2 Resident Inspector (w/o attachments)
NRC Region III Regional Administrator (w/o attachments)
NRC Region II Regional Administrator (w/o attachments)

Supervisor, Electric Operators, Michigan Public Service Commission
(w/o attachments)
Michigan Department of Natural Resources and Environment
Radiological Protection Section (w/o attachments)

Attachment 1
NRC3-11-0012

Response to RAI Letter No. 53
(Questions No. 10.02.03-1 through -5)
[Public Version]

(following 16 pages)

Attachment 1
NRC3-11-0012

Enclosure 1

Response to RAI Letter No. 53
(eRAI Tracking No. 5608)

RAI Question No. 10.02.03-1

NRC RAI 10.02.03-1

In a letter dated October 5, 2010, the applicant's response did not fully provide the information requested in RAI 4641, Question 10.02.03-4. Therefore, as requested in RAI 4641, Question 10.02.03-4, provide the operational experience of this turbine material as an integral rotor, which should include how many rotors, units, operating hours, number of defects detected during inspections, rotor failures, etc. to provide a basis of the material to be used. Also, the RAI response stated that "specification B50A373B8 or an equivalent specification with more restrictive chemistry requirements" will be used for the LP rotors. Does the more restrictive chemistry only apply to elements that have deleterious effects on toughness, such as sulfur and phosphorus as stated in NUREG-0800, Section 10.2.3, or does it also apply to the alloying elements? If it applies to the alloying elements, then this equivalent specification should be submitted to the staff for review as outlined in NUREG-0800, Section 10.2.3, Paragraph III.1.

Supplemental Response

Since the 1980s, all General Electric solid (i.e., not shrunk-on wheel) nuclear low-pressure (LP) rotors have been manufactured in accordance with GE specification B50A373B8. To date, [[ ]] rotor-years. No rotor failures have occurred within this fleet of units.

GE's nuclear LP monoblock experience can be divided into three design generations according to the table below.

[[ ]]

The rotor forging material and chemistry remains unchanged throughout the generations of rotors. What is changed is the geometry of the bucket to wheel attachment to reduce stresses and the use of metal improvement processes (shot-peening).

Early monoblock rotors (Generation 1) were designed to be direct replacements for the built-up rotors that were originally supplied with the turbine. As such, no changes to the bucket and wheel attachment (dovetail) geometry were made. Some stress corrosion cracking (SCC) has been found in the Generation 1 fleet.

GE redesigned the dovetail geometry in the early 1990s to reduce the stresses and added shot-peening as a standard process. The changes to the dovetail geometry were limited by the requirement for re-use of existing buckets. Inspection results of the Generation 2 solid rotors indicate that the shot-peening and the geometry change has eliminated or at least significantly delayed the initiation of SCC.

The current design (Generation 3) monoblock rotors include significant geometric changes to further reduce peak tensile stresses. Shot-peening continues to be standard practice. The first Generation 3 monoblocks are yet to be inspected.

General Electric will change the material specification for nuclear LP monoblock rotors from B50A373B8 to B50A373B12. The new material specification places tighter control on nickel content. There are no changes to the elements that have deleterious effects on toughness, such as sulfur and phosphorus as stated in NUREG-0800, Section 10.2.3.

The B50A373B8 specification allows a range of [[ ]] nickel, which covers both small fossil LP applications and nuclear LP applications. The B50A373B12 specification allows a range of [[ ]] nickel. All nuclear monoblock rotor forgings manufactured to date were manufactured in the nickel range of [[ ]]. As the rotor forging supply base further develops (i.e., additional monoblock forging capacity coming online) – it is prudent that GE specifies chemistry requirements, which are reflective of the nickel range required to achieve properties in the nuclear monoblock forgings.

The revision of the B50A373 material specification to include B50A373B12 is scheduled for completion by the end of the second quarter 2011. The specification will be available for review.

Proposed COLA Revision

None

Attachment 1
NRC3-11-0012

Enclosure 2

Response to RAI Letter No. 53
(eRAI Tracking No. 5608)

RAI Question No. 10.02.03-2

NRC RAI 10.02.03-2

In a letter dated October 5, 2010, the applicant's response to RAI 4641, Question 10.02.03-6 stated that a historical Fracture Appearance Transition Temperature (FATT) value was used in the turbine missile analysis. However, ESBWR DCD, Section 10.2.3.1.2 states that the material for the rotors will have a maximum 50% FATT value of +30°F. Therefore, the bounding turbine missile probability analysis (GE-Energy Steam Turbines (GE-ST) report ST-56834/P) should be based on the bounding material properties of the ESBWR DCD (50% FATT value of +30°F) in lieu of historical FATT measurements (50% FATT value of -30°F) currently used in the GE-Energy Steam Turbines (GE-ST) report ST-56834/P. Furthermore, Sections 10.2.3.8 and 10.2.5 of the ESBWR DCD states that the COL applicant will provide the turbine missile probability analysis, and if the actual material properties of the as-built turbine are not available, the bounding material property values should be used. Therefore, since the as-built turbine rotor material properties for Fermi, Unit 3 are not known, GE-Energy Steam Turbines (GE-ST) report ST-56834/P should use the bounding material properties of the ESBWR DCD.

Supplemental Response

ESBWR DCD Rev. 9, Section 10.2.3.1.2, states:

> "The fracture appearance transition temperature (50% FATT), as obtained from Charpy tests performed in accordance with ASTM A-370, is no higher than -1.1°C (30°F) for large integral forgings."

GE-Energy Steam Turbines (GE-ST) report ST-56834/P, Section 3.1, states:

> "The fracture appearance transition temperature (50% FATT), as obtained from Charpy tests performed in accordance with ASTM A-370, is no higher than -1.1°C (30°F) for large integral forgings."

Additionally, GE-ST report ST-56834/P states:

> "For missile generation probability calculations, a normally distributed FATT featuring a -30°F mean and a 30°F standard deviation is assumed."

The plus 2σ maximum of the normally distributed FATT featuring a -30°F mean and a 30°F standard deviation is +30°F. Therefore, Section 10.2.3.1.2 of the ESBWR DCD is consistent with report ST-56834/P. Report ST-56834/P uses the bounding material properties of the ESBWR DCD.

The historical correlation data is plotted in Figure 3.1 of GE-ST report ST-56834/P and depicts a line drawn at +30°F maximum FATT as the bounding assumption for the analysis.

Proposed COLA Revision

None

Attachment 1
NRC3-11-0012

Enclosure 3

Response to RAI Letter No. 53
(eRAI Tracking No. 5608)

RAI Question No. 10.02.03-3

NRC RAI 10.02.03-3

In a letter dated October 5, 2010, the applicant's response did not fully provide the information requested in RAI 4641, Question 10.02.03-8, and therefore the following information is requested:

a. Part (b) of the response to RAI 4641, Question 10.02.03-8 does not provide the quantitative information requested about flaw size and detection capability. Rather, it states that volumetric inservice inspection of solid LP rotors is unnecessary. Therefore, as requested in RAI 4641, Question 10.02.03-8, discuss the operating experience of solid rotors, including the effects on material properties and whether current volumetric inspections can detect cracking before they reach critical size resulting in a turbine missile. Compare the flaw size capability of the volumetric inspections to the average undetected embedded flaw specified in Section 4.2.2.

b. Section 10.2.3.6 of the ESBWR DCD states that volumetric inservice inspection of the rotor will be performed. However, the response to part (b) of the response to RAI 4641, Question 10.02.03-8, states "inservice volumetric inspection of solid nuclear LP rotors is not required to meet the calculations included in the report [GE-Energy Steam Turbines (GE-ST) report ST-56834/P]". Provide an analysis and discussion for a surface flaw that could grow radially inward and cause a rupture of the LP rotor in the locations (other than in the dovetail regions) where an inservice volumetric inspection is not performed. Otherwise, a volumetric inspection of the LP rotor should be included in the turbine inservice inspection program as outlined in NUREG-0800, Section 10.2.3, Paragraph II.5.

Supplemental Response

> *a. Part (b) of the response to RAI 4641, Question 10.02.03-8 does not provide the quantitative information requested about flaw size and detection capability. Rather, it states that volumetric inservice inspection of solid LP rotors is unnecessary. Therefore, as requested in RAI 4641, Question 10.02.03-8, discuss the operating experience of solid rotors, including the effects on material properties and whether current volumetric inspections can detect cracking before they reach critical size resulting in a turbine missile. Compare the flaw size capability of the volumetric inspections to the average undetected embedded flaw specified in Section 4.2.2.*

As discussed in RAI Response 10.02.03-1, operational issues with GE solid rotors have been limited to dovetail stress corrosion cracking (SCC) in early Generation I designs.

GE-ST report ST-56834/P includes consideration of center core material properties. Center cores removed from monoblock rotors are tested extensively. These test results are the statistical basis for the deep-seated material properties assumed in the report.

The critical flaw size of GE monoblock rotors is quite large. Outside surface geometry and features, however, limit the extent to which solid rotors can be inspected during an in-service volumetric test. At locations where sufficient access exists, an external volumetric inspection process can detect cracking before critical flaw size is reached. External surface features, however, limit the extent of inspectability.

Since the external geometry of a steam turbine rotor does not permit 100% volumetric in-service inspection, the GE process places tight controls on the rotor metallurgy and pre-service inspection.

As discussed in Sections 8 and 9 of GE-ST report ST-56834/P, the annual probability of missile generation is dominated by turbine over speed for the first 20 years of life, then postulated SCC crack growth originating at the axial entry dovetail slot bottoms thereafter. The annual probability of generating a missile from an undetected flaw growing to critical crack size is never the most limiting factor and is always much less than the NRC annual probability for the entire 60-year life.

b. Section 10.2.3.6 of the ESBWR DCD states that volumetric inservice inspection of the rotor will be performed. However, the response to part (b) of the response to RAI 4641, Question 10.02.03-8, states "inservice volumetric inspection of solid nuclear LP rotors is not required to meet the calculations included in the report [GE-Energy Steam Turbines (GE-ST) report ST-56834/P]". Provide an analysis and discussion for a surface flaw that could grow radially inward and cause a rupture of the LP rotor in the locations (other than in the dovetail regions) where an inservice volumetric inspection is not performed. Otherwise, a volumetric inspection of the LP rotor should be included in the turbine inservice inspection program as outlined in NUREG-0800, Section 10.2.3, Paragraph II.5.

GE-ST report ST-56834/P as-submitted includes analysis and discussion of a worst-case surface flaw that could grow radially inward and cause a rupture of the LP rotor in locations other than the dovetail region. The bored rotor surface stress shown in Table 4-1 (stage 1) is the maximum predicted surface stress for the entire LP rotor. The total predicted stage 1 tangential stress magnitude of [[ ]] (found by adding the values shown in the 2nd and 3rd columns) exceeds the magnitude predicted along the entire outer surface including the axial entry dovetail slot bottoms. The overall missile probability summarized in Figure 9-1 includes the probability of an escaping bore surface flaw at this peak surface stress location (reference Section 4.2.2) reaching critical size and resulting in an uncontained missile.

Proposed COLA Revision

None

Attachment 1
NRC3-11-0012

Enclosure 4

Response to RAI Letter No. 53
(eRAI Tracking No. 5608)

RAI Question No. 10.02.03-4

NRC RAI 10.02.03-4

In a letter dated October 5, 2010, the applicant's response did not fully provide the information requested in RAI 4641, Question 10.02.03-10, and therefore the following information is requested:

a. As requested in RAI 4641, Question 10.02.03-10, provide the tangential stresses at the slot bottoms of axial entry dovetails in Section 4.3 of the GE-Energy Steam Turbines (GE-ST) report ST-56834/P and compare them to the corresponding stresses around the previous shrunk-on-wheel keyways for a similar size turbine to demonstrate that the ESBWR axial entry dovetail slot bottoms feature dramatically lower tangential stresses versus shrunk-on-wheel keyways, and therefore the use of shrunk-on-wheel crack initiation and growth characteristics is considered conservative.

b. Concerning the location of axial entry dovetails, clarify which stages are axial entry dovetails since Sections 10.1.1 and 4.3 of the GE-Energy Steam Turbines (GE-ST) report ST-56834/P identifies different stages that are axial entry dovetails.

c. Provide operating experience with shot-peening of a rotor which demonstrates that compressive stresses are created and increases initiation time for this material and geometry.

Supplemental Response

a. As requested in RAI 4641, Question 10.02.03-10, provide the tangential stresses at the slot bottoms of axial entry dovetails in Section 4.3 of the GE-Energy Steam Turbines (GE-ST) report ST-56834/P and compare them to the corresponding stresses around the previous shrunk-on-wheel keyways for a similar size turbine to demonstrate that the ESBWR axial entry dovetail slot bottoms feature dramatically lower tangential stresses versus shrunk-on-wheel keyways, and therefore the use of shrunk-on-wheel crack initiation and growth characteristics is considered conservative.

[[ ]]

b. Concerning the location of axial entry dovetails, clarify which stages are axial entry dovetails since Sections 10.1.1 and 4.3 of the GE-Energy Steam Turbines (GE-ST) report ST-56834/P identifies different stages that are axial entry dovetails.

As shown in Figure 4-1 of GE-ST report ST-56834/P, stages 5, 6, and 7 are axial entry dovetail designs. By comparison, stages 1-4 feature tangential entry dovetails. There is a typographical error in Section 10.1.1 of the same report. The text should read: *"Surface inspection of tangential entry dovetails (Stages 1 thru 4),"* not stages 1 thru 5. This will be corrected in the next revision of the report.

c. Provide operating experience with shot-peening of a rotor which demonstrates that compressive stresses are created and increases initiation time for this material and geometry.

GE began shot-peening nuclear LP rotors approximately 20 years ago. To date, no confirmed (i.e., measurable) stress corrosion cracking (SCC) cracks have been found in this fleet. General industry opinion about shot-peening and its impact on SCC is reflected in the following statement from Reference 1:

> "...the compressive layer from shot peening removes the tensile stress of the SCC (Venn diagram) triangle. Without tensile stress, SCC failure is significantly retarded or prevented from ever occurring..."

The diagram below, reproduced from Reference 2, demonstrates that compressive stresses are created in GE dovetail geometries by shot-peening.

[[ ]]

References:

1. Shot Peening Applications 9th Ed; Metal Improvement Company 2005 p. 27

2. X-Ray Diffraction Determination of the Residual Stress Distributions in Three NiCrMoV Steel Turbine Wheel Sections; Report #0025-0504 Prepared by Lambda Research Inc.; Cincinnati OH for the General Electric Company, 7/27/1990

Proposed COLA Revision

None

Attachment 1
NRC3-11-0012

Enclosure 5

Response to RAI Letter No. 53
(eRAI Tracking No. 5608)

RAI Question No. 10.02.03-5

NRC RAI 10.02.03-5

In a letter dated October 5, 2010, the applicant's response to RAI 4641, Question 10.02.03-11 provided information concerning valve testing. However, the following additional information is requested to clarify the response:

a. The RAI response to RAI 4641, Question 10.02.03-11(c) provides a figure (graph) with no scale for the x and y axis on the graph. Please provide the appropriate numbers for the graph. Also, please clarify and discuss the following statement: "The percentage of the updated failure rates that are associated with a valve test frequency of 120 days cannot be determined at this time as there is no data that has been collected with this longer test frequency interval. Assessment of the valve failure data indicates that there are no factors that would prevent the extrapolation of the data to the longer test frequency interval and when assessed against the missile probability analysis the risk resulting from the longer test frequency was considered conservative."

b. The RAI response to RAI 4641, Question 10.02.03-11(d) states that no additional data has been collected. Does this statement mean there was no operating experience for these valves after 1984? If there was valve operating experience, confirm that the operating experience since 1984 is bounded by the operating experience before 1984. In other words, is the operating experience prior to 1984 worse than the operating experience after 1984?

Supplemental Response

> *a. The RAI response to RAI 4641, Question 10.02.03-11(c) provides a figure (graph) with no scale for the x and y axis on the graph. Please provide the appropriate numbers for the graph. Also, please clarify and discuss the following statement: "The percentage of the updated failure rates that are associated with a valve test frequency of 120 days cannot be determined at this time as there is no data that has been collected with this longer test frequency interval. Assessment of the valve failure data indicates that there are no factors that would prevent the extrapolation of the data to the longer test frequency interval and when assessed against the missile probability analysis the risk resulting from the longer test frequency was considered conservative."*

The maximum recommended valve test interval for the operating fleet of GE nuclear steam turbines remains at 90 days. Despite some evidence that an extension to 120 days may result in maintenance of acceptable annual missile probability for some units, GE has not gathered, nor has any nuclear plant operator submitted to GE, any reliability or failure data for valves tested at 120 day test intervals. Therefore, GE has not made any recommendation that valve test intervals for the existing fleet be extended beyond 90 days. The table below reflects the maximum historical valve test interval recommendations for GE nuclear steam turbines.

[[ ]]

	Pre-1984 GEK17812	TIL-969 1984	TIL-969-3R1 1993	
			Built Up	Mono Block
Main Stop	Daily	Weekly	Up to 3 Months	3 Months
Control	Weekly	Monthly	Up to 3 Months	3 Months
Intercept/Intermediate	Daily	Weekly	Up to 3 Months	3 Months

Section 5.1.2.1 of the ESBWR Steam Turbine Low-Pressure Missile Generation Probability Analysis ST-56834/P, Revision 2, provides information regarding the steam valve failure rates used within the analysis. As can be seen within the data set, the extension of the valve test interval from 1984 levels (TIL-969) to 1993 levels (TIL-969-3R1) resulted in no increase in the incidence of valve failures. Further, the data indicates that the countermeasures deployed to correct the pre-1993 valve failures were effective in reducing the probability of future failures.

As stated in Section 5.1.2.1 of the ESBWR Steam Turbine Low-Pressure Missile Generation Probability Analysis ST-56834/P, Revision 2, and shown in the graph in RAI response to 10.02.03-5(a) above, approximately the same level of missile probability risk is realized for a valve test frequency of 120-days (with the updated valve test failure rates) versus a 90-day test interval with the older valve test failure rates. Thus, GE recommends a 120-day valve test frequency.

b. The RAI response to RAI 4641, Question 10.02.03-11(d) states that no additional data has been collected. Does this statement mean there was no operating experience for these valves after 1984? If there was valve operating experience, confirm that the operating experience since 1984 is bounded by the operating experience before 1984. In other words, is the operating experience prior to 1984 worse than the operating experience after 1984?

RAI 10.02.03-11(d) refers specifically to the hydraulic probability model and failure rates of the hydraulic system. As such, the response was addressing only the hydraulic model and not the valve failure rate model. The valve failure rate data and operating experience is covered in GE-ST report ST-56834/P.

The 1984 hydraulic system reliability model was dominated by two common and known failure modes: (1) water contamination due to leaking EHC oil coolers, and (2) corrosion of non-stainless steel mechanical and/or electrical hydraulic trip valves. Only a small percentage of the existing GE fleet had components that were subject to these failure modes. GE has worked with customers to retrofit affected machines with components of improved design and materials, as well as improving plant maintenance practices (reference: GE TIL 796-2). GE has not gathered, nor has any nuclear plant operator submitted to GE, any reliability or failure data for the hydraulic system since the retrofits and operational changes were put into effect. However, operating experience indicates that the changes were effective. Thus, the 1984 system reliability model values are considered conservatively bounding for existing units.

The last two paragraphs of GE-ST report ST-56834/P, Section 5.1.4, "Hydraulic Model," discusses the design features of the ESBWR MARK VIe hydraulic system to address the above concerns.

Proposed COLA Revision

None

Attachment 2
NRC3-11-0012

Affidavit of Damodar Padhi (GE), dated April 25, 2011
[Public]

(following 3 pages)

GE-Energy

AFFIDAVIT

I, Damodar Padhi, state as follows:

(1) I am the General Manager-Steam Turbine Engineering, 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 within the "GE responses to the Nuclear Regulatory Commission letter to Detroit Edison related to the Request for Additional Information Letter No. 53 Related to the SRP Section 10.02.03 for the Fermi 3 Combined License Application" dated April 25, 2011. The GE proprietary information contained within the report is delineated by a [[text of proprietary information (B)]]. Figures and large equation objects are identified with bold red double square brackets before and after the object. In each case, the superscript notation (B) refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination. A non-proprietary version of this report has been provided titled, "GE responses to the Nuclear Regulatory Commission letter to Detroit Edison related to the Request for Additional Information Letter No. 53 Related to the SRP Section 10.02.03 for the Fermi 3 Combined License Application - Public Version", dated April 25, 2011.

(3) In making this application (via GEH submittal letter) for withholding of proprietary information of which GE 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 that 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 GE competitors without license from GE 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 GE customer-funded development plans and programs, resulting in potential products to GE;

d. Information that 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 Chief Engineer – Steam Turbines, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GE. 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 GEH or GE-Steam Turbine 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 non-disclosure agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it identifies detailed GE ESBWR steam turbine design information. GE utilized prior design information and experience from its Turbine-Generator fleet with significant resource allocation in developing the system over several years at a substantial cost.

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 comprehensive BWR Turbine-Generator 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 is clearly 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 25 day of April 2011.

Damodar Padhi
General Manager, Steam Turbine Engineering
GE-Energy Engineering