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AUG 13 2007

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U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
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Washington, DC 20555

**SUSQUEHANNA STEAM ELECTRIC STATION  
PROPOSED LICENSE AMENDMENT NO. 285  
FOR UNIT 1 OPERATING LICENSE NO. NPF-14  
AND PROPOSED LICENSE AMENDMENT NO. 253  
FOR UNIT 2 OPERATING LICENSE NO. NPF-22  
CONSTANT PRESSURE POWER UPRATE APPLICATION  
REGARDING STEAM DRYER FLOW EFFECTS  
VERBAL AND CONFIRMATORY REQUESTS FOR  
ADDITIONAL INFORMATION RESPONSES  
PLA-6255**

**Docket Nos. 50-387  
and 50-388**

- References: 1) PPL Letter PLA-6076, B. T. McKinney (PPL) to USNRC, "Proposed License Amendment Numbers 285 for Unit 1 Operating License No. NPF-14 and 253 for Unit 2 Operating License No. NPF-22 Constant Pressure Power Uprate," dated October 11, 2006.*
- 2) PPL Letter PLA-6176, B.T. McKinney (PPL) to USNRC, "Proposed License Amendment No. 285 for Unit 1 Operating License No. NPF-14 and Proposed License Amendment No. 253 for Unit 2 Operating License No. NPF-22 Extended Power Update Application Regarding Steam Dryer and Flow Effects Request for Additional Information Responses," dated April 27, 2007.*
- 3) PPL Letter PLA-6237, B. T. McKinney (PPL) to USNRC, "Proposed License Amendment No. 285 for Unit 1 Operating License No. NPF-14 and Proposed License Amendment No. 253 for Unit 2 Operating License No. NPF-22 Constant Pressure Power Uprate – Supplement," dated July 6, 2007.*
- 4) PPL Letter PLA-6242, B. T. McKinney (PPL) to USNRC, "Proposed License Amendment No. 285 for Unit 1 Operating License No. NPF-14 and Proposed License Amendment No. 253 for Unit 2 Operating License No. NPF-22 Extended Power Uprate Application Regarding Steam Dryer and Flow Effects Request For Additional Information Responses," dated July 31, 2007.*

Pursuant to 10 CFR 50.90, PPL Susquehanna LLC (PPL) requested in Reference 1 approval of amendments to the Susquehanna Steam Electric Station (SSES) Unit 1 and Unit 2 Operating Licenses (OLs) and Technical Specifications (TS) to increase the maximum power level authorized from 3489 megawatts thermal (MWt) to 3952 MWt, an approximate 13% increase in thermal power. The proposed Constant Pressure Power Uprate (CPPU) represents an increase of approximately 20% above the Original Licensed Thermal Power (OLTP).

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NRK

The purpose of this letter is to provide responses to the NRC Staff's verbal and confirmatory Requests for Additional Information (RAIs). The responses contained herein are intended to provide supplemental information to References 2 through 4.

Attachment 1 contains the PPL responses.

The PPL responses in Attachment 1 contain information that GE - Hitachi Nuclear Energy Americas, LLC considers proprietary. GE - Hitachi Nuclear Energy Americas, LLC requests that the proprietary information be withheld from public disclosure in accordance with 10 CFR 2.390 (a) 4 and 9.17 (a) 4. An affidavit supporting this request is provided in Attachment 3. A non-proprietary version of Attachment 1 is provided in Attachment 2.

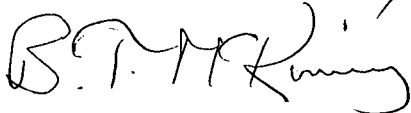
There are no new regulatory commitments associated with this submittal.

PPL has reviewed the "No Significant Hazards Consideration" and the "Environmental Consideration" submitted with Reference 1 relative to the Enclosure. We have determined that there are no changes required to either of these documents.

If you have any questions or require additional information, please contact Mr. Michael H. Crowthers at (610) 774-7766.

I declare under perjury that the foregoing is true and correct.

Executed on: 8-13-07



B. T. McKinney

Attachment 1: Proprietary Version of the Request for Additional Information Responses  
Attachment 2: Non-Proprietary Version of the Request for Additional Information Responses  
Attachment 3: GE-Hitachi Nuclear Energy Americas, LLC Affidavit

Copy: NRC Region I  
Mr. R. V. Guzman, NRC Sr. Project Manager  
Mr. R. R. Janati, DEP/BRP  
Mr. F. W. Jaxheimer, NRC Sr. Resident Inspector

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**Attachment 2 to PLA-6255**  
**Non-Proprietary Version of the Request for**  
**Additional Information Responses**

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**NRC Verbal Question 1:**

In Table 6-1 in the GE report (GE-NE-0000-0061-0595-P-R1), [[

]] This justification is not clear.

(a) Figure 6-24 in the report shows [[

]]

(b) What is the maximum stress intensity for the tie-rod and at which location it is acting?

(c) In Section 6.4 of the report, it is stated,

[[

]]

It is not clear why [[

]] Please explain.

**PPL Response 1:**

1(a) The Staff asked that justification be provided for [[

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[[

]]

Figure 1.a.1 below [[

]]

More important, as stated in GE-NE-0000-0061-0595-P-R1 (Reference 3):

[[

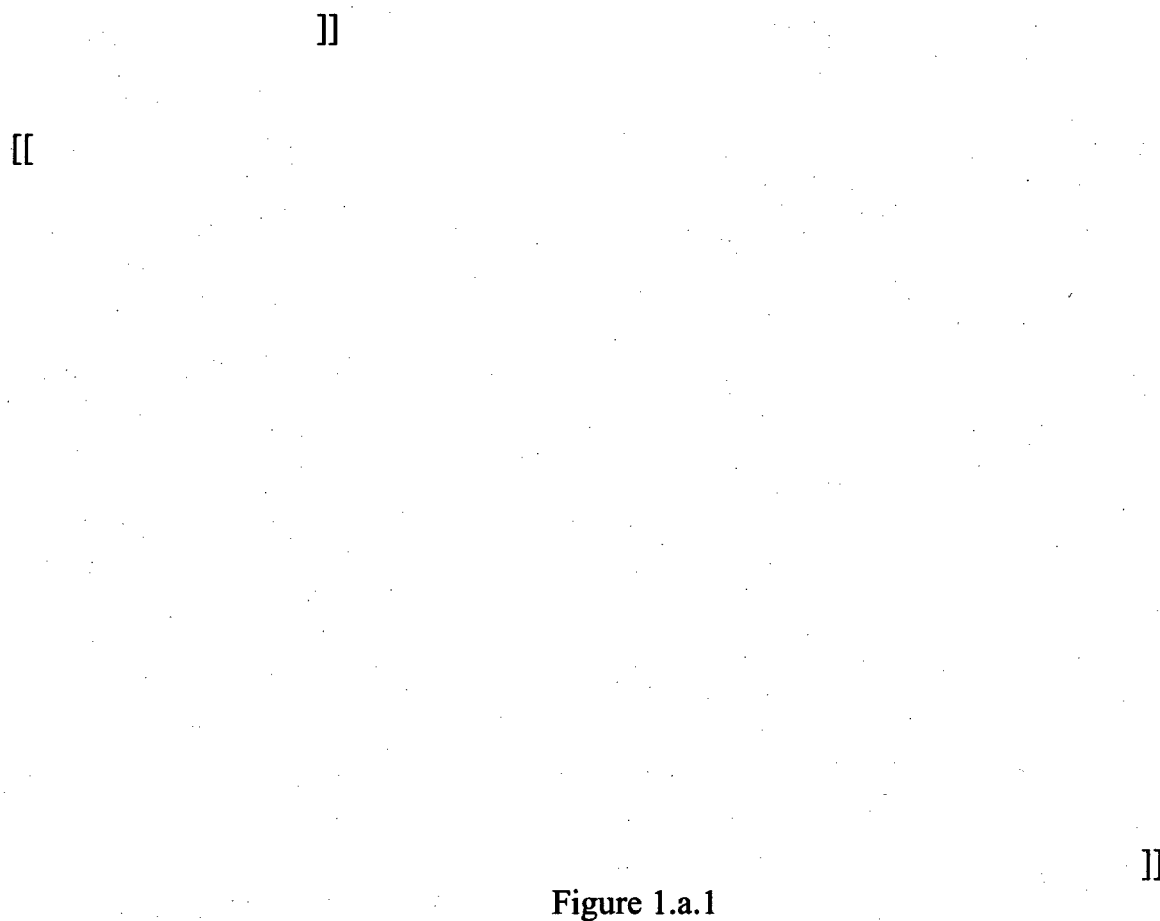
]] See RAI Response 6(a) of PLA-6242 dated  
July 31, 2007 (Reference 4). [[

]]

1(b) [[

]]

1(c) [[



[[

Figure 1.b.1

]]

[[

Figure 1.b.2

]]



[[

]]

Figure 1.b.3

[[

Figure 1.b.4

]]

**NRC Verbal Question 2:**

During the public meeting on June 29, 2007, [[

]]

- (a) In Figure 6-28, as-built geometry of skirt wall and lower skirt ring is shown. In addition, corresponding finite element model is shown. Please explain [[

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- (b) Figure 6-29 shows the submodel geometry and mesh for the split-end region of the skirt. Provide a corresponding as-built sketch of that region of the skirt. Please explain the differences between the as-built geometry sketch and the finite element model.

**PPL Response 2:**

Geometric and material property differences between the steam dryer model used in GE-NE-0000-0061-0595-P-R1 (Reference 3) and the as built/design configuration of the replacement steam dryer are contained in the response to RAI 6(a) of PLA-6242 dated July 31, 2007 (Reference 4). GEH considers that the analysis presented in GE-NE-0000-0061-0595-P-R1 (Reference 3) adequately bounds the as-built/designed configuration of the Susquehanna steam dryer and that the additional improvements identified in the response to RAI 6(a) of PLA-6242 will lead to a final dryer design with additional fatigue margin to that reported in GE-NE-0000-0061-0595-P-R1 (Reference 3).

Additional design improvements are being incorporated into the replacement dryer that increase the margin to structural limits and reduce the susceptibility to stress corrosion cracking. In a complex welded structure, such as the dryer, any component or geometric change will change the dryer's dynamic characteristics. As explained in the response to RAI 6(a) of PLA-6242, all fabrication improvements have been and will continue to be evaluated with detailed finite element modeling and full dryer analyses to ensure they

increase the fatigue design margin. The dryer will be dynamically tested and the finite element model and associated modeling assumptions benchmarked against the measured response. Finally the replacement dryer will be instrumented with pressure transmitters, accelerometers and strain gages to allow benchmarking of dynamic load definitions and the structural analysis modeling.

The following components in the replacement steam dryer are solution annealed to minimize residual stresses from fabrication:

[[

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**PPL Response 2(a):**

This issue has been addressed in RAI response 6(a) of PLA-6242 (Reference 4), which is reiterated below:

[[

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[[

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**PPL Response 2(b):**

Figure 2.b.1 below is a sketch of the original steam dryer split-end region of the skirt.

[[

Figure 2.b.1

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[[

]]

[[

Figure 2.b.2

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**NRC Confirmatory Question 1**

In RAI 26 PPL was asked to provide natural frequencies of the dryer components and the pump vane passing frequency at 120% OLTP. If any component experiences a resonance with the pump vane passing frequency, PPL was asked to explain how the resulting stresses are accounted for in the fatigue evaluation of that component. PPL responds to RAI 26 in Attachment 1 to a letter (PLA-6167) from B. T. McKinney (PPL) to NRC dated 4/27/2007. In its response, PPL shows images of several dryer modes that might be excited by the recirculation pump vane passing frequency. Since any of these modes might be excited, PPL proposes to [[

]]

- (a) Please explain how and when the proposed forcing function would be developed.
- (b) When would the corresponding fatigue evaluation be performed and the results be submitted for the staff review?

**PPL Response 1**

- (a) The response to RAI 5 contained in PLA-6176 (Reference 2) provides a description of the instrumentation which will be installed on the new Unit 1 steam dryer for the first two CPPU steps. RAI 5 states:

[[

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[[

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The increased core flow (ICF) mode of operation was not approved for Susquehanna SES until 1993. Therefore, the 1985 in-plant steam dryer test data does not contain dryer acceleration data in the 100 Mlb<sub>m</sub>/hr to 108 Mlb<sub>m</sub>/hr core flow range. As noted in the PATP also contained in Reference 2, steam dryer vibration measurements will be taken at ICF conditions up to 108 Mlb<sub>m</sub>/hr at the 107% CLTP power level. Additional dryer acceleration data from vane passing frequencies at these core flows must be obtained to provide a complete analysis.

- (b) The fatigue evaluation will be performed as part of the steam dryer reanalysis following the first two CPPU steps on Unit 1. That data will be forwarded to the staff for review in accordance with the Unit 1 proposed license condition 2.d contained in PLA-6242 (Reference 4).

[[

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**NRC Confirmatory Question 2**

Please confirm whether the correct boundary conditions were used in the steam dryer fatigue analysis presented in GENE-0000-0057-4166-R1-P, Rev. 1, "Susquehanna Steam Dryer Fatigue Analysis," September 2006. If not, please explain how the use of correct boundary conditions would affect the determination of the stress under-prediction factor.

**PPL Response 2**

The steam dryer fatigue analysis presented in GENE-0000-0057-4166-R1-P, Rev. 1 did not use the correct boundary conditions for the steam dryer support brackets. As part of the GEH actions to correct the dryer boundary conditions, the Original Licensed Thermal Power (OLTP) benchmark analysis for the original dryer presented in GENE-0000-0057-4166-R1-P, Rev. 1 was reanalyzed with the corrected boundary conditions and the stress under-prediction factor was recalculated. The finite element model used in GENE-0000-0057-4166-R1-P, Rev. 1 was based on the current Susquehanna dryer configuration with reinforcing straps on each of the four middle bank corners. As part of the reanalysis to correct the boundary conditions, the strap was removed on the end of the bank where strain gauge S6 was located in 1985. This configuration matched the bank as it was for the 1985 measurements and allowed the comparison of the S6 predicted/measured response to be included along with S4 and S5 in the reanalysis of the stress under-prediction factor. The change in the boundary conditions did change the predicted strain response for S4 and S5. However, when using the same methodology as was used in GENE-0000-0057-4166-R1-P, Rev. 1 and including the comparison for S6, the corrected stress under-prediction factor remained unchanged at [[ ]]. Therefore, the original stress under-prediction factor of [[ ]] remains applicable to the revised Susquehanna dryer analyses which was provided to the NRC in Reference 3.

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**Attachment 3 to PLA-6255**  
**GE-Hitachi Nuclear Energy Americas, LLC**  
**Affidavit**

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# GE-Hitachi Nuclear Energy Americas LLC

## AFFIDAVIT

I, **Tim E. Abney**, state as follows:

- (1) I am Project Manager, Services Licensing, Regulatory Affairs GE-Hitachi Nuclear Energy Americas LLC ("GEH"), 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 Attachment 1 to PPL Susquehanna letter PLA-6255 to the U. S. Nuclear Regulatory Commission.

The proprietary information is delineated by a [[dotted underline inside double square brackets.<sup>131</sup>]] Figures and large equation objects are identified with double square brackets before and after the object. In each case, the superscript notation <sup>131</sup> 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 or licensee, GEH relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:
  - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GEH's competitors without license from GEH 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 GEH customer-funded development plans and programs, resulting in potential products to GEH;
  - 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 GEH, 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 GEH, 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, or subject to the terms under which it was licensed to GEH. Access to such documents within GEH 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 for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GEH 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 results and details of analysis methods and techniques developed by GEH for evaluations of a BWR Steam Dryer and of other reactor internals, including separators. Development of these methods, techniques, and information and their application for the design, modification, and analyses methodologies and processes for the Steam Dryer Program and to the design and manufacturing of other BWR internal hardware was achieved at a significant cost to GHNEA, on the order of approximately several million dollars.
- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH'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 GEH.

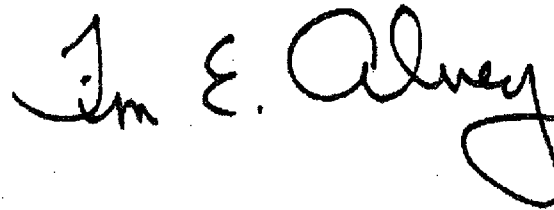
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH 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 GEH 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 GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining 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 8<sup>th</sup> day of August, 2007.

A handwritten signature in black ink that reads "Tim E. Abney". The signature is written in a cursive style with a large, looped final letter.

Tim E. Abney  
GE-Hitachi Nuclear Energy Americas LLC