Attachment 2 to PLA-6138

Non-Proprietary Version of the PPL Responses

In order to provide technical information that will allow the NRC staff to proceed with its technical review, the following is provided:

Acceptance Comment 1

Operating experience shows that previous applications of an acoustic circuit analyses have determined pressure loads on steam dryers based on pressure fluctuation measurements in the main steam lines caused by downstream sources in the steam lines. The licensee indicates in Attachment 10, Section 4.2.5.1 of their submittal, that the pressure pulses measured in the main steam line are generated by hydrodynamic sources. The licensee's application does not provide the technical justification to show that the acoustic circuit analysis is reliable in determining SSES steam dryer pressure loads caused by such hydrodynamic sources.

PPL Response

Attachment 10 of PPL's CPPU submittal (PLA-6076) acknowledges that the acoustic circuit model (ACM) by itself does not reliably predict the pressure loading from hydro-dynamic sources. The results of the SSES benchmarking effort and the ACM benchmark report (Appendix 4 to Attachment 10) both indicate that the ACM will produce frequency spectra representative of hydrodynamic stresses. Therefore, PPL developed a "stress under prediction" factor to provide a reliable, predictive methodology (ACM and a "stress under prediction factor") which bounds the stresses produced by the hydrodynamic loads.

CDI Report No. 04-09P Revision 6 (ML050960049), "Methodology to Determine Unsteady Pressure Loading on Components in Reactor Steam Domes," indicates that there exists at least two mechanisms which result in dryer pressure loads; vortex shedding from the dryer and "whistling" of safety valve standpipes (standpipe resonance). Previous analysis of other plants indicate that when significant dryer loadings are observed or predicted from the Acoustic Circuit Methodology (ACM), these loads result from safety valve standpipe resonance. Periodic vortical flow is ingested into the steam lines and is the hydrodynamic source of the acoustic pressure oscillations. By the very nature of the assumptions made in the ACM, the portion of the dryer pressure loading that is dependent on the square of the steam velocity is not predicted by the ACM. The ACM predicts dryer pressure loading that is dependent on the first power of steam velocity. The ACM predicts dryer loading to the order of the Mach Number. The hydrodynamic loading is a Mach Number squared loading.

Since the ACM was not developed to predict loads that are dependant on the square of the steam velocity, a benchmarking effort was conducted to determine if the ACM

methodology would identify significant hydrodynamic frequency loading on the steam dryer and determine if the resulting generated stresses were of an appropriate magnitude. This effort included a review of the ACM benchmark report (Appendix 4 of Attachment 10), and the results from a finite element analysis (FEA) which used an ACM predicted load at the Original Licensed Thermal Power Level (OLTP). The FEA results were then benchmarked against SSES steam dryer strain gauge data obtained in 1985. The benchmarking effort is detailed in Section 4.2.5.1.1 of Attachment 10 of PPL's CPPU submittal. The results of the SSES benchmarking effort contained in Attachment 10 and the ACM benchmark report (Appendix 4 to Attachment 10) both indicate that the ACM will produce frequency spectra representative of hydrodynamic loads. While the SSES benchmarking effort determined that the frequency spectra is representative of hydrodynamic loads, it also concluded that the ACM loading produced stresses which were lower than actual measured strains. Therefore, a stress under prediction factor was applied to the peak loads for all dryer components to address the non-bounding stress bias that results from using the ACM to predict hydrodynamic loads. The determination of the stress under prediction factor is detailed in Section 4.2.5.1.1 of Attachment 10 of PPL's CPPU submittal.

It should be noted that the SSES benchmarking effort revealed a significant spectral stress at 110Hz. This spectral stress peak was not modeled using the ACM pressure loading. A review of the SSES 1985 test data has concluded that this stress peak is not the result of or dependant on steam flow. The 110Hz stress peak is discussed in detail in the response to the staff's supplemental comment #2 below.

Acceptance Comment 2

The Final Element Analyses (FEA) in Attachment 10, Section 4.3 of the licensee's submittal is incomplete as it does not include the application of sufficiently small variations in the steam dryer load definition's time step size to evaluate the potential for more significant stress areas in the steam dryer. As indicated during the public meeting on November 6, 2006, the licensee plans to include the smaller variations in the time step size as part of the final FEA in January 2007.

PPL Response

A review has been completed of modifications required to resolve the over stress conditions identified with the current Susquehanna steam dryer design. The review has concluded that structural modifications to the existing steam dryer are not justifiable when economic and ALARA factors are considered. As a result, PPL directed GE to design and fabricate two new steam dryers for the Susquehanna units. The new Unit 1 steam dryer will be installed during the 2008 refueling outage and the new Unit 2 steam dryer will be installed during the 2009 refueling outage.

Table 1 below presents the results of finite element analyses (FEA) at small time steps that correspond to frequency shifts of [[ ]]. The FEA model used to generate the stress intensities presented in Table 1 below represents the new steam dryer design. Resultant stress intensities from the frequency shifted FEAs have been included into the structural uncertainty calculations. The results presented in Table 1 below have been verified in accordance with a 10 CFR 50 Appendix B Quality Assurance Program.

TABLE 1 - SSES Replacement Dryer Stress Summary (FIV Response under 113% OLTP Loads)

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Acceptance Comment 3

The licensee's calculations indicate that the fatigue stress limits will be exceeded within the SSES 1 and 2 steam dryers during CPPU operation. The licensee indicates that the overstressed areas will require further analysis and modifications to, or replacement of, the steam dryer. The pending analysis is needed by the NRC staff to assure no different or additional stresses result from the modification or new dryer, that the overstress results will be resolved, and that steam dryer structural integrity will be maintained at the full CPPU conditions.

PPL Response

The new Susquehanna steam dryer has resolved the over stress conditions identified in Attachment 10 of PPL's CPPU submittal. The new Susquehanna steam dryer design maintains the current curved hood configuration and the current geometry and dimensional envelope. Critical structural components have had their thickness increased to improve the overall stiffness of the steam dryer. The critical component changes are:

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The Figure 1 below is a graphic representation of these structural changes.

FIGURE 1 - Structural Enhancements for the New Susquehanna Dryers

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GE has constructed a finite element model for the new steam dryer and has completed the required fatigue analysis. The 113% OLTP ACM loads (based on Susquehanna main steam line strain gauge data) calculated for the existing steam dryer were input to the new FEA model. Weld factors were then applied to the component maximum stress intensities if applicable. The maximum stress intensities were then increased by applying the stress under prediction factor. The 113% stress intensities were then scaled, as described in Attachment 10 of PPL's CPPU submittal, to the full CPPU steam flow conditions. The results of this analysis are presented in Table 2 below:

TABLE 2 - Predicted Maximum Stresses and Fatigue Margin under EPU

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Table 2 above illustrates that the maximum stress intensities for all components are below the ASME 13,600 PSI fatigue design limit for 304 stainless steel with adequate margins. The highest stressed component has a 11.9% margin to the ASME fatigue design limit with all "end to end" uncertainties included. PPL Susquehanna will instrument the new Unit 1 steam dryer with strain gauges at selected high stress locations. These strain gauges will be used to confirm the adequacy of the fatigue analysis performed on the new Susquehanna steam dryers.

The results presented in Table 2 have been verified in accordance with a 10 CFR 50 Appendix B Quality Assurance Program.

The following responses are provided to address the NRC's request for additional technical discussion, as presented in Reference 2 of the cover letter for this response.

Supplemental Comment 1

Significant uncertainties exist in determining the stress in the steam dryer from scale model testing and main steam line pressure fluctuation analysis. The licensee should address its means of estimating the uncertainties and bias errors, and applying those uncertainties and bias errors in calculating stresses, attributed to acoustic dryer pressure loads calculated based on acoustic circuit model assumptions (Table 4-13 component symbol U2b of Attachment 10 of the application) to provide confidence that the allowable limits will not be exceeded in the SSES 1 and 2 steam dryers at CPPU conditions.

PPL Response

Scale model test results were not used in the determination of the Susquehanna steam dryer loads. The benchmarking discussed in Attachment 10 of PPL's CPPU submittal did identify an under prediction bias of the ACM. This bias was accounted for by the use of a stress under prediction factor. The Susquehanna steam dryer loads were determined as discussed in the response to Acceptance Comment 1 above.

Rather than calculating a negative bias due to the under-prediction of the dryer loads by the ACM, the stress under prediction factor was used directly as a multiplier for the dryer stresses calculated by the FEA. As a result, it is not appropriate to include the bias value for this component. Table 4-13 of Attachment 10 of PPL's CPPU submittal is modified as shown below to clarify the dryer analysis uncertainties.

PLA-6076 Attachment 10 - Table 4-13 (Revised)

List of Uncertainty Components for Susquehanna Steam Dryer FIV Load and Stress Calculations

Uncertainty Component	Symbol	Bias (see Note 1)	Precision (see Note 2)
MSL acoustic pressure measurement	U1	0%	±6.2%
Difference in MSL strain gauge locations between Susquehanna and Quad Cities Unit 2	U2a	0%	±16.9%
Ability of ACM to determine acoustic dryer pressure loads	U2b	(See Component U3b)	(See Component U3b)
Measurement of dryer pressures in 1985 Susquehanna measurements	U3a	0%	±10%
Ability of ACM to determine spatial distribution of dryer pressure loads	U3b	(See Note 3)	±7.6%
Use of a two-second time history in FE calculations	U4a	-2%	0%
Ability of FEA to Model Dryer Structure	U4b	(See Note 4)	(See Note 4)
Determination of CPPU scale factor	U5a	[[	]]
Conservatism in 113% OLTP load definition	U5b	+24%	0%

Notes:

1. A negative bias value indicates an under-prediction of the dryer loads or stress intensities and a positive bias value indicates an over-prediction.
2. The precision value indicates either an over-prediction or an under-prediction of the dryer loads or stress intensities.
3. The stress under prediction factor is determined in Section 4.2.5.1.1 of Attachment 10. The stress intensities determined by the FEA are adjusted by this factor and therefore it is not appropriate to include the bias value for this component in this table. Approximately 70% of this factor is attributed to the limited ability of the ACM to predict hydrodynamic loads.
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Supplemental Comment 2

The licensee's submittal indicates the presence of a strong spectral peak at about 110 Hz in the SSES 1 and 2 plant measurements on the steam dryer. The licensee should discuss the source of this peak and the absence of its prediction in the analysis.

PPL Response

The frequency of the observed panel resonance matches the recirculation pump vane passing frequency corresponding to the core flows and recirculation pump speeds present when the measurements were made. The 110 Hz peak observed in the second bank hood panel strain gauge measurements is due to a local structural resonance in the panel where strain gauges S4 and S5 were located. The dryer panels are responding to a strong vibration response in the recirculation loop piping that is excited by the recirculation pump vane passing frequency. The piping vibration is transmitted through the vessel to the dryer supports. This recirculation piping vibration response was first observed in SSES Unit 2 when the plant entered the Increased Core Flow (ICF) region for the first time following licensing of the ICF region.

The recirculation pump vane passing frequency matched a structural mode of the panel at the core flow conditions when the measurements were taken (110 Hz at 100% OLTP and 113 Hz at 90% OLTP). The 110 Hz response was noted at that time of the measurements, as determined in MDE-199-0985-P, Revision 1, which is provided as Appendix 1 of this letter. At that time, the source of the resonance was not investigated. Structural analyses in MDE-199-0985-P, Revision1 determined that the 110 Hz frequency was a structural mode of the second panel. These conclusions were confirmed by performing a vibration analysis using the current whole dryer finite element model. The fatigue evaluation presented in Attachment 10 considered flow-induced vibration resulting from pressure loads applied directly to the dryer. Because the 110 Hz vibration load was transmitted mechanically through the dryer supports, it was not predicted in the pressure load Flow Induced Vibration (FIV) analysis presented in Attachment 10 of PPL's CPPU submittal.

Figures 2 and 3 show the frequency spectra for the second bank strain gauges for power levels from 70% to 100% OLTP. In Attachment 10, a scaling factor was developed in order to adjust the predicted stress results from the finite element analysis to be equivalent to the stresses indicated by the in-plant dryer instrumentation. The scaling factor was based on a comparison of the predicted strains to the measured strains for S4 and S5 at the 100% OLTP power case where the 110 Hz peak is the highest. As discussed above, the 110 Hz peak shown in Figures 2 and 3 were correlated to the recirculation pump vane passing frequency. Because this dominant peak is based on the

recirculation pump vane passing frequency and a local structural resonance, a stress under prediction factor based on it will be bounding for the other power levels. Without the 110 Hz peak, the stress under prediction factor would be approximately 30% lower. The rest of the frequency spectrum is proportional to steam flow during the power ascension. The pressure loads, as shown by the pressure drum (Figure 4) and steam line pressure measurements (Figure 5) are also proportional to steam flow as power increases. If the 110 Hz peak were not present, a scaling factor based on the measured strain gauge response would be relatively constant as power increased. Strain gauges S4 and S5 were located on the second bank panel near the high stress location where the weld seam cracked during the first cycle. It is most likely that the 110 Hz peak is a local structural resonance in this panel caused by the vibrations introduced by the recirculation pump vane passing frequency. The structural performance of the dryer over more than 20 years suggests that there are no other locations on the dryer that are experiencing high stresses as a result of the recirculation pump vane passing vibration.

Figure 2 - Second Bank Strain Gauge S4 Response as a Function of Power

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Figure 3 - Second Bank Strain Gauge S5 Response as a Function of Power

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Figure 4 - Pressure Drum Response as a Function of Power

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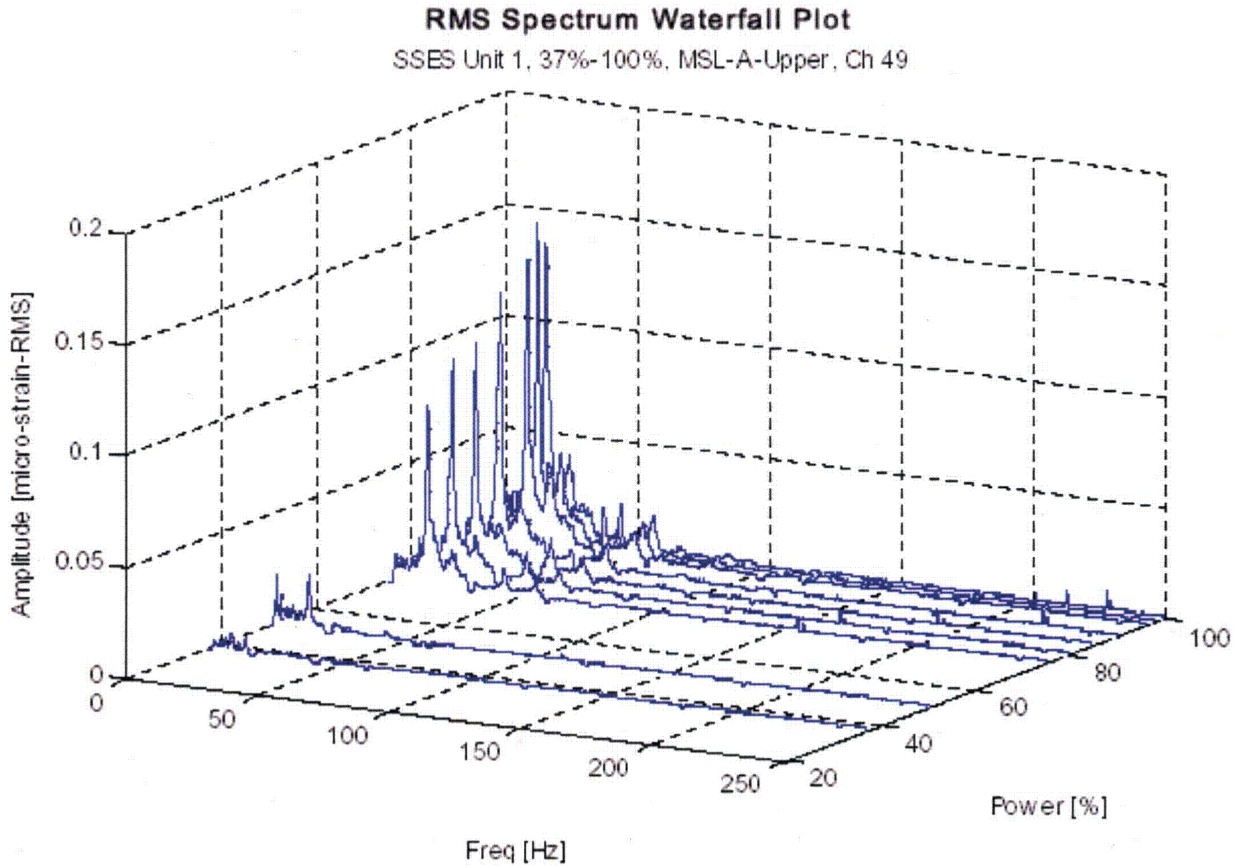
Note: The 110 Hz peaks shown in the plot are due to the mechanical excitation of pressure drum diaphragm by the recirculation loop vibration (confirmed by a vertical accelerometer mounted next to one of the pressure drums).

Figure 5 - Main Steamline Pressure as a Function of Power



Supplemental Comment 3

Operating experience has not revealed past significant concerns with hydrodynamic loads in low frequency ranges on steam dryer performance. The licensee should discuss the presence of a hydrodynamic excitation source at SSES 1 and 2 that predict steam dryer stresses near fatigue limits at power uprate conditions.

PPL Response

Section 2.4 and Table 2-2 of BWRVIP-139 summarize the past dryer structural performance for the BWR fleet. Of the cracking observed in the dryers, a significant number of the observations was attributed to high cycle fatigue. However, the root cause evaluations for these observations did not determine the specific frequency ranges of the loads responsible for the cracking. Section 3 of GE-NE-0000-0049-6652-01P (ML 060720354) provides an overview of the frequency characteristics of the pressure loading and structural response observed in the in-plant measurement data taken from instrumented dryers. Specifically, Figures 16-19 show the similarity in both the low and high frequency pressure loads acting on several dryers. Figures 14 and 15 show that the dryer structure is responding to both the low frequency and high frequency loads. Based on these in-plant measurements, it must be concluded that the full frequency range of pressure loads must be considered when evaluating the steam dryer structural performance.

The characteristics of the low frequency (15-30 Hz) pressure loading observed in SSES are discussed in Sections 3.3.1.3 and 3.3.1.4 of GE-NE-0000-0049-6652-01P. The low frequency hydrodynamic loads are due to turbulent buffeting, but have characteristics that are acoustic in nature. As can be seen by the sharp, well-defined peaks in Figures 5-21 and 5-22 of Attachment 10 of PPL's CPPU submittal, these loads exhibit the controlled frequencies associated with acoustic loads. It is believed that the source of the low frequency loading is related to the stationary vortex observed between the outer hood of the dryer and the vessel steamline nozzle. The wavelengths associated with the frequencies of these loads suggest that the main steam lines, or some portion thereof, are the resonating chamber providing the frequency control, though this has not been confirmed. These low frequency peaks are established at low plant power levels and grow in amplitude while maintaining constant frequencies as the plant comes up in power. A detailed assessment of the measured SSES dryer structural response to the low frequency loads observed in SSES is provided in MDE #199-0985-P, Revision 1 (See PPL response to supplemental comment #6 below).

Supplemental Comment 4

The licensee's submittal indicates spectral peaks near 15 Hz in the two main steam lines at SSES with "dead" legs. The licensee should discuss the source of these peaks and the reason that they do not appear for the other two steam lines. Also, the licensee should discuss how the 15 Hz loading is considered in the FEA of the SSES 1 and 2 steam dryers under CPPU conditions.

PPL Response

The source of the 15 Hz loading is the turbulent flow over the surfaces of the steam dryer. The "A" and "D" main steam lines contain dead legs, on which safety relief valves are installed. Fifteen Hz periodic vortical flow down the "A" and "D" main steam lines over the junction of the dead legs results in energy being stored in the dead leg. The largest amount of energy can be stored at 15 Hz, since this is a resonant frequency of the dead legs, thus sustaining the oscillation. Vortical flow at 15 Hz ingested into the steam lines which do not contain dead legs have no means of storing energy at this frequency, and hence the 15 Hz loading is much lower in amplitude.

The 15 Hz loading is accounted for in the ACM, which maps this load across the surfaces of the dryer. These loads are used as inputs for the FEA structural model, as discussed in Sections 5.2, 5.3, 5.4, and 6.3 of the GE dryer FEA (Appendix 5 of Attachment 10 of PPL's CPPU submittal).

Supplemental Comment 5

In Attachment 10, Section 4.2.1, the licensee discusses its selection of Strouhal number to identify the steam velocities for acoustic resonance to occur in the SSES steam lines. The licensee should discuss the basis for application of the same Strouhal number for various steam line branch openings, including the dead leg.

PPL Response

Typical Strouhal numbers are discussed in Section 4.2.1 of Attachment 10 of PPL's CPPU submittal. These values were used as a preliminary indicator in determining the potential for acoustic loading on the dryer. However, Strouhal numbers were not used in the final dryer structural analysis, since actual plant data was used. The purpose of the Strouhal analytical prediction was to support that the results of subsequent scale model testing and the final analysis were reasonable and in line with current understanding.

Section 4.2.1 in Attachment 10 of PPL's CPPU submittal suggests that the onset of resonance occurs at a Strouhal number of about 0.55 and peak of resonance occurs at a Strouhal value of about 0.4. Ziada & Shine have done research on the onset and peak of shear wave resonance. Ziada & Shine note that as the diameter ratio (d/D) of branch line diameter (d) to main line diameter (D) increases, the Strouhal number associated with onset and peak also increases. Ziada & Shine also point out that for a diameter ratio of about 0.57, the Strouhal number associated with peak resonance is about 0.5. Higher increases in diameter ratios above 0.57 do not affect the onset and peak Strouhal numbers much - according to Peters (1993). For the most part, Susquehanna has branch lines that have diameter ratios less than 0.5. This is true for the SRV standpipes, RCIC, HPCI, and drain lines branches even when the sweepolet radius is included which makes the Strouhal number scale with the branch diameter plus the sweepolet radius. Section 3.3.2 of GE-NE-0000-0049-6652-01P describes the characteristics of the SRV standpipe resonances observed in plant measurements observed on the various dryers that GE has instrumented. Table 4 of GE-NE-0000-0049-6652-01P provides a summary of the Strouhal numbers determined for the peak SRV standpipe resonances in these in-plant measurements. GE used bounding Strouhal numbers in its Strouhal evaluation of the SRV standpipes, the RCIC, HPCI, and drain line branch connections that consider these in-plant measurements. Bounding Strouhal numbers in this case refers to a prediction that will yield lower velocities for resonance (i.e., earlier onset and peak of shear wave resonance). The SRV standpipe, RCIC, HPCI, and drain line branch geometries are all a simple right angle tee off of the main steam line carrying the flow. Therefore, the Strouhal numbers discussed in Attachment 10, Section 4.2.1 of PPL's CPPU submittal are reasonable to estimate onset and peak of shear wave resonance.

Strouhal calculations for the dead legs were not specifically performed. However, 1/8-scale model testing confirmed the presence of a 15 Hz response, which is attributed to the dead legs on the "A" & "D" main steam lines.

Supplemental Comment 6

In Attachment 10, Section 3.7, the licensee discusses anomalies in the steam dryer in SSES Unit 1 upon initial plant operation, and the installation of steam dryer instrumentation to evaluate dryer performance during testing in 1985. The licensee should provide its report regarding the instrumented steam dryer test performed at Susquehanna in 1985, and the related steam dryer issues.

PPL Response

The non-proprietary version of GE Report MDE #199-0985-NP Revision 1, which describes the results of an instrumented dryer test performed at Susquehanna in 1985 is provided as Appendix 1 of this response.

Appendix 1

General Electric Company
Nuclear Energy Report
MDE-199-0985-NP, Rev. 1

Susquehanna - 1
Steam Dryer Vibration
Steady State and Transient Response

January 1986

(GE Non-Proprietary)

Attachment 3 to PLA-6138

General Electric Company 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 GE-SSE-EP-312, Larry King to Mike Gorski (PPL), *GE Review of draft PPL letter, PLA-6138*, dated December 2, 2006. The Enclosure 1 (*GE Review of PPL Letter PLA-6138*) proprietary information 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 sidebars and 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, 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 details of steam dryer loading analyses of the design of the Susquehanna BWR Steam Dryer. Development of this information and its application for the design, procurement and analyses methodologies and processes for the Steam Dryer Program was achieved at a significant cost to GE, on the order of approximately two million dollars.

The development of the dryer performance 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 2nd day of December 2006.

George B. Stramback

George B. Stramback
General Electric Company