



**PROPRIETARY-Withhold under 10 CFR 2.390**

November 20, 2009

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

Serial No. 09-528A  
NL&OS/GDM R0  
Docket Nos. 50-305  
50-336/423  
50-338/339  
50-280/281  
License Nos. DPR-43  
DPR-65/NPF-49  
NPF-4/7  
DPR-32/37

**DOMINION ENERGY KEWAUNEE, INC.**  
**DOMINION NUCLEAR CONNECTICUT, INC.**  
**VIRGINIA ELECTRIC AND POWER COMPANY**  
**KEWAUNEE POWER STATION**  
**MILLSTONE POWER STATION UNITS 2 AND 3**  
**NORTH ANNA POWER STATION UNITS 1 AND 2**  
**SURRY POWER STATION UNITS 1 AND 2**  
**REMOVAL OF MIXING VANE GRID SPACING RESTRICTION IN APPENDIX B TO**  
**FLEET REPORT DOM-NAF-2 – SUPPLEMENTAL INFORMATION**

In an August 28, 2009 letter (Serial No. 09-528), Dominion requested NRC approval to remove a mixing vane grid spacing restriction contained in Appendix B of Fleet Report DOM-NAF-2-A, "Qualification of the Westinghouse WRB-1 CHF Correlation in the Dominion VIPRE-D Computer Code." Specifically, the subject restriction states that "VIPRE-D/WRB-1 will not be used for fuel with less than 13" mixing vane grid spacing." Dominion provided technical justification for removing the restriction in the subject letter; however, we are providing supplemental information herein to further support our request and to facilitate NRC review. The supplemental information is provided in Attachment 1.

Attachment 1 contains information proprietary to Westinghouse Electric Company, LLC. Therefore, this information is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.390 of the Commission's regulations. Accordingly, it is respectfully requested that the information, which is proprietary to Westinghouse, be withheld from public disclosure in accordance with 10 CFR 2.390 of the Commission's regulations. The affidavit is included in Westinghouse authorization letter LTR-CAW-09-2701, "Application for Withholding

**Attachment 1 contains information that is being withheld from public disclosure under 10 CFR 2.390. Upon separation this page is decontrolled.**

ADD/HR

Proprietary Information from Public Disclosure,” which also includes a Proprietary Information Notice and a Copyright Notice. The Westinghouse authorization letter is provided in Attachment 3. Correspondence with respect to the copyright or proprietary aspects of the Westinghouse information noted above or the supporting Westinghouse affidavit should reference the authorization letter and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355. A redacted, non-proprietary version of the Westinghouse information is provided in Attachment 2.

If you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Sincerely,



J. Alan Price  
Vice President – Nuclear Engineering  
Dominion Energy Kewaunee, Inc.  
Dominion Nuclear Connecticut, Inc.  
Virginia Electric and Power Company

Attachments:

1. Supplemental Information (PROPRIETARY), Removal of the Grid Spacing Restriction in Appendix B to Fleet Report DOM-NAF-2-A
2. Supplemental Information (NON-PROPRIETARY), Removal of the Grid Spacing Restriction in Appendix B to Fleet Report DOM-NAF-2-A
3. Westinghouse Electric Company LLC Authorization Letter LTR-CAW-09-2701, “Application for Withholding Proprietary Information from Public Disclosure,” dated November 10, 2009

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, Pennsylvania 19406-1415

U.S. Nuclear Regulatory Commission  
Region II  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, SW  
Suite 23T85  
Atlanta, Georgia 30303

U.S. Nuclear Regulatory Commission  
Region III  
2443 Warrenville Road  
Suite 210  
Lisle, Illinois 60532-4352

Mr. P. S. Tam  
NRC Senior Project Manager – Kewaunee Power Station  
U. S. Nuclear Regulatory Commission  
One White Flint North  
11555 Rockville Pike  
Mail Stop 8 H4A  
Rockville, Maryland 20852-2738

Ms. C. J. Sanders  
NRC Project Manager – Millstone Power Station Units 2 and 3  
U. S. Nuclear Regulatory Commission  
One White Flint North  
11555 Rockville Pike  
Mail Stop 8 B1A  
Rockville, Maryland 20852-2738

Ms. K. R. Cotton  
NRC Project Manager  
U. S. Nuclear Regulatory Commission  
One White Flint North  
Mail Stop 16 E15  
11555 Rockville Pike  
Rockville, MD 20852-2738

Dr. V. Sreenivas  
NRC Project Manager  
U. S. Nuclear Regulatory Commission  
One White Flint North  
Mail Stop 8 G9A  
11555 Rockville Pike  
Rockville, MD 20852-2738

NRC Senior Resident Inspector  
Kewaunee Power Station

NRC Senior Resident Inspector  
Millstone Power Station

NRC Senior Resident Inspector  
North Anna Power Station

NRC Senior Resident Inspector  
Surry Power Station

**ATTACHMENT 2**

**Supplemental Information (NON-PROPRIETARY)**

**Removal of the Grid Spacing Restriction in Appendix B to  
Fleet Report DOM-NAF-2-A**

**DOMINION ENERGY KEWAUNEE, INC.  
DOMINION NUCLEAR CONNECTICUT, INC.  
VIRGINIA ELECTRIC AND POWER COMPANY  
KEWAUNEE POWER STATION  
MILLSTONE POWER STATION UNITS 2 AND 3  
NORTH ANNA POWER STATION UNITS 1 AND 2  
SURRY POWER STATION UNITS 1 AND 2**

**Supplemental Information in Support of the Removal of the Grid Spacing Restriction in  
Appendix B to Fleet Report DOM-NAF-2-A**

**Background**

The WRB-1 CHF correlation was developed from a large body of rod bundle CHF data obtained at the Columbia University Heat Transfer Research Facility (HTRF) using full-scale, electrically heated rod bundle test sections (Reference 1). Westinghouse used this database in Reference 2 to qualify the THINC/WRB-1 code/correlation for "R" grid fuel. This is also the same database used by Westinghouse to qualify the VIPRE-01/WRB-1 code/correlation (Reference 3). Dominion used a subset of this experimental data, as described in Reference 4, for the qualification of the WRB-1 correlation with the VIPRE-D code. Appendix B of Reference 4 imposed an additional restriction on the intended range of application as follows: "VIPRE-D/WRB-1 will not be used for fuel with less than 13" mixing vane grid spacing."

Dominion in a letter dated August 28, 2009 (Reference 5) requested NRC approval to remove the mixing vane grid spacing restriction contained in Appendix B of Fleet Report DOM-NAF-2-A. Additional technical justification is provided herein for the WRB-1 application to Westinghouse 15x15 fuel designs containing IFM grids.

**Technical Justification**

Westinghouse conducted confirmatory critical heat flux (CHF) testing in December 1998 / January 1999 to revalidate the WRB-1 applicability to the 15x15 Vantage+ fuel design which included intermediate flow mixer (IFM) grids. The CHF test section consisted of a 4x4 typical cell with geometry prototypical of 15x15 Vantage+ fuel design. Reference 6 provides details of the test section, axial layout of the grids and instrumentation, and axial and radial power distributions. Westinghouse demonstrated in Reference 6 that the quantity of test data was comparable with other Westinghouse test bundles and that the test conditions were representative of the WRB-1 database. Westinghouse evaluated the test data for normality, and compared the test data to the WRB-1 database using the F- and T-statistical tests. The results indicated that the test data produced a 95/95 DNBR limit less than 1.17 (the accepted WRB-1 design limit) and a mean M/P (measured to predicted CHF) greater than 1.0, which shows that these results are conservative. Westinghouse showed similar results using VIPRE and THINC. Westinghouse concluded that the CHF test data can be conservatively considered as part of the WRB-1 database and the WRB-1 DNBR design limit of 1.17 can be conservatively

applied to 15x15 Vantage+ fuel. The test results were discussed during a March 17, 1999 meeting between the NRC, Westinghouse, and New York Power Authority (NYPA). Westinghouse documented this meeting in a letter to the NRC dated March 29, 1999 (Reference 6). Further, the NRC staff reviewed data and documentation of the tests performed by Westinghouse in an amendment request for Indian Point Unit 3 (Reference 7).

Dominion replicated the Westinghouse evaluation of the CHF test data using the VIPRE-D code with the WRB-1 correlation to develop a 95/95 DNBR limit for the test data. One-sided tolerance theory (Reference 8) is used for the calculation of the test data DNBR design limit. This theory allows the calculation of a DNBR limit so that, for a DNBR equal to the design limit, DNB will be avoided with 95% probability at a 95% confidence level. A comparison of the WRB-1 M/P results between Westinghouse VIPRE-W and Dominion VIPRE-D codes is shown in Table 1.

Because all the statistical techniques used in Table 1 assume that the original data distribution is normal, it is necessary to verify that the overall distribution for the M/P ratio is a normal distribution. To evaluate whether the distribution is normal, the D' normality test was applied (Reference 9). A value of D' equal to [ ]<sup>a,b,c</sup> was obtained for the test data. This D' value is within the range of acceptability for [ ]<sup>a,b,c</sup> data points with a 95% confidence level [ ]<sup>a,b,c1</sup>. Thus, it is concluded that the M/P distribution for the test data is indeed normal.

Based on the results listed in Table 1, the 95/95 DNBR limit for the test data can be calculated as:

$$DNBR_L = \frac{1.0}{M/P - K_{N,C,P} * \sigma_{M/P}} \quad \text{(Equation 1)}$$

where :

- M/P = average measured-to-predicted CHF ratio
- $\sigma_{M/P}$  = standard deviation of the measured-to-predicted CHF ratios of the database

<sup>1</sup> From Table 5 in Reference 1 [ ]<sup>a,c</sup>

D' Lower Limit [ ]<sup>a,b,c</sup>  
 D' Upper Limit [ ]<sup>a,b,c</sup>

$K_{N,C,P}$  = one-sided tolerance factor based on N degrees of freedom, C confidence level, and P portion of the population protected. This number is taken from Table 1.4.4 in Reference 8.

Then, the DNBR design limit for test data with the VIPRE-D can be calculated as described in Table 1:

Table 1: WRB-1 DNBR Design Limit for the Westinghouse Confirmatory Test Data

			VIPRE-D	VIPRE-W
Number of data	n		[ ] <sup>a,b,c</sup>	[ ] <sup>a,b,c</sup>
Degrees of freedom	N	= n - 1	[ ] <sup>a,b,c</sup>	---
Average M/P	M/P		[ ] <sup>a,b,c</sup>	[ ] <sup>a,b,c</sup>
Standard Deviation	$\sigma_{M/P}$		[ ] <sup>a,b,c</sup>	[ ] <sup>a,b,c</sup>
Corrected Standard Deviation	$\sigma_N$	= $\sigma_{M/P} \cdot [(n-1) / N]^{1/2}$	[ ] <sup>a,b,c</sup>	---
Owens Factor	K(N,0.95,0.95)		[ ] <sup>a,b,c</sup>	---
95/95 DNBR Limit	DNBR <sub>L</sub>	[ ] <sup>a,b,c</sup>	1.112	1.108

The F-Test Two Sample for Variances (Reference 10) was considered to determine whether the variances for the WRB-1 database and the test data are equal. The hypothesis is tested by comparing the T statistic ([ ]<sup>a,b,c</sup>, at a 0.05 level of significance), and  $F_{Critical}(932, [ ]<sup>a,b,c</sup>, 0.05) = [ ]<sup>a,b,c</sup>.$

$$T = \frac{s_{WRB_1}^2}{s_{test\ data}^2} = \frac{0.00692}{[ ]<sup>a,b,c</sup>} = [ ]<sup>a,b,c</sup> \quad \text{(Equation 2)}$$

Therefore, it can be concluded that the variances are the same (i.e., equal), since the T statistic is less than  $F_{Critical}$  (i.e. both the WRB-1 database and the additional test data have the same variability). Thus, the test data can be conservatively considered as part of the WRB-1 database, which is also the same conclusion Westinghouse reported in Reference 6 from performing the F-Test.

The T-Test (Reference 10) was used to compare the means of the two populations with equal variance. The T-Test was employed to test the hypothesis that  $\mu_1 - \mu_2 = 0.0$ . The T-test produced an interval, [ ]<sup>a,b,c</sup>, thus the hypothesis that the means are equal is rejected and is confirmed by the low probability [ ]<sup>a,b,c</sup> of equal means. The T-Test for the test data failed, but was found to be conservative since the mean of the test data [ ]<sup>a,b,c</sup> is greater than the mean of the VIPRE-DWRB-1 code/correlation (1.0051). Westinghouse also failed the T-Test for equal means in Reference 6, but found it conservative with respect to the WRB-1 database.

Figure 1 displays the performance of the M/P ratio. This plot also includes the VIPRE-DWRB-1 DNBR design limit line at 1.17. It can be seen that only 1 data point is outside the VIPRE-DWRB-1 DNBR design limit. Figures 2 through 4 display the performance of the M/P ratio and its distributions as a function of the pressure, mass velocity and quality. The figures are effectively the same as the Westinghouse results (Reference 6).



Figure 1: Measured vs. Predicted CHF



a,b,c

Figure 2: M/P vs. Pressure

a,b,c



Figure 3: M/P vs. Quality

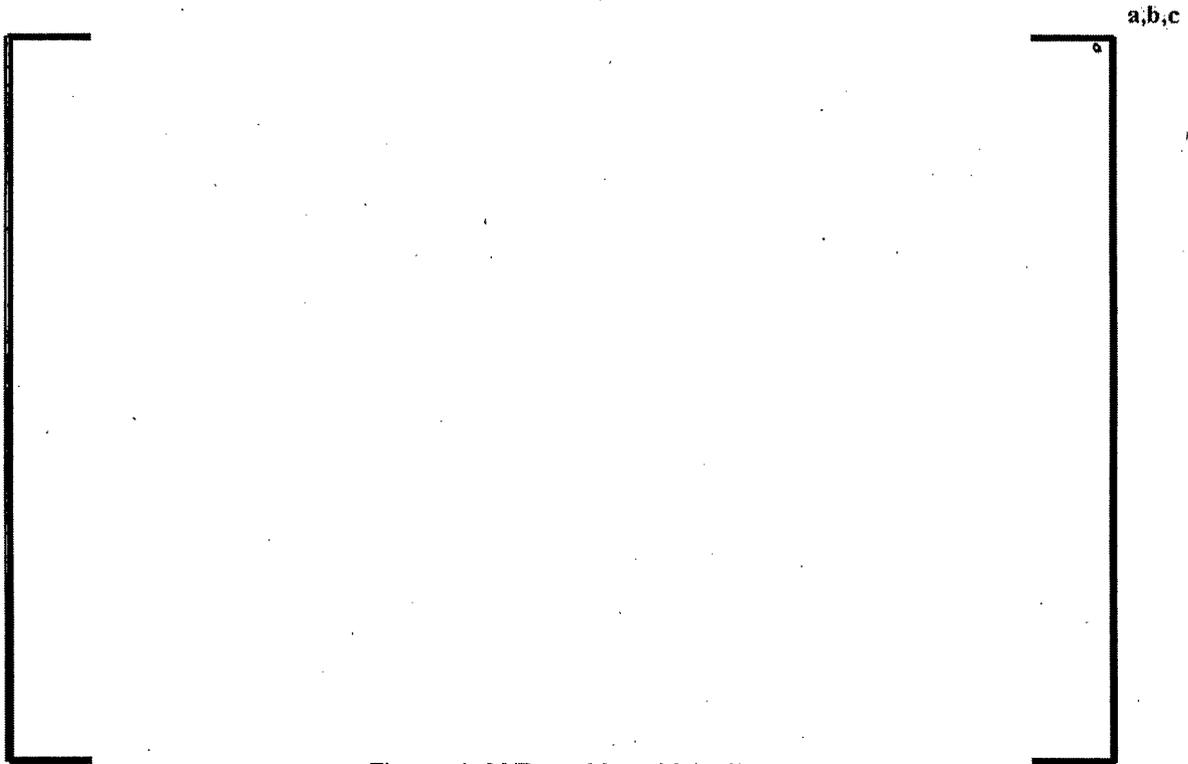


Figure 4: M/P vs. Mass Velocity

**Conclusions**

The VIPRE-D/WRB-1 analysis of the Westinghouse confirmatory CHF test data results in a [ ]<sup>a,b,c</sup> M/P ratio with a [ ]<sup>a,b,c</sup> standard deviation. Table 2 gives the 95/95 DNBR limit for the test data, which is compared to the Westinghouse results from Reference 6.

Table 2: 95/95 DNBR Limit for the WRB-1 Test Data

	VIPRE-D	Westinghouse
95/95 DNBR Limit:	1.112	1.114 (THINC) 1.108 (VIPRE-W)

Finally, the conclusions in Reference 5 (Serial No. 09-528) that are supplemented herein, support the use of VIPRE-D/WRB-1 with a 1.17 DNBR Design Limit for WRB-1 application to Westinghouse 15x15 fuel designs containing IFM grids.

**References**

1. Technical Report, EPRI NP-2609, "Parametric Study of CHF Data, Volume 3, Part 1; Critical Heat Flux Data," C. F. Fighetti, & D.G. Reddy, September 1982.
2. Technical Report, WCAP-8762-P-A, "New Westinghouse Correlation WRB-1 for Predicting Critical Heat Flux in Rod Bundles with Mixing Vane Grids", F. E. Motley, et. al., July 1984.
3. Technical Report, WCAP-14565-P-A, "VIPRE-01 Modeling and Qualification for Pressurized Water Reactor Non-LOCA Thermal-Hydraulic Safety Analysis," Y. X. Sung, P. Schueren, and A. Meliksetian, October 1999.
4. Fleet Report, DOM-NAF-2, Rev. 0.1-A "Reactor Core Thermal-Hydraulics using the VIPRE-D Computer Code," R. S. Brackmann, July 2009.
5. Letter from J. A. Price (Dominion) to Document Control Desk (USNRC), "Removal of Mixing Vane Grid Spacing Restriction in Appendix B to Fleet Report DOM-NAF-2 – Evaluation of 4x4 DNB Test of 15x15 Vantage+ with IFMs Using VIPRE-D/WRB-1," August 28, 2009, Serial No. 09-528.
6. Letter from H. A. Sepp (Westinghouse) to Document Control Desk (USNRC) (NSD-NRC-99-5828), "Notification of FCEP Application for DNB Testing and Revalidation of WRB-1 Applicability to the 15x15 Vantage+ Fuel Design, (Proprietary)," March 29, 1999.
7. Letter from G. F. Wunder (USNRC/NRR) to J. Knubel (NYPA), "Indian Point Nuclear Generation Unit NO.3-Issuance of Amendment RE: Removal of Footnote from Technical Specifications (TAC NO. MA5193)," September 2, 1999, ADAMS Accession No. ML003780850.
8. Technical Report, "Tables for Normal Tolerance Limits, Sampling Plans, and Screening," R. E. Odeh and D. B. Owen, 1980.
9. Technical Report, "Assessment of the Assumption of Normality (employing individual observed values)," American National Standards Institute, ANSI N15.15:1974.
10. Technical Report, WAPD-TM-1292, "Statistics for Nuclear Engineers and Scientists; Part 1: Basic Statistical Inference," February 1981; W. J. Beggs, Contract No. DE-AC11-76PN00014.

**ATTACHMENT 3**

**Westinghouse Electric Company LLC Authorization Letter LTR-CAW-09-2701,  
"Application for Withholding Proprietary Information from Public Disclosure,"  
dated November 10, 2009**

**DOMINION ENERGY KEWAUNEE, INC.  
DOMINION NUCLEAR CONNECTICUT, INC.  
VIRGINIA ELECTRIC AND POWER COMPANY  
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Westinghouse Electric Company  
Nuclear Services  
P.O. Box 355  
Pittsburgh, Pennsylvania 15230-0355  
USA

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

Direct tel: (412) 374-4643  
Direct fax: (412) 374-3846  
e-mail: greshaja@westinghouse.com

Our ref: CAW-09-2701

November 10, 2009

APPLICATION FOR WITHHOLDING PROPRIETARY  
INFORMATION FROM PUBLIC DISCLOSURE

Subject: Supplemental Information in Support of the Removal of the Grid Spacing Restriction in  
Appendix B to Fleet Report DOM-NAF-2 (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-09-2701 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Dominion Generation.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-09-2701, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

A handwritten signature in black ink, appearing to read 'J. A. Gresham', written over a horizontal line.

J. A. Gresham, Manager  
Regulatory Compliance and Plant Licensing

Enclosures

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

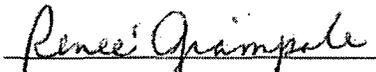
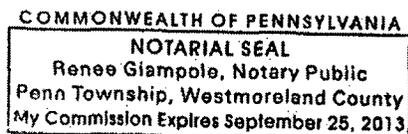
Before me, the undersigned authority, personally appeared J. A. Gresham, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:



J. A. Gresham, Manager

Regulatory Compliance and Plant Licensing

Sworn to and subscribed before me  
this 10<sup>th</sup> day of November, 2009

  
Notary Public

- (1) I am Manager, Regulatory Compliance and Plant Licensing, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.
- (2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse "Application for Withholding" accompanying this Affidavit.
- (3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.
- (4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
  - (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.
  - (ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

    - (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

- (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.
- (c) Its use 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 a similar product.
- (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.
- (e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.
- (f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

- (a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.
- (b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.
- (c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.
- (d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

- (e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.
  - (f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.
- (iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.
- (iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.
- (v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in, "Supplemental Information in Support of the Removal of the Grid Spacing Restriction in Appendix B to Fleet Report DOM-NAF-2 (Dominion Letter 09-528A)," dated November, 10, 2009 (Proprietary), for submittal to the Commission, being transmitted by Dominion Generation and Application for Withholding Proprietary Information from Public Disclosure to the Document Control Desk. The proprietary information as submitted by Westinghouse for Dominion Generation is expected to be used in support of the removal of the grid spacing restriction.

This information is part of that which will enable Westinghouse to:

- (a) Assist customer to obtain a license change.

Further this information has substantial commercial value as follows:

- (a) Westinghouse can use this information to further enhance their licensing position with their competitors.

- (b) The information requested to be withheld reveals the distinguishing aspects of Westinghouse fuel designs and CHF correlations.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar calculation, evaluation and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

## **PROPRIETARY INFORMATION NOTICE**

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

## **COPYRIGHT NOTICE**

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.