

Westinghouse Non-Proprietary Class 3



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LTR-NRC-17-76

December 5, 2017

**Subject:** Submittal of "Proprietary Markings for NRC Draft Request for Additional Information for WCAP-18032-P, Revision 0, and WCAP-18032-NP, Revision 0, 'Calculation of Mixed Core Safety Limit Minimum Critical Power Ratio,' Topical Report Westinghouse Electric Company" (Proprietary/Non-Proprietary).

Enclosed are copies of the proprietary and non-proprietary versions of "Proprietary Markings for NRC Draft Request for Additional Information for WCAP-18032-P, Revision 0, and WCAP-18032-NP, Revision 0, 'Calculation of Mixed Core Safety Limit Minimum Critical Power Ratio,' Topical Report Westinghouse Electric Company" (Proprietary/Non-Proprietary). Westinghouse is committing to a 120-day response timeframe for all of the RAIs once the RAIs have been formally received.

This submittal contains proprietary information of Westinghouse Electric Company LLC ("Westinghouse"). In conformance with the requirements of 10 CFR Section 2.390, as amended, of the Nuclear Regulatory Commission's ("Commission's") regulations, we are enclosing with this submittal an Application for Withholding Proprietary Information from Public Disclosure and an Affidavit. The Affidavit sets forth the basis on which the information identified as proprietary may be withheld from public disclosure by the Commission.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference AW-17-4680 and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 2 Suite 259, Cranberry Township, Pennsylvania 16066.

James A. Gresham, Manager  
Regulatory Compliance

Enclosures

cc: Ekaterina Lenning  
Dennis Morey

TOD  
NRR



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AW-17-4680

December 5, 2017

APPLICATION FOR WITHHOLDING PROPRIETARY  
INFORMATION FROM PUBLIC DISCLOSURE

**Subject:** LTR-NRC-17-76 P-Attachment, "Proprietary Markings for NRC Draft Request for Additional Information for WCAP-18032-P, Revision 0, and WCAP-18032-NP, Revision 0, 'Calculation of Mixed Core Safety Limit Minimum Critical Power Ratio,' Topical Report Westinghouse Electric Company." (Proprietary)

**Reference:** Letter from James A. Gresham to the Document Control Desk, LTR-NRC-17-76, dated December 5, 2017.

The Application for Withholding Proprietary Information from Public Disclosure is submitted by Westinghouse Electric Company LLC ("Westinghouse"), pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit AW-17-4680 signed by the owner of the proprietary information, Westinghouse. 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.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the accompanying Affidavit should reference AW-17-4680 and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 2 Suite 259, Cranberry Township, Pennsylvania 16066.

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

James A. Gresham, Manager  
Regulatory Compliance

AFFIDAVIT

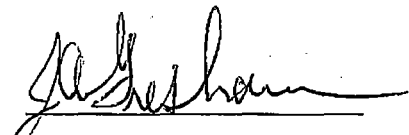
COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, James A. Gresham, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse") and declare that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

Executed on: 12/5/17

  
James A. Gresham, Manager  
Regulatory Compliance

- (1) I am Manager, Regulatory Compliance, 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 Nuclear Regulatory Commission's ("Commission's") regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure 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.
- (iii) 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.
- (iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, is to be received in confidence by the Commission.
- (v) 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.
- (vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in LTR-NRC-17-76 P-Attachment, "Proprietary Markings for NRC Draft Request for Additional Information for WCAP-18032-P, Revision 0, and WCAP-18032-NP, Revision 0, 'Calculation of Mixed Core Safety Limit Minimum Critical Power Ratio,' Topical Report Westinghouse Electric Company" (Proprietary), for submittal to the Commission, being transmitted by Westinghouse letter LTR-NRC-17-76. The proprietary information as submitted by Westinghouse is that associated with Westinghouse's request for NRC approval of WCAP-18032, and may be used only for that purpose.
- (a) This information is part of that which will enable Westinghouse to obtain NRC approval of a revised mixed core safety limit minimum critical power ratio methodology.

- (b) Further, this information has substantial commercial value as follows:
- (i) Westinghouse plans to sell the use of similar information to its customers for the purpose of assisting customers in obtaining licenses for use of Westinghouse boiling water reactor fuel.
  - (ii) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

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 technical evaluation justifications 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 non-proprietary versions of a document, furnished to the NRC in connection with requests for generic 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).

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REQUEST FOR ADDITIONAL INFORMATION FOR WCAP-18032-P, REVISION 0 AND**  
**WCAP-18032-NP, REVISION 0, "CALCULATION OF MIXED CORE SAFETY LIMIT MINIMUM**  
**CRITICAL POWER RATIO," TOPICAL REPORT**  
**WESTINGHOUSE ELECTRIC COMPANY**

1) For the following, provide specific variable names and where necessary a clarified variable description:

a. Information pertaining to the Legacy fuel including:

i. Define the legacy state points (e.g., P, m, Tin):

1. What is the expected number of state points? What if the number of statepoints is below this expected number?
2. What is the expected coverage of those statepoints over the application domain? What if the coverage over the application domain is smaller than expected?
3. How would you justify a conservative safety limit minimum critical power ratio (SLMCPR) and operating limit minimum critical power ratio (OLMCPR) if either the number of statepoints or their coverage was less than expected?

ii. Define the legacy fuel data (e.g., rod diameter, pitch).

iii. Which other fuel parameters does Westinghouse need to predict to obtain a prediction of the critical power value?

1. What process is used to calculate these values?
2. Provide justification demonstrating that the Westinghouse procedure for calculating these values is accurate.

iv. Describe where the legacy critical power values are generated.

b. For VIPRE-W/MEFISTO predictions of legacy fuel critical power (CP):

i. Confirm that these predictions are at the same state points as in 1.a.i.

ii. Confirm that these predictions use the same fuel data as in 1.a.ii.

iii. Confirm that these predictions only need the additional calculations performed in 1.a.iii.

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- iv. Define the error term which represents the difference between the VIPRE-W/MEFISTO predictions of CP and those predictions directly from the legacy fuel, as in 1.a.iv.
  - 1. Provide a histogram of this error term
  - 2. Provide an example of plots of Error vs. input parameter (e.g., pressure, inlet mass flux, subcooling, R-factor, and any other relevant parameters).
  - 3. For an actual analysis, describe how Westinghouse uses these plots.
  
- c. For the training data generated by VIPRE-W/MEFISTO:
  - i. Define the statement points over which this training data will be generated. These statepoints should be defined similarly to the statepoints in 1.a.i.
  - ii. Define the origin of the fuel data which will be needed by MEFISTO to generate the training data.
  - iii. For any fuel data which does not come directly from the legacy fuel itself, what parameters does Westinghouse need to predict and how does Westinghouse make those predictions.
  - iv. Define a term for the critical power training data as predicted by MEFISTO.
  
- d. For the training data used by the modified critical power correlation (e.g., D5), whether from the MEFISTO (1.c) code or the Legacy fuel data (1.a):
  - i. Define terms for the different ways Westinghouse is modifying the CP model (e.g., D5). (e.g., modified using only MEFISTO training data, modified using MEFISTO and Legacy data, modified using only legacy data).
  - ii. Define the error term which represents the difference between the VIPRE-W/MEFISTO training data as generated by MEFISTO (1.c.iv) and those predictions the modified D5 (1.d.i).
    - 1. Provide a histogram of this error term.
    - 2. Provide an example of plots of Error vs. input parameter (e.g., pressure, inlet mass flux, subcooling, R-factor, and any other relevant parameters).
    - 3. For an actual analysis, describe how Westinghouse uses these plots.

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- iii. Define the error term which represents the difference between the legacy CP data (1.a.iv) and those predictions from the modified D5 (1.d.i).
  - 1. Provide a histogram of this error term.
  - 2. Provide an example of plots of Error vs. input parameter (e.g., pressure, inlet mass flux, subcooling, R-factor, and any other relevant parameters).
  - 3. For an actual analysis, describe how Westinghouse uses these plots.
  
- 2) Provide justification that the true error of either version of the modified D5 correlation (1.d.i) (i.e., modified D5 compared to reality) is conservatively predicted by error between the modified D5 and the legacy CP values.
  
- 3) For the modeling used in VIPRE-W:
  - a. How is VIPRE-W thermal mixing applied? What is the magnitude of the coefficient and where is the data which supports the value?
  - b. Provide the equation for drop deposition model in VIPRE.
  - c. Provide a typical plot of the drop deposition variable vs. distance from the grid.
  - d. [

] <sup>a,c</sup>

- 4) In discussions with Westinghouse, the NRC staff found Step 5 in Section 3.2 greatly clarified as compared to the description in the topical report. Please provide a written clarification to this step which includes details on the development of the radial power shape and then how that shape is used as a statepoints.
  
- 5) Provide a set of data which would be an example of what would be submitted to the NRC with a license amendment request (LAR). This data should include:
  - a. A description of the legacy data (1.a) and if there was "enough" data or if another process (1.a.i) was used.
  - b. Provide plots of the error as defined in 1.d.iii above. [
    - ] <sup>a,c</sup>
  - c. Provide trend plots of the modified critical power model vs input variables (consistent with Figures 5-1 – 5-4 from the D5 topical report) to confirm appropriate model behavior.
  - d. Provide any other information Westinghouse would find relevant to the LAR.

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WCAP-18032-P, Revision 0, and WCAP-18032-NP, Revision 0, "Calculation of  
Mixed Core Safety Limit Minimum Critical Power Ratio," Topical Report  
Westinghouse Electric Company  
(Non-Proprietary)**

**December 2017**

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