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U.S. Nuclear Regulatory Commission
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Project No.: 700
Our ref: LTR-NRC-06-12
24 March 2006

Subject: Response to Request for Additional Information Regarding the CROSSFLOW Ultrasonic Flow Measurement System (Proprietary / Non-proprietary)

References: 1. Email, G. S. Shukla (NRC) to J. A. Gresham (Westinghouse), "NRC Staff Assessment of the AMAG UFM's (Response requested)", February 13, 2006 with attached White Paper entitled "Some Necessary and Sufficient Conditions for the Application of the AMAG CROSSFLOW Computational Methodology to the Measurement of the Mean Feedwater Flow"

On February 13, 2006, the Nuclear Regulatory Commission (NRC) sent Westinghouse Electric Company LLC (Westinghouse) a Request for Additional (RAI, Reference 1) regarding a review of the CROSSFLOW Ultrasonic Flow Measurement System. This letter provides both Proprietary (Enclosure 1-P) and Non-proprietary (Enclosure 2) responses to the NRC RAIs. Westinghouse identified proprietary information included in some RAI statements, we have marked such information where it was present, as is done for all proprietary information contained in the RAI responses.

Also enclosed are:

1. One (1) copy of the Application for Withholding, AW-06-2119 with Proprietary Information Notice.
2. One (1) copy of Affidavit, AW-06-2119.

This submittal contains Westinghouse proprietary information consisting of trade secrets, commercial or financial information which we consider privileged or confidential pursuant to 10 CFR Section 2.390. Therefore, it is requested that the Westinghouse proprietary information attached hereto be handled on a confidential basis and be withheld from public disclosure. Further, it should also be noted that some of the NRC RAIs transmitted by Reference 1 also included Westinghouse proprietary information in their statements. Where this occurred, we have appropriately marked the proprietary information with brackets. This information should be removed before the letter is entered in the Public Document Room.

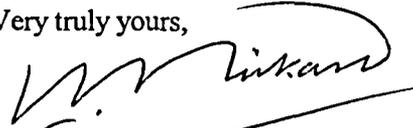
This material is for your internal use only and may be used solely for the purpose for which it is submitted. It should not be otherwise used, disclosed, duplicated, or disseminated, in whole or in part, to any other person or organization outside the Office of Nuclear Reactor Regulation without the expressed prior written approval of Westinghouse.

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Correspondence with respect to any Application for Withholding should reference AW-06-2119 and should be addressed to:

Westinghouse Electric Company LLC
Attn: James A. Gresham, Manager
Regulatory Compliance and Plant Licensing
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.

James A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Enclosures: As stated

cc: G. S. Shukla (NRC)

bcc: V. Askari (AMAG - Ontario)
R. Bastien, (Nivelles, Belgium)
C. B. Brinkman (Rockville)
J. Eversley (AMAG - Ontario)
S. L. Fiori (ECE 4-7A), w/affidavit
C. T. French (Windsor)
S. W. Lurie (Windsor)
B. F. Maurer (ECE 4-7A)
W. M. Turkowski (Windsor)
NRC LTR File, 1L, 1A



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Our ref: AW-06-2119

24 March 2006

**APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE**

Subject: Response to Request for Additional Information Regarding the CROSSFLOW Ultrasonic Flow Measurement System (Proprietary / Non-proprietary)

Reference: Letter, J. A. Gresham (Westinghouse) to USNRC Document Control Desk, "Response to Request for Additional Information Regarding the CROSSFLOW Ultrasonic Flow Measurement System (Proprietary / Non-proprietary)," LTR-NRC-06-12, March 24, 2006

The Application for Withholding is submitted by Westinghouse Electric Company LLC, a Delaware limited liability company ("Westinghouse"), pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Commission's regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary material for which withholding is being requested is identified in the proprietary version of the subject report. In conformance with 10 CFR Section 2.390, Affidavit AW-06-2119 accompanies this Application for Withholding, setting forth the basis on which the identified proprietary information may be withheld from public disclosure.

Accordingly, it is respectfully requested that the subject information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to this application for withholding or the accompanying affidavit should reference AW-06-2119 and should be addressed to the undersigned.

Very truly yours,

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

for James A. Gresham, Manager
Regulatory Compliance and Plant Licensing

AFFIDAVIT

STATE OF CONNECTICUT:

ss: TOWN OF WINDSOR

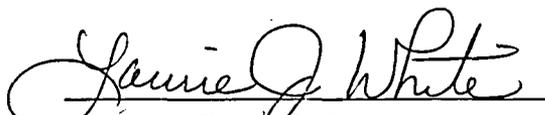
COUNTY OF HARTFORD:

Before me, the undersigned authority, personally appeared Ian C. Rickard, 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, a Delaware limited liability company ("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:



I. C. Rickard, Licensing Project Manager
Systems and Safety Analysis, Nuclear Services
Westinghouse Electric Company, LLC

Sworn to and subscribed
before me this 24th day of March, 2006.



Notary Public

My commission expires: 8/31/09

- (1) I, I. C. Rickard, am the Licensing Project Manager, Systems and Safety Analysis, in Nuclear Services, of the Westinghouse Electric Company LLC, a Delaware limited liability company ("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 rulemaking proceedings, and am authorized to apply for its withholding on behalf of the Westinghouse Electric Company.
- (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 the Westinghouse Electric Company 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 constitutes Westinghouse policy and provides 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 which 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 "Response to Request for Additional Information Regarding the CROSSFLOW Ultrasonic Flow Measurement System (Proprietary/Non-proprietary)", March 24, 2006, for submittal to the Commission, being transmitted by Westinghouse Electric Company letter (LTR-NRC-06-12) and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse Electric Company LLC is expected to be applicable in other licensee submittals in response to certain NRC requirements for justification for implementing the CROSSFLOW Ultrasonic Flow Measurement System in support of Appendix K type power uprates.

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

- (a) Implement the CROSSFLOW Ultrasonic Flow Measurement System in support of Appendix K type power uprates.
- (b) Support licensee in implementing the CROSSFLOW Ultrasonic Flow Measurement System in support of Appendix K type power uprates.

Further this information has substantial commercial value as follows:

- (a) Westinghouse plans to sell the use of similar information to its customers for purposes of meeting NRC requirements for licensing documentation.
- (b) Westinghouse can sell support and defense of the CROSSFLOW Ultrasonic Flow Measurement System in support of Appendix K type power uprates.
- (c) 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 for developing the enclosed improved core thermal performance methodology.

Further the deponent sayeth not.

Westinghouse Electric Company LLC

**Non-Proprietary Response to Request for Additional Information
Regarding the CROSSFLOW Ultrasonic Flow Measurement System**

Westinghouse/AMAG Response to Yuri Orechwa White Paper

The Nuclear Regulatory Commission (NRC) staff has completed an assessment to address whether the cross-correlation technique, employed by the CROSSFLOW Ultrasonic Flow Measurement System (e.g. CROSSFLOW), could capture the necessary information in the velocity field to allow for the prediction of feedwater flow rate within the claimed accuracy and precision. This assessment is documented in a White Paper prepared by Yuri Orechwa of the NRC Reactor Systems Branch staff and was provided to Westinghouse Electric Company LLC (Westinghouse) and the Advanced Measurement Analysis Group, Inc. (AMAG) via email on February 13, 2006². The assessment essentially consists of a theoretical review of the fluid dynamic aspects of turbulent flow with a summarized conclusion at the end of the assessment. The Westinghouse/AMAG response to this assessment is divided in two parts. The first part directly addresses the points in the turbulent flow theoretical modeling discussion and the second part provides an answer to each NRC assessment conclusion.

I. Response to Turbulent Flow Theoretical Modeling Discussion

Basic Principle of Operation and Performance in Fully Developed Flow Conditions

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Basic Principle of Operation, Performance, and Calibration in Non-Fully Developed Flow Conditions

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² Email, G. S. Shukla (NRC) to J. A. Gresham (Westinghouse), "NRC Staff Assessment of the AMAG UFM's (Response requested)", February 13, 2006 with attached White Paper entitled "Some Necessary and Sufficient Conditions for the Application of the AMAG CROSSFLOW Computational Methodology to the Measurement of the Mean Feedwater Flow".

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] a.c

Calibration in Non-Fully Developed Flow Conditions

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II. Response to NRC Staff Assessment Conclusions

The NRC staff assessment resulted in five conclusions which are individually addressed below.

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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).