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Project No.: 700
Our ref: LTR-NRC-06-36

June 1, 2006

**Subject: Applied Research Laboratory/Pennsylvania State University Investigations
Concerning the CROSSFLOW Technology (Proprietary)**

- References: 1) D. M. Jenkins, P. D. Lysak, D. E. Capone, W. L. Brown, V. Askari, "Ultrasonic Cross-correlation Flow Measurement: Theory, Noise Contamination Mechanisms, and a Noise Mitigation Technique," Proceedings of ICONE14, 2006 14th International Conference on Nuclear Engineering. Miami, FL July 17-30, 2006
2) Peter D. Lysak, "Analytical Model for an Ultrasonic Cross-Correlation Flow Meter," Applied Research Laboratory, Pennsylvania State University, May 2006

Westinghouse Electric Company LLC (Westinghouse) has been working with the Pennsylvania State University, Applied Research Laboratory (PSU/ARL) since 2004 in order to advance our understanding of the CROSSFLOW Ultrasonic Flow Measurement System cross-correlation technology and to assist us in responding to Nuclear Regulatory Commission (NRC) questions on the CROSSFLOW instrument. PSU/ARL was selected because of their expertise in hydro-acoustics, hydraulics, and analytical modeling of these phenomena. PSU/ARL also has laboratory facilities which are ideally suited for investigating ultrasonic flow measurement technology. PSU/ARL was contracted to provide an independent technical evaluation of the technology as well as assist us in evaluating signal contamination (noise) mitigation, develop an analytical model of the CROSSFLOW instrument and to conduct laboratory testing of the system performance.

Conclusions from the signal contamination research were presented to the NRC staff during the technical meetings held at the Westinghouse Rockville office in October 2005. In addition, a technical paper to be published in July 2006 concerning this work is provided as an attachment to this letter (Reference 1).

On April 28, 2006, Westinghouse and Advanced Measurement Analysis Group, Inc. (AMAG) met with the NRC staff to discuss CROSSFLOW related activities being performed at PSU/ARL. During the meeting members of the PSU/ARL staff discussed the CROSSFLOW analytical model developed for Westinghouse. PSU/ARL has documented this work in a report that is also being provided as an attachment to this letter (LTR-NRC-06-36 P-Attachment) (Reference 2).

The CROSSFLOW performance and accuracy testing is still in progress at PSU/ARL and is scheduled to be completed this summer. These tests will provide measurements taken with laser-doppler velocimetry (LDV) that provide a look inside the pipe with and without a flow disturbance. This data will be useful for evaluating any flow measurement technology. Additionally, comparisons of the CROSSFLOW instrument to other high precision instruments will be obtained. Preliminary results from these tests demonstrate an overall flow measurement accuracy better than 0.5% for the CROSSFLOW instrument in ideal conditions, which is consistent with the value quoted in the Topical Report. Results from this test program will be provided to the NRC staff when they are available.

Information in this record was deleted in
accordance with the Freedom of Information Act.
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FOI/PA 2008-0096

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Note that the PSU/ARL report (LTR-NRC-06-36 P-Attachment) (Reference 2) is considered by Westinghouse to be preliminary until all testing is completed this summer. Consequently, it is being transmitted as proprietary in its entirety; a non-proprietary version of this document does not exist. The final version of the report is expected to be used extensively in the revised CROSSFLOW topical report at which time appropriated proprietary markings and non-proprietary versions will be available.

Also enclosed is:

1. One (1) copy of the Application for Withholding, AW-06-2158 with Proprietary Information Notice.
2. One (1) copy of Affidavit, AW-06-2158.

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.

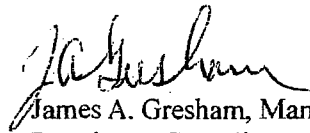
This material is for your internal use only and may be used solely for the purpose for which it is submitted. It should not be otherwise used, disclosed, duplicated, or disseminated, in whole or in part, to any other person or organization outside the Office of Nuclear Reactor Regulation without the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

Correspondence with respect to any Application for Withholding should reference AW-06-2158 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

If you have any further questions regarding this matter, please do not hesitate to contact me at (412) 374-4643.

Very truly yours,



James A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Attachment: As stated

cc: A. G. Howe (NRC, w/o Attachments)
J. A. Nakoski (NRC, w/o Attachments)
G. S. Shukla (NRC, w/ Attachments)

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NRC LTR File, 1L, 1A

Pages 4 through 51 redacted for the following reasons:

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