

PROPRIETARY



Nuclear Innovation
North America LLC
4000 Avenue F, Suite A
Bay City, Texas 77414

May 30, 2012
U7-C-NINA-NRC-120042
10 CFR 2.390

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Supplemental Response to Request for Additional Information

The NRC Staff requested during several phone conversations that Nuclear Innovation North America LLC (NINA) provide additional Flow Induced Vibration information supporting review of the Combined License Application (COLA). Attached is a supplemental response to a Request for Additional Information (RAI) related to COLA Part 2, Tier 2, Section 3.9.2 that address the Staff's requests.

Attachments 2 and 3 provide the revised or supplemental information to RAI question 03.09.02-51. Where there are COLA markups, they will be made at the first routine COLA update following NRC acceptance of the RAI response.

Please note that the information contained in Attachment 2 is considered proprietary to Westinghouse Electric Company, LLC and is supported by an affidavit signed by Westinghouse, the owner of the information. Attachment 3 contains the redacted (non-proprietary) version of this response. Attachment 1 provides the Westinghouse Application for Withholding Letter CAW-12-3484 and accompanying affidavit, Proprietary Information Notice, and Copyright Notice. 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 Section 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. Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse Affidavit should reference CAW-12-3484 and should be addressed to J.A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.

STI 33552902

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NRD

When separated from the proprietary material (Attachment 2), this letter is not proprietary.

There are no commitments in this letter.

If you have any questions, please contact Scott Head at (361) 972-7136 or Bill Mookhoek at (361) 972-7274.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 5-30-2012



Mark McBurnett
Chief Executive Officer and Chief Nuclear Officer
Nuclear Innovation North America LLC

jep

Attachments:

1. Westinghouse Application for Withholding letter CAW-12-3484 and Accompanying Affidavit, Proprietary Information Notice and Copyright Notice
2. RAI 03.09.02-51, Supplement 1 (Proprietary)
3. RAI 03.09.02-51, Supplement 1 (Redacted Non-Proprietary)

cc: w/o attachment except*
(paper copy)

(electronic copy)

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Attachment 1

Westinghouse Application for Withholding letter CAW-12-3484
and Accompanying Affidavit, Proprietary Information Notice
and Copyright Notice



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WEC-NINA-2012-0034

CAW-12-3484

May 25, 2012

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: WEC-NINA-2012-0034 P-Enclosure, "South Texas Project Units 3 & 4 Response to RAI 03.09.02-51 Supplement 1 for the ACSTIC2 NRC Audit" (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced document is further identified in Affidavit CAW-12-3484 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 Nuclear Innovation North America (NINA).

Correspondence with respect to the proprietary aspects of this application for withholding or the accompanying affidavit should reference CAW-12-3484 and should be addressed to J. A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.

Very truly yours,

A handwritten signature in black ink, appearing to read 'B. F. Maurer'.

B. F. Maurer, Manager
ABWR Licensing

Enclosures

cc: T. Tai (NRC TWFN 6 D38M)

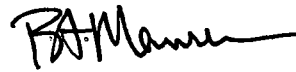
AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

SS

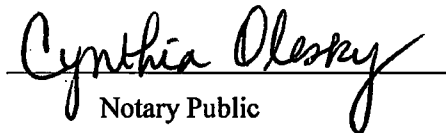
COUNTY OF BUTLER:

Before me, the undersigned authority, personally appeared B. F. Maurer, 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:



B. F. Maurer, Manager
ABWR Licensing

Sworn to and subscribed before me
this 25th day of May 2012



Notary Public

COMMONWEALTH OF PENNSYLVANIA

Notarial Seal
Cynthia Olesky, Notary Public
Manor Boro, Westmoreland County
My Commission Expires July 16, 2014
Member, Pennsylvania Association of Notaries

- (1) I am Manager, ABWR 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 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 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 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 WEC-NINA-2012-0034 P-Enclosure, "South Texas Project Units 3 & 4 Response to RAI 03.09.02-51 Supplement 1 for the ACSTIC2 NRC Audit" (Proprietary) for submittal to the Commission, being transmitted by Nuclear Innovation North America (NINA) letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with NRC Audit of the ACSTIC2 computer code for South Texas Project Units 3&4.

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

- (a) Assist the customer in obtaining NRC review of the ACSTIC2 computer code as part of the FIV program for South Texas Project 3&4.

Further this information has substantial commercial value as follows:

- (a) Westinghouse plans to sell the use of this information to its customers for purposes of plant specific FIV analysis for ABWR licensing basis applications.
- (b) Its use by a competitor would improve their competitive position in the design and licensing of a similar product for ABWR FIV analysis.
- (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 evaluations 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.

RAI 03.09.02-51, Supplement 1**QUESTION:**

This is a follow-up to Question 3.9.1-2.

In WCAP-17371-P, Revision 2, the applicant assumed all 10 pumps running in phase to calculate the reactor internal pump forcing function from the Reference Japanese ABWR (RJ-ABWR) plant startup pressure measurement. In the January 18, 2012 audit for the ACSTIC2 computer code as part of the SRP Section 3.9.1 review, the staff discovered that the pump phasing information for the RJ-ABWR is not known. Using the RJ-ABWR pressure measurement and assuming all pumps running in phase to solve for the pump forcing function will yield the smallest pump forcing function. The applicant is requested to demonstrate that the pump forcing function used in the reactor internal component acoustic analysis is conservative.

SUPPLEMENTAL RESPONSE:

The response to RAI 03.09.02-51 (submitted in Nuclear Innovation North America (NINA) letter number U7-C-NINA-NRC-120035 dated April 25, 2012, ML12121A402) stated that there were two additional portions of the response that would be provided as supplemental information, specifically: (a) information regarding the uncertainty in the single pump testing; and (b) a summary of changes that will be made in the next revision of WCAP-17371-P to incorporate a summary of pump forcing functions developed using single pump test data as described in the aforementioned RAI response. Also, as discussed in the NRC public teleconference with NINA held on May 2, 2012, NRC reviewers requested NINA to provide supplemental information supporting the statements provided in the aforementioned RAI response as it relates to pump frequencies as compared to measured response frequencies. Finally, as agreed in the NRC public teleconference with NINA held on April 18, 2012, this supplemental response also provides a markup of the changes that will be incorporated into the next revision of the STP 3&4 COLA to incorporate all six of the technical reports that were submitted by NINA and reviewed by NRC that support the flow-induced vibration (FIV) evaluation of the STP 3&4 reactor internals. Each of these supplemental items is provided as below.

Uncertainty in Single Pump Testing Results

Uncertainty associated with the pump test includes both biases and uncertainties associated with the test conditions and test hardware. An explicit uncertainty value for the tests used for the pump pulsation loads confirmatory analysis was not readily available for this response. However, specific information for the transducer used in the test, in conjunction with standard testing apparatus and processes, were used to develop a conservative uncertainty value. Values not available were obtained from known values for similar tests, or were estimated based on industry experience. [

]^{a,c} Biases were conservatively estimated to account for possible variation in the

temperature and the resulting effect on [

] ^{a,c} The resulting upper bound uncertainty based on this evaluation is conservatively estimated to be [] ^{a,c}, with the realistic uncertainty likely about half that value.

Changes for WCAP-17371-P

The following will be added in the next revision of WCAP-17371-P at the end of Subsection 6.1.2.3 to summarize the use of the alternate pump pulsation forcing function development using single pump test data to validate the conservatism of the forcing functions used in the analyses that were developed using the reference Japanese ABWR (RJ-ABWR) data.

As confirmation of the conservatism in the RJ-ABWR approach, pump forcing function amplitudes for the STP 3&4 RIPs were calculated by scaling the results of single pump testing performed for another pump (hereinafter referred to as the “reference pump” or “RP”). Both pumps are vertical single stage pumps. The RP forcing functions were independently determined from single pump scale model testing. To determine the full-scale RP forcing functions from this scale model test data, pump affinity relationships were used. In particular, the pump forcing functions were taken to be proportional to the dynamic pressure at the impeller tip. This in turn is proportional to the product of fluid density and the square of the product of impeller diameter and shaft rotational speed. This same scaling approach was used to estimate the single pump forcing function amplitudes for the STP 3&4 ABWR RIPs (RP-ABWR RIP). Comparison of the STP 3&4 RIP forcing function amplitudes calculated using the RJ-ABWR data (RJ-ABWR RIP) for Case 4 from Table 6.1.2.3-2, and the RIP forcing function amplitudes based on single pump test data (RP-ABWR RIP) determined as described above (Reference 6-20), is provided in Table 6.1.2.3-3.

**Table 6.1.2.3-3
Comparison of STP 3&4 ABWR Forcing Function Amplitudes**

Forcing Function Frequency	RJ-ABWR RIP (psi)	RP-ABWR RIP (psi)	Ratio RP/RJ
One-per revolution	[] ^{a,b,c}
Two-per revolution	[] ^{a,b,c}
First Blade-Passing	[] ^{a,b,c}

These results demonstrate that the forcing functions developed on the basis of single pump testing are bounded by the forcing functions developed using the RJ-ABWR data by a significant margin. The forcing functions based on RJ-ABWR data are used in the analysis of the various internals components. As demonstrated by the independent evaluation based on appropriately scaled single pump test data, the analysis approach using RJ-ABWR test data results in conservative pump forcing functions.

Reference to be added to the next revision of WCAP-17371-P:

6-20 Westinghouse Letter, LTR-A&SA-12-14, "STP-3/4 Pump Forcing Functions,"
05/17/2012. (Proprietary)

Supplemental Information on Pump Frequencies and Measured Response Frequencies

In the response to RAI 03.09.02-51, a discussion was provided regarding possible sources of other loads (under the heading "Additional Information" in the response). The supplemental information below provides specific data which supports the statements and conclusions made in the aforementioned response.

[

] ^{a,b,c}

References

1. Westinghouse Calculation Note CN-A&SA-11-50, Revision 1, "ACSTIC2-Data Comparisons"
2. Westinghouse Calculation Note CN-A&SA-11-03, Revision 0, "South Texas Project 3 and 4 Pump Forcing Function Reduction Factors"

a,c



Figure 1
P6 and P7 spectra for 100.3% flow and a pump rotational speed of 24.23 Hz

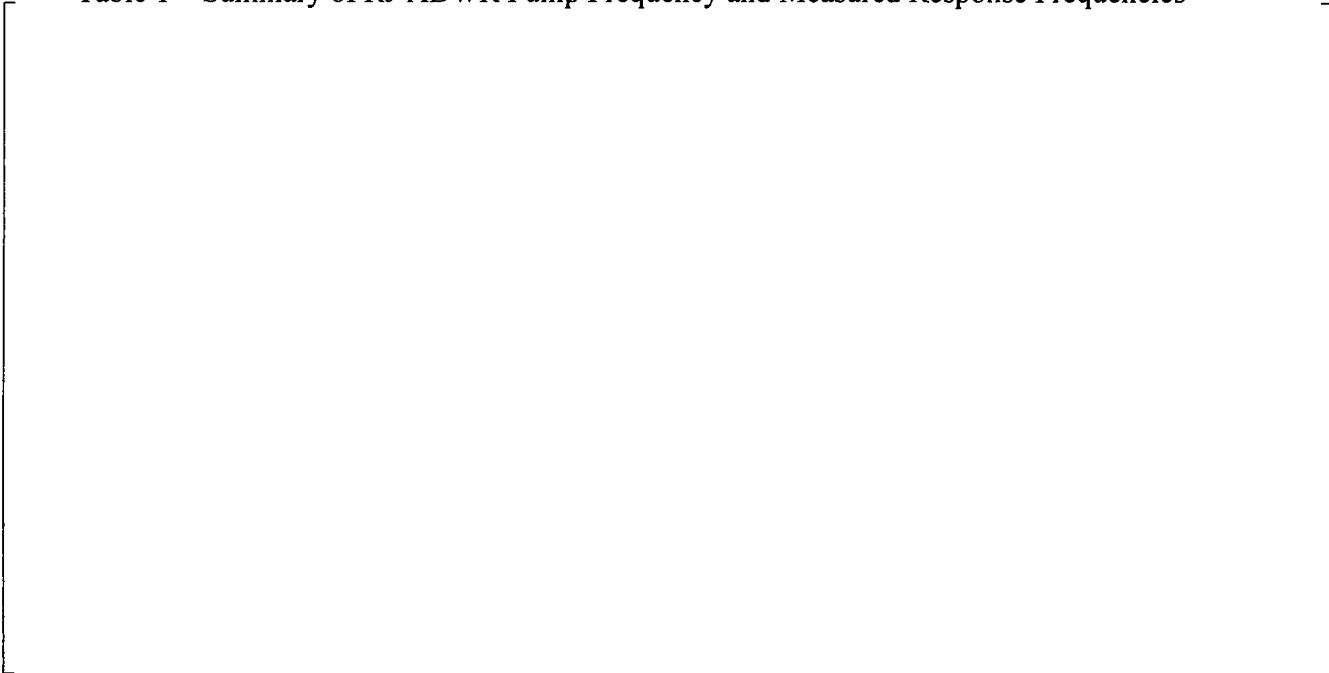
a,c

Figure 2
P6 and P7 spectra for 98% flow and a pump rotational speed of 19.1Hz

a,c

Figure 3
P6 and P7 spectra for 15.4% flow (natural circulation) and a pump rotational speed of 0
Hz

Table 1 – Summary of RJ-ABWR Pump Frequency and Measured Response Frequencies



a,c

Note: Frequencies are in Hz.

COLA Changes

The following markup shows changes that will be made in the next revision of the STP 3&4 COLA. Changes from COLA Revision 7 are indicated with gray shading.

3.9.7 COL License Information

3.9.7.1 Reactor Internals Vibration Analysis, Measurement and Inspection Program

The following standard supplement addresses COL License Information Item 3.27.

As described in Subsection 3.9.2.3, the STP 3 ABWR FIV Assessment Program (Ref. 3.9-13) provides the summary of the results of the vibration and stress analysis, and summary descriptions of the vibration and stress measurement program and inspection program. Additional detailed information on the results of the vibration and stress analysis program for the steam dryer and the non-dryer reactor internals are provided in Reference 3.9-25 and Reference 3.9-26, respectively, and steam dryer operating experience is summarized in Reference 3.9-27. Additional detailed information on the vibration and stress measurement program and inspection program are provided in Reference 3.9-28. The preliminary and final reports, which together summarize the results of the vibration analysis, measurement, and inspection programs, will be submitted to the NRC within 60 and 180 days, respectively, following the completion of vibration testing in accordance with the guidance in RG 1.20 Rev. 3.

3.9.8 References

- 3.9-13 "STP Unit 3 ABWR Prototype Reactor Internals Flow-Induced Vibration Assessment Program," WCAP-17256-P, Revision 3.
- 3.9-14 "STP Unit 4 Reactor Internals Flow-Induced Vibration Assessment Program," WCAP-17257-P, Revision 1.
- 3.9-25 "STP Unit 3 Steam Dryer Flow-Induced Vibration Assessment," WCAP-17385-P, Revision 3.
- 3.9-26 "South Texas Project Units 3 and 4 Reactor Internals Non-Dryer Component Flow-Induced Vibration Assessment," WCAP-17371-P, Revision 3.
- 3.9-27 "ABWR Dryer Operating Experience for STP Units 3 and 4," WCAP-17369-P, Revision 0.
- 3.9-28 "South Texas Project Unit 3 Comprehensive Vibration Assessment Program Measurement, Test, and Inspection Plan," WCAP-17370-P, Revision 3.