



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) 374-4011
e-mail: greshaja@westinghouse.com

Our ref: LTR-NRC-05-28

Attn: J. S. Wermiel, Chief
Reactor Systems Branch
Division of Systems Safety and Analysis

April 18, 2005

Subject: "Responses to NRC Request for Additional Information on WCAP-16260-P, Rev. 0, The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement" TAC No. MC3065 (Proprietary/Non-Proprietary)

Dear Mr. Wermiel:

Enclosed is a copy of Responses to NRC Request for Additional Information on WCAP-16260-P, Rev. 0, "The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement" TAC No. MC3065 (Proprietary/Non-Proprietary), dated April 2005.

Also enclosed is:

1. One (1) copy of the Application for Withholding, AW-05-1984 (Non-Proprietary) with Proprietary Information Notice.
2. One (1) copy of Affidavit (Non-Proprietary).

This submittal contains proprietary information of Westinghouse Electric Company LLC. In conformance with the requirements of 10 CFR Section 2.390, as amended, of the Commission's regulations, we are enclosing with this submittal an Application for Withholding 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 this affidavit or Application for Withholding should reference AW-05-1984 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

cc: F. M. Akstulewicz/NRR
A. C. Attard/NRR
B. J. Bennet/NRR
L. M. Feizollahi/NRR



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

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April 18, 2005

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: "Responses to NRC Request for Additional Information on WCAP-16260-P, Rev. 0, The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement" TAC No. MC3065 (Proprietary)

Reference: Letter from J. A. Gresham to J. S. Wermiel, LTR-NRC-05-28, dated April 18, 2005

The Application for Withholding is submitted by Westinghouse Electric Company LLC (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-05-1984 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-05-1984 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

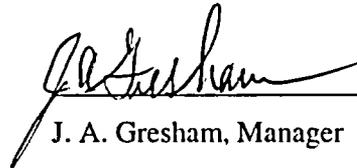
AFFIDAVIT

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 18th day
of April, 2005



Notary Public

Notarial Seal
Sharon L. Fiori, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires January 29, 2007
Member, Pennsylvania Association Of Notaries

- (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 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, "Responses to NRC Request for Additional Information on WCAP-16260-P, Rev. 0, The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement" (Proprietary), TAC No. MC3065, dated April 2005, for submittal to the Commission, being transmitted by Westinghouse letter (LTR-NRC-05-28) 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 Westinghouse's request for NRC approval of WCAP 16260-P, "The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement".

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

- (a) Obtain generic approval for the Westinghouse Methodology for Spatially Corrected Inverse Count Rate (SCICR) Methodology for Subcritical Reactivity Measurement.
- (b) Westinghouse can use this methodology to further enhance their licensing position over their competitor.

Further this information has substantial commercial value as follows:

- (a) Westinghouse plans to sell the use of the information to its customers for the purpose of enhancing plant operations.
- (b) Westinghouse can sell support and defense of SCICR.
- (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 methodology, measurements 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.

Responses to NRC Request for Additional
Information on WCAP-16260-P, "The Spatially
Corrected Inverse Count Rate (SCICR) Method for
Subcritical Reactivity Measurement"

TAC No. MC3065

April 2005

Westinghouse Electric Company LLC
P.O. Box 355
Pittsburgh, PA 15230-0355

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The following is provided as additional explanation regarding the response to NRC request for additional information (RAI) transmitted via LTR-NRC-05-3.

1. *The response to Question # 9 stated that a “non-conventional” analysis method was needed to effectively detect potential systematic bias in a core model.*

a. *Please elaborate further on this response since it is a non-conventional approach. Please state the basis of this non-conventional approach, and provide a reference to the documentation used to develop this non-conventional statistics.*

Response:

[

] ^{a.c}

- b. *Also, please describe/discuss why a conventional method could not be used to identify/define the model bias.*

Response:

Conventional statistical methods associated with characterizing the nature of deviations of measurements from a linear expectation function are primarily developed to investigate the hypothesis of the existence of a linear relationship between two or more parameters, and to quantify the certainty with which the linear hypothesis can be ascertained. A basic assumption of this process is that the factors contributing to uncertainty associated with the truth of the linear hypothesis are random in nature. This information is ultimately used to determine how accurately the dependent variable can be determined from a linear relationship derived from a set of measured data points. [

] a,c

2. *The same paragraph also discusses the ratio of mean deviation to RMS deviation.*

- a. *How and why does the ratio of the mean deviation to RMS deviation measure the model bias?*

Response:

The ratio of the mean deviation (MD) to the RMS difference between measured and predicted eigenvalues at each rod configuration statepoint during the SRWM process can be expressed by the formula:

a,c

a,c



a,c

b. *From existing in-house data, please provide a value for the standard deviation σ_b .*

Response:

The available in-house measurement data are those presented in Table 4-2 of the Topical Report. This data covers 13 operating cycles of 8 plants. If we use this data base to calculate the mean value of MD and its standard deviation σ_b , we find

[]^{a,c}

The average of the RMS values of the data analysis for the 13 operating cycles of the 8 plants in Table 4-2 of the SCICR Topical Report is []^{a,c}. The ratio of []^{a,c} which is much smaller than the []^{a,c} criterion proposed in the Topical Report.

[]^{a,c}

3. *Please identify all typical bias components in the model and their magnitude.*

Response:

Theoretically the most likely model biases [

] ^{a,c}

4. *Please identify all typical sources of variability in the model and their magnitude.*

Response:

Theoretically the most likely [

] ^{a,c}

5. *Show by a working example, how these components are combined.*

Response:

[] ^{a,c}

6. Calculate the associated 95/95 tolerance limits for all four cases of application alluded to in the Topical Report, i.e., Rod worth, estimated criticality calculations, core shutdown margin, and negative reactivity calculations.

Response:

The magnitude of the value of MD/RMS for all four cases should be less than []^{a,c}

7. In reviewing the documentation provided to the staff during the staff's visit to Westinghouse last October, it is not clear to the staff as to how the signal selection process will work.

Response:

The SRWM data collection and processing methodology relies on several distinct Source Range (SR) detector input validation processes to ensure the SR range data adequately reflects the thermal neutron flux incident on the detector. The first process requires that the SR data input to the SRWM Data Analysis System (DAS) agree with the standard indications available to the reactor operator. Since the standard SR response indicators are required by the plant Tech Specs to be operable in order for the plant to make reactivity changes, verifying agreement with the standard indications is a fundamental SRWM DAS operability requirement.

The second process used to ensure the SR data is representative of the thermal neutron flux utilizes a Chi-Square evaluation of the measured SR data. [

] ^{a,c}

a,c

The measured Chi-Square value is evaluated against Chi-Square probability limits at the 5% and 95% values. If the measured data is not within the defined Chi-Square probability limits, the SR detector response cannot be used for SRWM application until the cause of the failure is corrected. This process ensures the SR detectors are operating properly prior to beginning reactivity change measurements.

The SR data collection and validation process during the reactivity change measurements also uses the Chi-Square process to ensure SR data afflicted with spurious noise inputs or systematically biased count data has a minimum probability of influencing the reactivity change measurement. [

] ^{a,c}

a,c

When the deviation of the mean of the individual data set values reaches the 0.5% level (σ_{μ}/μ_p), the data collection process for that control rod configuration is terminated. This process is repeated for each of the control rod configurations used in the SRWM reactivity change measurement process. This process ensures that the maximum statistical uncertainty in any measured SR data point used in the SRWM reactivity change calculations is less than or equal to 0.5%.

8. *How will the bias indication parameter, MD/RMS, change, if the bias magnitude is varied in the simulation study of Table 5-2 and Table 5-4? Provide one demonstration/example.*

Response:

The case of []^{a,c} in Tables 5-2 and 5-4 is taken as an example. [

] ^{a,c} The results are summarized in the following tables for the values of Mean Deviation (MD), Root Mean Square (RMS), and the ratio of MD/RMS respectively.

Table A. Values of MD

[] a,b,c

Table B. Values of RMS

[] a,b,c

Table C. Values of MD/RMS

[] a,b,c

As expected, the values of MD and RMS both decrease with the decrease of the magnitude of the biases. [

] a,c

9. *Please provide information regarding the proposed SRWM Low Power Physics Test (LPPT) Program review and acceptance criteria.*

Response:

1. SRWM/LPPT RESULTS EVALUATION CRITERIA

a,c

a.c

2. REFERENCES:

1. Nath, R. J. et. al., "Westinghouse Standard Operational Test Program for Initial Plant Startups", WCAP-7905, Rev. 1, November 1972 (Proprietary).
2. Camden, T. M., Palowitch, B. L., Tuley, C. R., "Rod Bank Worth Measurements Utilizing Rod Bank Exchange", WCAP-9864-A, May 1982 (Non-Proprietary).
3. Chao, Y. A., et. al., "Westinghouse Dynamic Rod Worth Measurement Technique", WCAP-13361-A, Rev. 1, October 1998 (Non-Proprietary).