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Our ref: LTR-NRC-06-29

May 22, 2006

Subject: SER Compliance with WCAP-16260-P-A "The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement" (Proprietary/Non-Proprietary)

Enclosed are copies of the Proprietary/Non-Proprietary SER Compliance with WCAP-16260-P-A "The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement."

Per SER Limitations and Conditions documented in the NRC's SER for WCAP-16260, Limitation and Condition # 3 specifies the following:

"3. The SCICR methodology can be applied for the following measurements:

To measure reactivity changes due to temperature changes while the core is close to criticality. This application needs to be demonstrated with measurement data and submitted to the NRC staff for review/audit."

The first application, of this methodology, for Vogtle Unit 2, has been done for Cycle 12. Enclosed are the reactivity changes due to temperature changes while the core is close to criticality which demonstrates the acceptability of the methodology.

Also enclosed is:

1. One (1) copy of the Application for Withholding, AW-06-2149 (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-06-2149 and should be addressed to B. F. Maurer, Acting Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,



B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

Enclosures

cc: F. M. Akstulewicz, NRR
A. C. Attard, NRR
G. S. Shukla, NRR
Southern Nuclear Operating Company c/o Vogtle Unit 2



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Our ref: AW-06-2149

May 22, 2006

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

Subject: SER Compliance with WCAP-16260-P-A "The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement" (Proprietary)

Reference: Letter from B. F. Maurer to NRC, LTR-NRC-06-29, dated May 22, 2006

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-06-2149 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-06-2149 and should be addressed to B. F. Maurer, Acting Manager of 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 "B. F. Maurer".

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

cc: F. M. Akstulewicz, NRR
A. C. Attard, NRR
G. S. Shukla, NRR
Pacific Gas & Electric Company c/o Diablo Canyon Unit 2

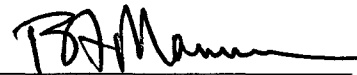
AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

SS

COUNTY OF ALLEGHENY:

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, Acting Manager

Regulatory Compliance and Plant Licensing

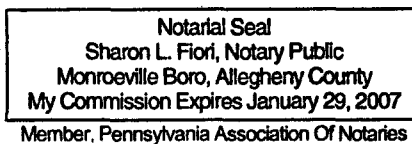
Sworn to and subscribed

before me this 22nd day

of May, 2006



Notary Public



- (1) I am Acting 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 rulemaking 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 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 in SER Compliance with WCAP-16260-P-A "The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement," (Proprietary), for submittal to the Commission, being transmitted by Westinghouse letter (LTR-NRC-06-29) and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse Electric Company is for NRC review/audit.

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

- (a) Demonstrate the applicability of the SCICR Methodology for a specific plant.
- (b) Assist customers in implementing an improved measurement technique.

Further this information has substantial commercial value as follows:

- (a) Westinghouse can use this methodology to further enhance their licensing position over their competitors.
- (b) Assist customers to obtain license changes.

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 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.

**SER Compliance with WCAP-16260-P-A
“The Spatially Corrected Inverse Count Rate (SCICR)
Method for Subcritical Reactivity Measurement”
(Non-Proprietary)**

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MTC Measurement Using SRWM

Introduction and Background

On August 11, 2005, the NRC provided Westinghouse with the Final Safety Evaluation for Topical Report (TR) WCAP-16260-P, "The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement". Section 6, Limitations and Conditions, Item 3 of the Final Safety Evaluation states the following:

"3. The SCICR methodology can be applied for the following measurements:

- To measure reactivity changes due to temperature changes while the core is close to criticality. This application needs to be demonstrated with measurement data and submitted to the NRC staff for review/audit."

In accordance with the Final Safety Evaluation, this letter is submitted as a demonstration of the SCICR methodology for measuring Moderator Temperature Coefficient (MTC).

As a part of the Westinghouse Subcritical Physics Test Program, the Moderator Temperature Coefficient (MTC) is determined via the Subcritical Rod Worth Measurement Data Analysis System (SRWM-DAS) Isothermal Temperature Coefficient (ITC) calculation option. The determination of MTC can be broken down into five basic steps. They are:

1. Based on the Source Range count rates recorded at each control and shutdown bank configuration statepoint, determine the Inverse Count Rate Ratio (ICRR). [$\frac{C_{SR}}{C_{SR0}}$]
2. Determine a [$\frac{C_{SR}}{C_{SR0}}$]
3. From the relationship described in step 2, determine K_{eff} from the [$\frac{C_{SR}}{C_{SR0}}$]
4. Initiate a cooldown of [$\frac{C_{SR}}{C_{SR0}}$] and determine the ITC from the measured changes in K_{eff} at the nominal and reduced temperature divided by the change in reactor coolant temperature.
5. Calculate MTC by summing the measured ITC, the predicted Doppler Temperature Coefficient (DTC), and the cycle burnup correction.

This letter provides an in-depth description of the process by which the SRWM-DAS is used to determine MTC.

Step 1: Determination of Measured ICRR

During the rod worth measurement phase of Subcritical Physics Tests (SPT), count rates from the Source Range detectors are recorded by the SRWM-DAS. Once each statepoint has been recorded and an [$\frac{C_{SR}}{C_{SR0}}$], the SRWM-DAS will calculate measured ICRR values and correct for according to the following equation:

$$\left[\begin{array}{c} \text{[unclear]} \\ \text{[unclear]} \end{array} \right]^{a,c}$$

where: [unclear]

$$]^{a,c}$$

In this equation, "(c)" refers to the current case and "R" refers to the reference case. [unclear]
 $]^{a,c}$. The result of this equation is an ICRR with two applied corrections.

The first correction to the ICRR is made for [unclear]
 $]^{a,c}$.

The second correction applied to the ICRR accounts for [unclear]

$$]^{a,c}$$

Step 2: [unclear] $]^{a,c}$

Once the measured ICRR has been determined for each statepoint, a [unclear]
 $]^{a,c}$ can be determined using the following equation:

$$\left[\begin{array}{c} \text{[unclear]} \\ \text{[unclear]} \end{array} \right]^{a,c}$$

where: [unclear]

$$]^{a,c}$$

Step 3: Determination of Measured K_{eff}

The relationship determined in Step 2 between []^{a, c} provides a way to determine the K_{eff} value for each statepoint. The SRWM-DAS is used to relate a measured ICRR to its corresponding K_{eff} value. However, the specific statepoint conditions are not exactly the same as the reference conditions. Consequently, the K_{eff} value must be adjusted for the reactivity effects associated with the differences in temperature and boron concentration from the reference case. The following equation is used to determine the measured K_{eff} :

$$\left[\right]^{a, c}$$

where: []

] ^{a, c}

Step 4: RCS Cooldown and Measured ITC

The final statepoint used for rod worth measurement is for the ARO, hot no-load temperature condition. In order to calculate ITC, however, one additional statepoint is necessary. This statepoint is collected with all rods still at the full out position, after the RCS has been cooled by []^{a, c}. Data from both of these statepoints is used in the following equation determined the measured ITC:

$$\left[\right]^{a, c}$$

where: []

] ^{a, c}

The ITC measured during subcritical physics tests for []^{a, c}.
The predicted value for ITC was []^{a, c}. The difference of []^{a, c} was well within the ± 2.0 pcm/ $^{\circ}$ F review criteria.

Step 5: Determination of Measured MTC

Once the measured ITC has been established, the measured MTC can be determined using the following equation:

$$\left[\frac{\text{MTC}}{\text{ITC}} \right]^{a, c}$$

The []^{a, c} are supplied by the Westinghouse via the Nuclear Design report. For []^{a, c}

$$\left[\frac{\text{MTC}}{\text{ITC}} \right]^{a, c}$$

The acceptance criteria for MTC is that the measured MTC is less than or equal to the Technical Specification limit for MTC. For []^{a, c}, the Technical Specification limit for MTC was 7.0 pcm/°F. Therefore, the measured MTC of 2.225 pcm/°F passed the acceptance criteria.

Summary

The Final Safety Evaluation for the SCICR Topical Report requires that use of the SCICR methodology to measure MTC must be demonstrated with measurement data and submitted to the NRC for review/audit. The initial application of Subcritical Physics Tests at []^{a, c} demonstrated the validity of a subcritical MTC measurement.

Isothermal temperature coefficient data were obtained at the ARO configuration only. The measurement was performed by reducing RCS temperature approximately []^{a, c}. The measured []^{a, c}

[]^{a, c}. The measured value of the ARO ITC after adjustment to the ARO critical boron concentration was []^{a, c} which agreed within the required ± 2 pcm/°F of the design prediction of []^{a, c}. This information is summarized on the SRWM-DAS ITC Measurement Results printout, which is attached to this letter.

Once the ITC was determined, the MTC was calculated by adding the cycle burnup correction and subtracting the Doppler Temperature Coefficient. The result was a measured MTC of 2.225 pcm/°F, which was less than the Technical Specification limit of 7.0 pcm/°F.

In conclusion, the SCICR methodology was utilized at []^{a, c} startup to safely and accurately measure the Moderator Temperature Coefficient.

a, c

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).

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