



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) 374-3846  
e-mail: greshaja@westinghouse.com

LTR-NRC-10-40

July 9, 2010

Subject: Information Satisfying WCAP-16500-P-A SER Condition 4 (Proprietary/Non-Proprietary)

Reference: Letter from Ho K. Nieh (NRC) to J. A. Gresham (Westinghouse), "Final Safety Evaluation for Westinghouse Electric Company (Westinghouse) Topical Report (TR) WCAP-16500-P, Revision 0, 'CE [Combustion Engineering] 16x16 Next Generation Fuel [(NGF)] Core Reference Report' (TAC No. MD0560)," July 30, 2007

Enclosed are copies of the Proprietary and Non-Proprietary attachments providing information satisfying Condition 4 of the reference letter. It is requested that the NRC provide Westinghouse with a letter confirming that Condition 4 of the CE 16x16 Next Generation Fuel SER has been met and the growth model has been validated.

Also enclosed is:

1. One (1) copy of the Application for Withholding Proprietary Information from Public Disclosure, AW-10-2882 (Non-Proprietary) with Proprietary Information Notice and Copyright 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 Proprietary Information 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 the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference AW-10-2882, 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,

J. A. Gresham, Manager  
Regulatory Compliance and Plant Licensing

Enclosures

cc: E. Lenning, NRR  
H. Cruz, NRR  
P. Clifford, NRR

Add: E Lenning  
H. Cruz  
P. Clifford

TO ERLOS

T007  
NRR



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) 374-3846  
e-mail: greshaja@westinghouse.com

AW-10-2882

July 9, 2010

APPLICATION FOR WITHHOLDING PROPRIETARY  
INFORMATION FROM PUBLIC DISCLOSURE

Subject: LTR-NRC-10-40 P-Attachment, Information Satisfying WCAP-16500-P-A SER  
Condition 4 (Proprietary)

Reference: Letter from J. A. Gresham to Document Control Desk, LTR-NRC-10-40, dated July 9, 2010

The Application for Withholding Proprietary Information from Public Disclosure 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-10-2882 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 the proprietary aspects of the application for withholding or the accompanying affidavit should reference AW-10-2882 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

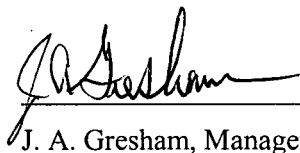
AFFIDAVIT

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:



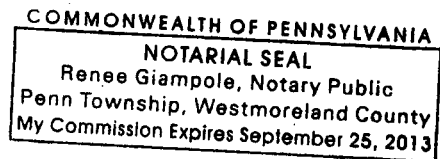
J. A. Gresham, Manager

Regulatory Compliance and Plant Licensing

Sworn to and subscribed before me  
this 9<sup>TH</sup> day of July 2010



Notary Public



- (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 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 LTR-NRC-10-40 P-Attachment, "Information Satisfying WCAP-16500-P-A SER Condition 4" (Proprietary), for submittal to the Commission, being transmitted by Westinghouse letter, LTR-NRC-10-40, 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 an NRC SER condition, and may be used only for that purpose.

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

- (a) Demonstrate the acceptability of CE 16x16 Next Generation Fuel.

- (b) Assist customers in implementing an approved fuel product.

Further this information has substantial commercial value as follows:

- (a) Westinghouse can use this fuel design 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 fuel design 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.



**Information Satisfying WCAP-16500-P-A SER Condition 4  
(Non-Proprietary)**

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

©2010 Westinghouse Electric Company LLC  
All Rights Reserved

## 1.0 Introduction

This report is provided to satisfy Condition 4 of Section 4.0 of the SER to topical report WCAP-16500-P-A (Reference 1), which addresses the evaluation of any additional [

] <sup>a,c</sup> ZIRLO<sup>®1</sup> guide thimble growth data to ensure the continued compliance of the CE 16x16 Next Generation Fuel (CE16NGF) design with its design requirements and to demonstrate the accuracy of the growth predictions.

Specifically, Condition 4 of the SER to Reference 1 states the following:

4. "Licensees shall demonstrate the accuracy of their growth predictions based upon measured data and this validation shall be ahead of the burnups achieved by batch implementation. The growth model validation (e.g. measured versus predicted) should be documented in a letter(s) to the NRC (SE Section 3.2.1)."

The pertinent information in the referenced SE section states the following:

"An SE condition on the timely validation of these guide tube growth predictions is required to ensure that the design requirements are satisfied. Similar to the NRC staff's approval of Optimized ZIRLO, Westinghouse shall demonstrate the accuracy of its growth predictions based upon measured data and this validation shall be ahead of the burnups achieved by batch implementation."

The conclusions presented below are that the growth model is acceptable to evaluate axial clearances between the CE16NGF assemblies and the reactor internals to burnups consistent with the current peak rod licensing limit of 62 GWD/MTU (Reference 1). Based on these results, Westinghouse concludes that the requirements associated with Condition 4 of the SER in Reference 1 have been satisfied.

## 2.0 Fuel Assembly Growth Data and Model Predictions

### 2.1 Advanced Fuel Design (AFD) in a Foreign CE-NSSS Reactor

The available growth data associated with AFD LTAs that employed [ ] <sup>a,c</sup> ZIRLO guide thimbles and operated in a foreign CE-NSSS reactor were presented in Reference 2. Those data are repeated in Figure 1 for comparison to their upper and lower 95% model predictions and the CE16NGF data. Figure 1 shows good agreement between the AFD growth data and the model predictions with the growth data being within the upper and lower 95% predictions.

### 2.2 CE16NGF Design

The four CE16NGF LTAs have completed their third cycle of operation and have been discharged. Each of the four LTAs has been measured for length after each cycle of operation, as have four fuel assemblies from the first full region of the CE16NGF design after one cycle of

---

<sup>1</sup> ZIRLO<sup>®</sup> is a registered trademark of Westinghouse Electric Company LLC in the United States and may be registered in other countries throughout the world. All rights reserved. Unauthorized use is strictly prohibited

operation. The growth data of the LTAs after one and two cycles of operation were presented in Reference 2 along with the corresponding upper and lower 95% model predictions. Separate model predictions for CE16NGF and AFD are needed since the model explicitly accounts for the respective axial stresses in the guide tubes that result from each design's holddown spring force and uplift force on the spacer grid assemblies.

As shown in Figure 1, the measured growths of the four CE16NGF LTAs are very consistent and are [ ]<sup>a,c</sup>. Figure 1 also shows that the growths of the full region assemblies are [ ]<sup>a,c</sup>, but comparable to, that of the LTAs and that the data for the full region assemblies are [ ]<sup>a,c</sup> 95% prediction. This observation demonstrates that the [ ]<sup>a,c</sup> ZIRLO growth model of Reference 1 [ ]<sup>a,c</sup> the best estimate growth data for the CE16NGF design. The trend of the model predictions with exposure is consistent with that of the growth data. These conclusions are further supported by Figure 2, which plots the measured growth data for the CE16NGF designs versus the corresponding best estimate growth predictions.

### 3.0 Assessment

The [ ]<sup>a,c</sup> of the CE16NGF growth data demonstrates that the use of the model is conservative for evaluating compliance with axial clearances between the CE16NGF assemblies and the reactor internals. The AFD data further supports the use of the growth model for the CE16NGF bundle clearances since the AFD measured growths are greater relative to predictions than the CE16NGF data and the AFD data are still bounded by the upper 95% model prediction. The burnup of the third cycle AFD assemblies is comparable to the peak assembly burnups in recent and upcoming cycles where full region implementation of the CE16NGF design has taken place. In addition, the burnup of the third cycle AFD assemblies is [ ]<sup>a,c</sup> of the assembly burnup associated with the peak rod burnup licensing limit of 62 GWD/MTU in Reference 1. Based on the burnup level of the AFD data, the fact that the measured growths of the CE16NGF bundles relative to predictions are [ ]<sup>a,c</sup> the AFD bundles, and the trend of both the AFD and CE16NGF data, it is concluded that the growth model for [ ]<sup>a,c</sup> ZIRLO guide thimbles in Reference 1 is acceptable to confirm axial clearance between the CE16NGF fuel assemblies and the reactor internals to the 62 GWD/MTU peak fuel rod burnup limit of Reference 1.

While the model's [ ]<sup>a,c</sup> of bundle growth is conservative for evaluations of axial clearances of the fuel and internals, it is [ ]<sup>a,c</sup> for shoulder gap evaluations. However, shoulder gap calculations were done with conservative estimates of bundle growth relative to the growth data [ ]<sup>a,c</sup> and demonstrate substantial shoulder gap clearance at the peak fuel rod burnup limit of 62 GWD/MTU (lower 95% prediction of [ ]<sup>a,c</sup>).

### 4.0 Summary

A comparison of the CE16NGF growth data to model predictions shows that the model [ ]<sup>a,c</sup> the best estimate growth data with the trend of the predictions being consistent with the growth data and with no indication of anomalous behavior. The evaluation of these data concludes that the continued use of the growth model for [ ]<sup>a,c</sup> ZIRLO guide thimbles in Reference 1 is acceptable to confirm axial clearance between the CE16NGF fuel assemblies

and the reactor internals to burnups consistent with the current peak rod licensing limit of 62 GWD/MTU (Reference 1). The evaluation also concludes that the shoulder gap associated with the CE16NGF design is acceptable to the same burnup level.

Based on the above results, Westinghouse concludes that the requirements associated with Condition 4 of the SER in Reference 1 have been satisfied.

## **5.0 References**

1. WCAP-16500-P-A, Revision 0, "CE 16x16 Next Generation Fuel Core Reference Report", August 2007.
2. Letter from J. A. Gresham (Westinghouse) to USNRC, "Compliance with WCAP-16500-P-A SER Condition 4 (Proprietary/Non-Proprietary)", LTR-NRC-09-28, May 19, 2009.

**Figure 1**

**Comparisons of Predictions to Measured Growths with [ ]<sup>a,c</sup> ZIRLO Guide Thimbles**



**Figure 2**

**Predicted Best Estimate Growths versus Measured Growths for CE16NGF**

