



Westinghouse Electric Company  
Engineering Services Integration  
2000 Day Hill Road  
P.O. Box 500  
Windsor, Connecticut 06095  
USA

25 June, 2002  
LTR-NRC-02-29

Project No. 700

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

**SUBJECT: SUBMITTAL OF TOPICAL REPORT WCAP-15836-P, REVISION 0, FUEL ROD  
DESIGN METHODS FOR BOILING WATER REACTORS – SUPPLEMENT 1  
[Enclosure 1-P Contains Westinghouse Proprietary Class 2 Material]**

References: 1. CENPD-285-P-A, "Fuel Rod Design Methods for Boiling Water Reactors",  
July 1996  
2. CENPD-287-P-A, "ABB Fuel Assembly Mechanical Design Methodology for  
BWR Fuel", July 1996  
3. CENPD-300-P-A, "Reference Safety Report for Boiling Water Reactor Reload  
Fuel", July 1996

This letter submits topical report WCAP-15836-P, Revision 0 for Nuclear Regulatory Commission (NRC) review and acceptance. WCAP-15836-P describes improved versions of the computer codes used to evaluate boiling water reactor (BWR) fuel rod performance under varying pressure, power, temperature, and irradiation conditions for design and licensing applications which were described in CENPD-285-P-A (Reference 1). Reference 1 is the original version of this topical report. CENPD-287-P-A (Reference 2) documents the Westinghouse BWR fuel rod design bases and methodologies used to apply these computer codes for design and licensing applications. CENPD-300-P-A (Reference 3) documents the Westinghouse reload licensing analyses methodologies which includes integration of the mechanical analyses of the fuel assembly and fuel rods with the overall reload licensing analysis.

WCAP-15836-P is Supplement 1 to CENPD-285-P-A (Reference 1) and presents the latest versions of the BWR computer codes (i.e., STAV7.2, VIK-3, and COLLAPS-3.3D). This supplement provides a description of the revised models implemented in the latest code versions relative to the original code descriptions along with the qualification actions which demonstrate that these codes are appropriately qualified for fuel rod design and safety analyses. In the case of STAV, the revised models address the issues identified in the NRC's Safety Evaluation Report (SER) for CENPD-285-P-A. STAV has been updated to improve the treatment of extended burnup fuel performance with a number of model changes. VIK has been improved to allow execution in conjunction with STAV to provide cladding stress evaluations as a function fuel rod burnup based on materials properties and STAV-calculated parameters. COLLAPS has been updated with revised cladding creep correlations consistent with those in

the updated STAV code as well as with an option to treat finite length axial gaps between pellets.


Based on the adoption of these enhanced tools, it is Westinghouse's aim to extend the current rod-average burnup limit of 50,000 MWd/MTU to 62,000 MWd/MTU. In support of this burnup extension Westinghouse will submit, in addition to WCAP-15836-P, a supplement to CENPD-287-P-A in the fall, 2002, time frame. This supplement will update the BWR fuel assembly and fuel rod design and licensing methodology in accordance with the code revisions described in WCAP-15836-P and the current Westinghouse extended experimental data base relative to that in CENPD-285-P-A and CENPD-287-P-A. NRC review and acceptance of this document for referencing in licensing applications to a rod-average burnup of 62,000 MWd/MTU is requested.

PSEG Nuclear, LLC will be the first utility to use this enhanced methodology for the Cycle 13 reload of the Hope Creek Generating Station. The work to support this reload will be initiated in the summer of 2003. In addition, it is anticipated that the enhanced methodology will be used to support operation of resident Westinghouse fuel in the Columbia Generating Station starting in the summer of 2003. Consequently, Westinghouse respectfully requests that the NRC complete its review no later than August, 2003.

Westinghouse has determined that the information contained in WCAP-15836-P, Revision 0 (Enclosure 1-P) is proprietary in nature. Consequently, it is requested that this topical report be withheld from public disclosure in accordance with the provisions of 10 CFR 2.790 and that copies of the topical report be appropriately safeguarded. The reasons for the classification of this information as proprietary are delineated in the affidavit provided in Enclosure 2. Enclosure 3 provides a non-proprietary version of the topical report (i.e., WCAP-15836-NP, Revision 0).

If you have any questions regarding this matter, please do not hesitate to call Chuck Molnar of my staff at (860) 731-6286 or Bill Harris of our technical staff at (860) 731-1846.

Very truly yours,  
Westinghouse Electric Company LLC



Ian C. Rickard  
Licensing Project Manager  
Windsor Nuclear Licensing

Enclosure(s): As stated

xc: w/o Enclosures

G. Shukla (NRC)

R. Caruso (NRC)

**WESTINGHOUSE ELECTRIC COMPANY LLC**

**PROPRIETARY AFFIDAVIT**

**FOR**

**TOPICAL REPORT WCAP-15836-P, REV. 0,  
FUEL ROD DESIGN METHODS FOR BOILING  
WATER REACTORS – SUPPLEMENT 1**

### Proprietary Affidavit

I, Ian. C. Rickard, depose and say that I am the Licensing Project Manager, Windsor Nuclear Licensing, of Westinghouse Electric Company LLC (WEC), duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and described below.

I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations for withholding this information. I have personal knowledge of the criteria and procedures utilized by WEC in designating information as a trade secret, privileged, or as confidential commercial or financial information.

The information for which proprietary treatment is sought, and which documents have been appropriately designated as proprietary, is contained in the following:

WCAP-15386-P, Revision 0, "Fuel Rod Design Methods for Boiling Water Reactors – Supplement 1", June 2002

Pursuant to the provisions of Section 2.790(b)(4) of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information included in the documents listed above should be withheld from public disclosure.

- i. The information sought to be withheld from public disclosure is owned and has been held in confidence by WEC. It consists of information concerning enhanced analysis methodologies for the design and evaluation of BWR fuel.
- ii. The information consists of test data or other similar data for the design, development and implementation of enhanced analysis methodologies for the design and evaluation of BWR fuel, the application of which results in substantial competitive advantage to WEC.
- iii. The information is of a type customarily held in confidence by WEC and not customarily disclosed to the public.
- iv. The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the understanding that it is to be received in confidence by the Commission.
- v. The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements that provide for maintenance of the information in confidence.
- vi. Public disclosure of the information is likely to cause substantial harm to the competitive position of WEC because:
  - a. A similar product is manufactured and sold by major competitors of WEC.
  - b. WEC invested substantial funds and engineering resources in the development of this information. A competitor would have to undergo similar expense in generating equivalent information.
  - c. The information consists of enhanced analysis methodologies for the design and evaluation of BWR fuel, the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to design their product to better compete with WEC, take marketing or other actions to improve their product's position or impair the position of WEC's product, and avoid developing similar technical analysis in support of their processes, methods or apparatus.
  - d. In pricing WEC's products and services, significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included. The ability of WEC's competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.
  - e. Use of the information by competitors in the international marketplace would increase their ability to market a competing product, reducing the costs associated with their technology development.

  
\_\_\_\_\_  
Ian. C. Rickard  
Licensing Project Manager  
Westinghouse Electric Company LLC

Sworn to before me this 25<sup>th</sup> day of June, 2002

  
\_\_\_\_\_  
Notary Public

My commission expires: \_\_\_\_\_  
**JOAN C. HASTINGS**  
NOTARY PUBLIC  
MY COMMISSION EXPIRES SEP. 30, 2002

# **WESTINGHOUSE ELECTRIC COMPANY LLC**

## **NON-PROPRIETARY TOPICAL REPORT WCAP-15836-NP, REV. 0, FUEL ROD DESIGN METHODS FOR BOILING WATER REACTORS – SUPPLEMENT 1**

**JUNE, 2002**

This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.

## Westinghouse Electric Company LLC

### Copyright Notice

The report(s) transmitted herewith each bear a Westinghouse Electric Company LLC 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 2.790 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 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.