



~~PROPRIETARY~~

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

January 11, 2012  
U7-C-NINA-NRC-120003

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 No. PROJ0772  
Overheads from the November 30, 2011 Meeting with the  
ACRS Joint Subcommittee on Thermal Hydraulics

On November 30, 2011, NINA met with the ACRS to present an overview of WCAP-17065-P, "Westinghouse ABWR Subcompartment Analysis Methodology Using GOTHIC." This is one of a series of topical reports NINA has submitted to the NRC to support a future fuel license amendment for STP Units 3 & 4. A proprietary and non-proprietary version of the overheads presented at this meeting is provided in Attachments 1 and 2.

Since this letter contains information proprietary to Westinghouse Electric Company LLC, it is supported by an affidavit signed by Westinghouse, the owner of the information. 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 Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of this information or the supporting Westinghouse affidavit should reference letter CAW-11-3320 and should be addressed to: J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, Suite 428, Cranberry Township, Pennsylvania, 16066.

If the proprietary information in Attachment 1 becomes separated from this letter, the letter is no longer proprietary. The affidavit requesting this information be withheld from disclosure is provided in Attachment 3.

STI 33205904

T007  
HRW

If there are any questions, please contact me 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 11/11/12



Scott Head  
Manager, Regulatory Affairs  
Nuclear Innovation North America LLC

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**Attachments:**

1. Presentation on WCAP-17065 (Proprietary)
2. Presentation on WCAP-17065 (Non-Proprietary)
3. Request for Withholding Proprietary Information

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

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## ABWR Fuel LTR #8 – WCAP-17065-P

### Westinghouse ABWR Subcompartment Analysis Methodology Using GOTHIC

Presentation to ACRS Joint Subcommittee on  
Thermal Hydraulics

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# Agenda

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- Attendees
- Introduction
- Background on GOTHIC
- Benchmarking
- Proposed Analysis Methodology
- Noding Sensitivity
- Summary and Conclusions

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## Attendees

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- Scott Head NINA Manager, Regulatory Affairs, STP 3&4
- James Tomkins NINA Licensing, STP 3&4
- Robert Schrauder TANE
- Rick Ofstun Westinghouse
- Jason Douglass Westinghouse
- Tom George NAI

# Introduction

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- The original ABWR DCD subcompartment analyses were done using the SCAM code, which is not available to Westinghouse.
- SRP 6.2.1.2 provides guidance and acceptance criteria for performing the containment subcompartment differential pressure analyses
- WCAP-17065 describes the Westinghouse methodology for performing subcompartment analyses using the GOTHIC code
- WCAP-17065 was submitted for NRC review/approval to provide a capability to perform future subcompartment analyses in support of potential design changes for STP 3&4

# Background on GOTHIC

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- GOTHIC is widely used throughout the industry and has the necessary capabilities for these types of analyses
  - Inertia
  - Compressibility
  - Two-phase flow (steam and liquid drops) with non-condensable gas
  - Mixing
  - Flow resistance
- The GOTHIC code has been qualified for subcompartment pressurization analyses by comparison with test data from two test facilities
  - Battelle-Frankfurt Model Containment (BFMC)
  - Heissdampfreaktor (HDR)
- Subcompartment differential pressure analysis methods that use the GOTHIC code have been previously reviewed/approved
  - River Bend



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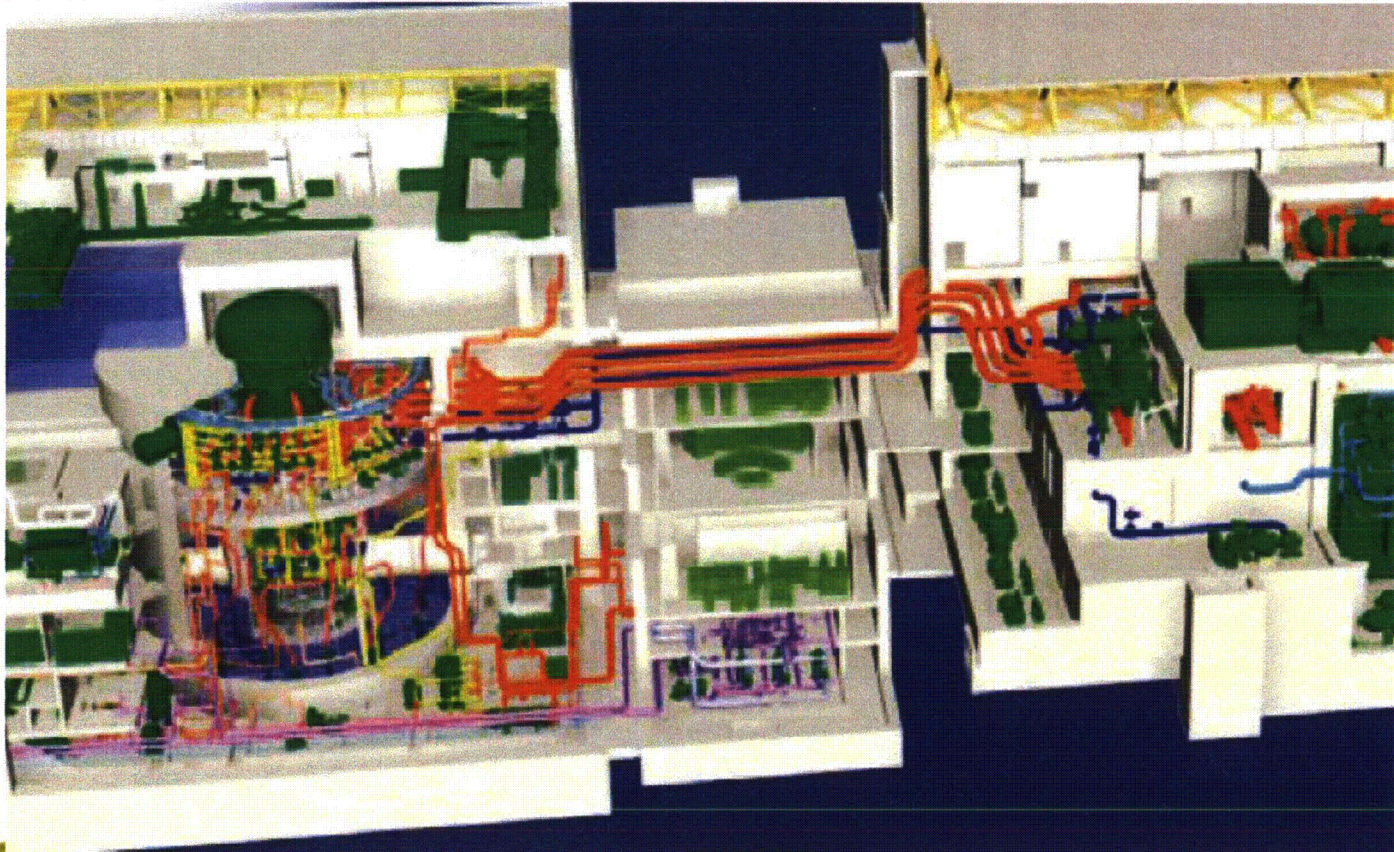
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# WCAP Methodology and Benchmarking

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# Steam Tunnel Overview



# Benchmark Comparison

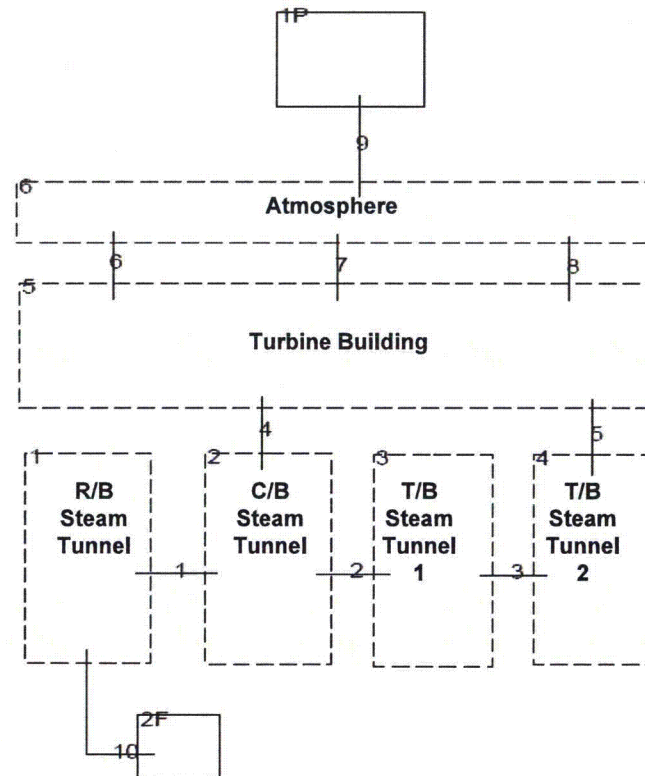
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- Purpose was to compare subcompartment pressurization results from the GOTHIC analysis methodology to the approved TMD analysis methodology
- Input data from the ABWR DCD for the steam tunnel subcompartment analysis was used to create the GOTHIC and TMD subcompartment models
  - Input data that was not available in the DCD was supplemented using guidance from the approved TMD methodology and from the recommended GOTHIC modeling methodology (primarily inertia length)
- Results for both the MSLB and FWLB events were compared

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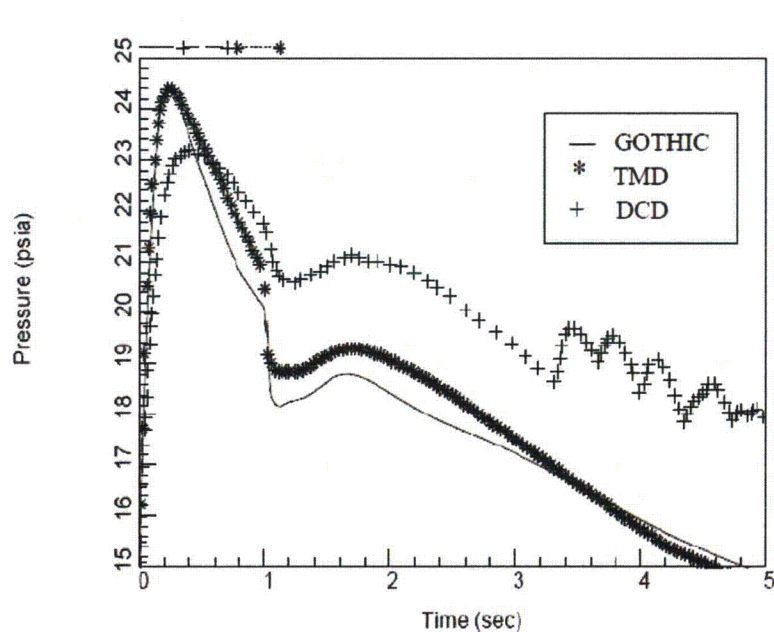
# Benchmark Model Noding Diagram



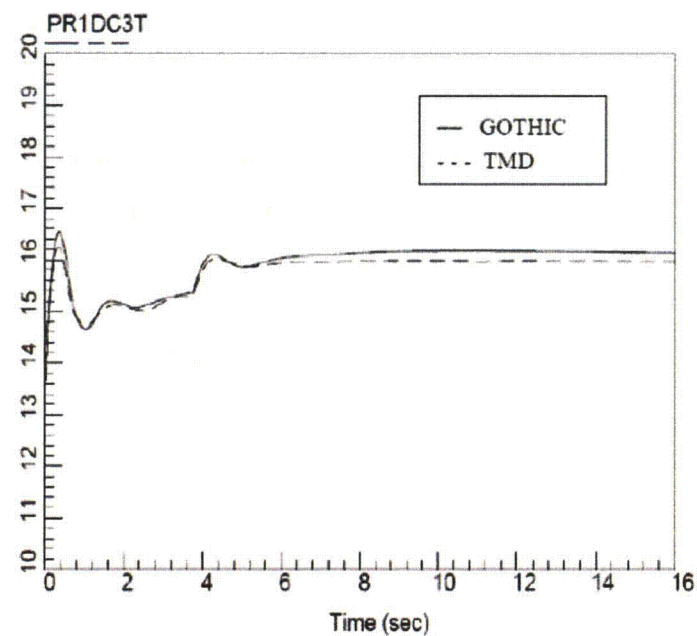
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# Benchmark Case Results



Main Steam Line Break



Feedwater Line Break

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# Representative Steam Tunnel Results and Sensitivity Study

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# Westinghouse Analysis Methodology

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# Representative STP Steam Tunnel Analysis Noding Diagram

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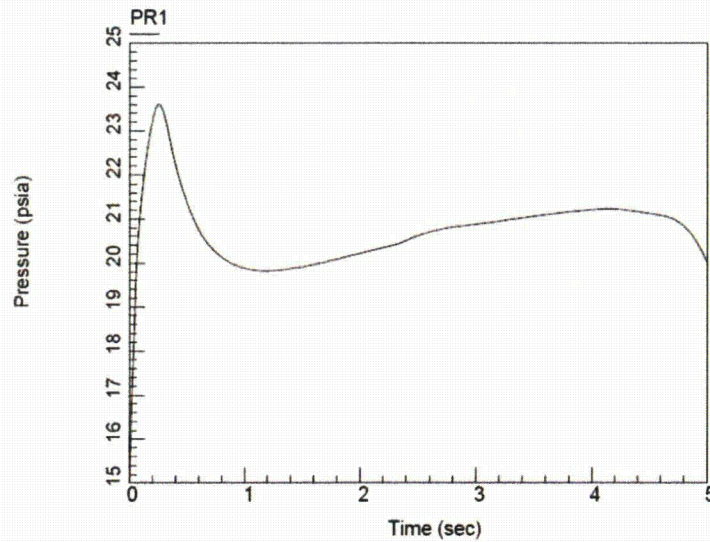




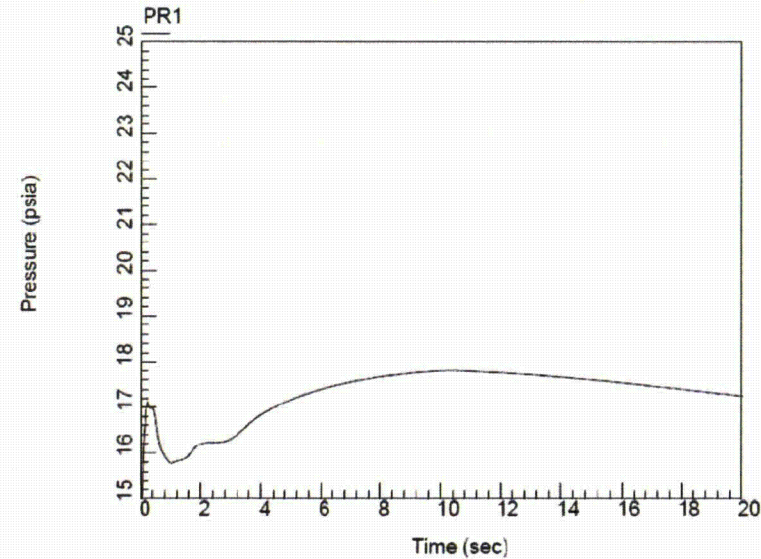
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# Representative STP Steam Tunnel Analysis Results



**Main Steam Line Break**  
Peak Pressure = 23.60 psia



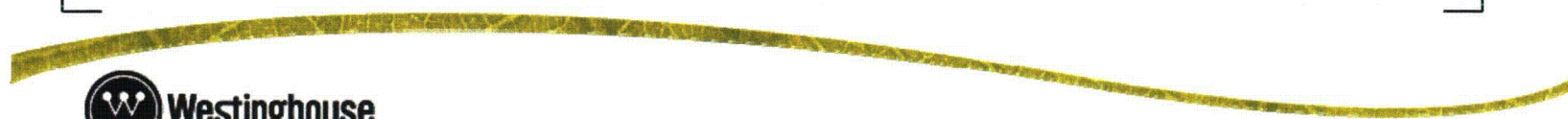
**Feedwater Line Break**  
Peak Pressure = 17.81 psia

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# MSLB Noding Sensitivity

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## MSLB Noding Sensitivity - Results

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- RB Steam Tunnel Results:
  - Base Case Peak Pressure = 23.60 psia
  - Case 1 (2 volumes) Peak Pressure = 23.81 psia
  - Case 2 (5 volumes) Peak Pressure = 23.87 psia
  - Case 3 (8 volumes) Peak Pressure = 23.90 psia
  - Case 4 (10 volumes) Peak Pressure = 23.90 psia
- The results converge and the difference between the base case and converged case is small (1.3%)
- The base model is not very sensitive to increasing the number of nodes.

## Summary and Conclusions

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- GOTHIC has the capabilities required for these types of analyses and has been qualified against test data
- Benchmarking:
  - GOTHIC results are consistent with the approved subcompartment code TMD and both are slightly higher than the current DCD results
- Representative STP Steam Tunnel Subcompartment Results:
  - The model results were not very sensitive to increased nodding
- The Westinghouse methodology using the GOTHIC code is acceptable for performing subcompartment analyses

CAW-11-3320

AFFIDAVIT

STATE OF MARYLAND:

SS

COUNTY OF MONTGOMERY:

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 29th day of November 2011



Notary Public

**Brenda L. Hall**  
**NOTARY PUBLIC**  
**Montgomery County, Maryland**  
**My Commission Expires 7/8/2012**

- (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 ACRS Presentation Material entitled: "ABWR Fuel LTR #8 – WCAP-17065-P -- Westinghouse ABWR Subcompartment Analysis Methodology Using GOTHIC -- Presentation to ACRS Joint Subcommittee on Thermal Hydraulics" (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 and ACRS review of the ABWR subcompartment analysis methodology 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 subcompartment analysis 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 subcompartment analysis and methodology development 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 subcompartment design and 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.