



PROPRIETARY

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

May 11, 2011
U7-C-NINA-NRC-110072

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 Number PROJ0772
Responses to Supplemental Requests for Additional Information

Reference: Request for Additional Information Regarding South Texas Project Nuclear
Operating Company Topical Report WCAP-17116-P Revision 0, Supplement 5 –
Application to the Advanced Boiling Water Reactor (TAC NO. RG0007), March 14,
2011 (ML110730488)

Attached are responses to NRC staff questions included in the reference. The following RAI
questions are addressed:

RAI-34 Supplement 1
RAI-35 Supplement 1

The responses to these RAIs contain information proprietary to Westinghouse Electric
Corporation. Since these responses contain information proprietary to Westinghouse Electric
Company LLC, they are 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.

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MRD

STI 32862890

Attachments 1 and 2 contain the proprietary responses to the above RAI questions. Attachments 3 and 4 contain the non-proprietary versions of the responses. Attachment 5 contains the request for withholding of proprietary information, the affidavit, the proprietary information notice, and the copyright notice.

Correspondence with respect to the copyright or proprietary aspects of this information or the supporting Westinghouse Affidavit should reference letter CAW-11-3154 and should be addressed to: J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania, 16066.

If this letter becomes separated from the proprietary material it is no longer proprietary.

There are no commitments in this letter.

If you have 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 5/11/11



Scott Head
Manager, Regulatory Affairs
South Texas Project Units 3 & 4

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Attachments:

1. RAI-34 Supplement 1 (Proprietary)
2. RAI-35 Supplement 1 (Proprietary)
3. RAI-34 Supplement 1 (Non-Proprietary)
4. RAI-35 Supplement 1 (Non-Proprietary)
5. Request for Withholding of Proprietary Information

cc: w/o enclosure except*
(paper copy)

Director, Office of New Reactors
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Richard A. Ratliff
Bureau of Radiation Control
Texas Department of State Health Services
1100 West 49th Street
Austin, TX 78756-3189

*Steven P. Frantz, Esquire
A. H. Gutterman, Esquire
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Ave. NW
Washington D.C. 20004

*Tekia Govan
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852

(electronic copy)

*George F. Wunder
*Tekia Govan
Loren R. Plisco
U. S. Nuclear Regulatory Commission

Jamey Seely
Nuclear Innovation North America

Peter G. Nemeth
Crain, Caton & James, P.C.

Richard Peña
Kevin Pollo
L. D. Blaylock
CPS Energy

RAI-34 Supplement 1:**QUESTION:**

a) RAI-34(a) requested the ABWR Reactor Internal Pump (RIP) suction flow area. A value of []^{a,c} m² was transmitted in the response to RAI-34(a) in U7-C-STP-NRC-110002. In addition, a RIP flow area of []^{a,c} m² was given in Table B-1 of WCAP-17116-P (Item Ath on page B-5). It is not clear if the generic RIP flow area given in WCAP-17116-P represents the RIP internal flow area. In addition, it is not clear if the flow areas previously transmitted represent one RIP or more than one RIP. For clarification purposes, please provide the following information:

- Suction flow area for one RIP
- Internal flow area for one RIP
- Discharge flow area for one RIP

b) RAI-34(b) requested that the ABWR RIP pump curves be provided. The response to RAI-34(b) (U7-C-STP-NRC-110002) did not provide the requested information. Please provide the following information and source for the ABWR RIPs as modeled in the LOCA, AOO, ATWS, and Stability Analyses:

- Single phase homologous pump head curve
- Fully degraded homologous pump head curve
- Single phase homologous pump torque curve
- Fully degraded homologous pump torque curve
- Pump head degradation multiplier curve
- Pump torque degradation multiplier curve

RESPONSE:

- a) The ABWR Reactor Internal Pumps (RIPs) characteristics are modeled utilizing a RIP flow area of []^{a,c} m². This flow area is for a single RIP; the number of RIP's utilized for a specific case is defined for that case. In addition, both forward and reverse loss coefficients of []^{a,c} and []^{a,c}, respectively, are utilized to ensure accurate modeling of the RIP's. These values are applicable to ABWR accident analysis conditions. The suction flow area, internal flow area, and discharge flow area are not explicitly modeled and therefore were not needed to perform the Westinghouse analysis.
- b) The pump curves used in GOBLIN were originally based on Forsmark 3 (BWR-75) data. However, because the peak cladding temperature occurs due to early dryout when the pumps coast down, the BWR-75 curves were replaced with the actual ABWR curves. The ABWR pump head and pump torque data are shown in Figures 34S01-1 and 34S01-2 respectively.

a,c

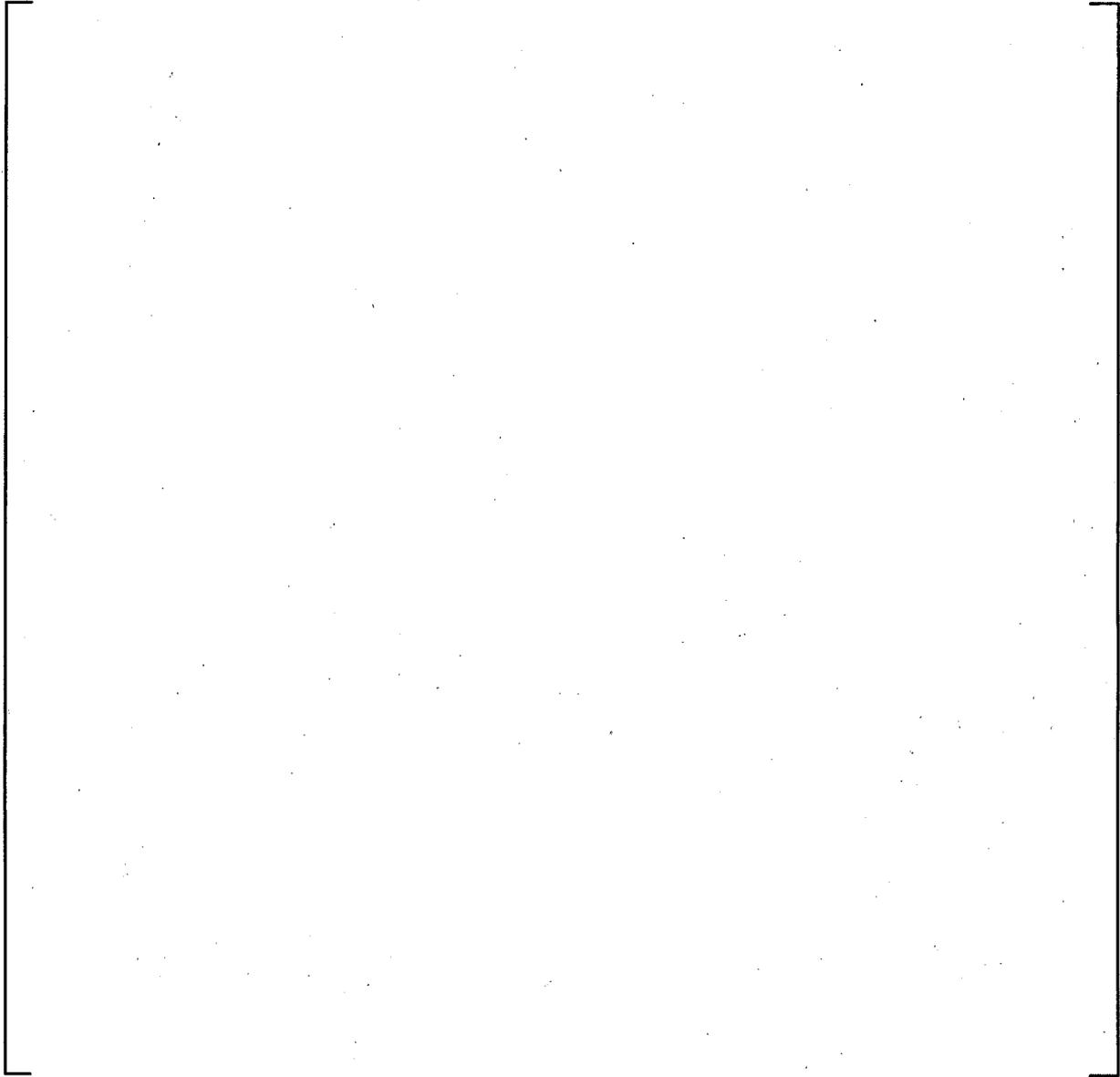


Figure 34S01-1 – ABWR RIP Head Data

a,c

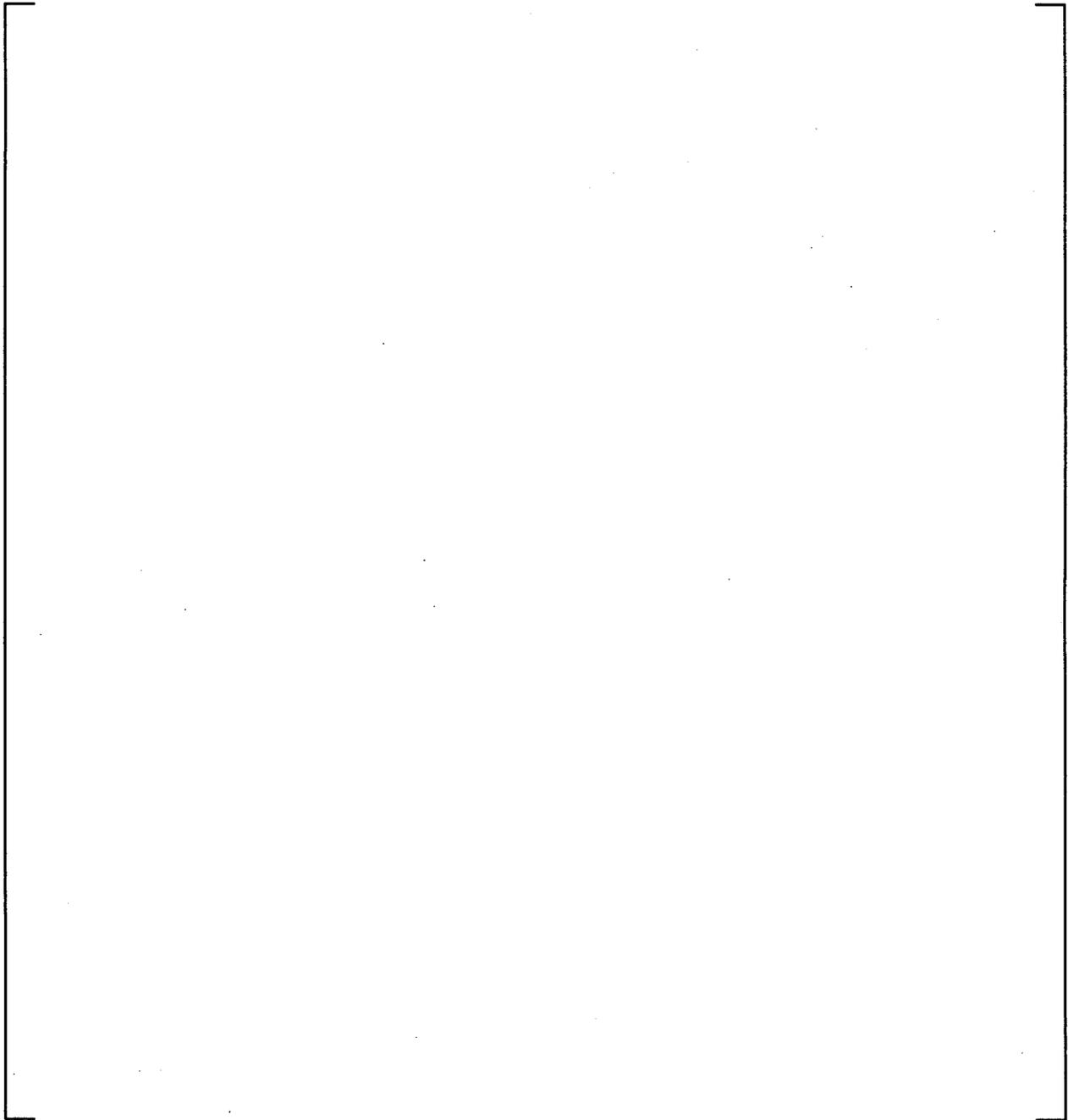


Figure 34S01-2 – ABWR RIP Torque Data

These data were then converted to homologous curves. These curves are shown in Figure 34S01-3, which also displays the BWR-75 curves for comparison. (In this figure, the ABWR data is represented by diamonds (to be compared with Curve 1), squares (to be compared with Curve 2) and triangles (to be compared with Curve 4), whereas the curves represent the BWR-75.) Note that Curve 1 corresponds to the pump

speed to rated pump speed ratio being greater than 0, Curve 2 corresponds to the flow to rated flow ratio being less than 0, and Curve 4 corresponds to the flow to rated flow ratio being greater than 0 (Curve 3 corresponds to the pump speed to rated pump speed ratio being less than 0, which is not applicable to the ABWR due to the RIP's anti-rotation device)

a,c



Figure 34S01-3 – ABWR and BWR-75 Homologous Head Curves

The ABWR RIP Torque model data are described in the Westinghouse response to RAI-6. From the data described there, the homologous torque curves are developed. These curves are shown in Figure 34S01-4, which also displays the BWR-75 data for comparison. (In this figure, the ABWR data is represented by diamonds (to be compared with Curve 1), squares (to be compared with Curve 2) and triangles (to be compared with Curve 4), whereas the curves represent the BWR-75.)

a,c



Figure 34S01-4 - ABWR and BWR-75 Homologous Torque Curves

The pump head multiplier data are shown in Table 34S01-1.

Table 34S01-1 – RIP Head Multiplier

Void Fraction	Multiplier

a,c

[]^{a,c}

RAI-35 Supplement 1:**QUESTION:**

a) Appendix B of WCAP-17116 provided ABWR separator geometry information. Please provide the following additional dimensions:

- Axial length from the top of separator skirt 1 to the bottom of separator skirt 2
- Axial length from the top of separator skirt 2 to the bottom of separator skirt 3

b) RAI-35 and RAI-44(f) both requested the expected pressure loss through the steam separators during normal operating conditions. The response to RAI-35 (U7-C-STP-NRC-110002) provides a value of []^{a,c} kPa pressure loss through the separators at a 90% flow condition. The response to RAI-44(f) (U7-C-STP-NRC-110011) provides a maximum pressure drop of []^{a,c} MPa. The responses to these two RAIs are inconsistent. Please indicate which expected pressure loss through the steam separators is correct.

RESPONSE:

- a) Separator skirts 1 and 2 each have an axial length of []^{a,c} m, and separator skirt 3 has an axial length of []^{a,c} m. As such, the length from the top of skirt 1 to the bottom of skirt 2 is []^{a,c} m []^{a,c} and the length from the top of skirt 2 to the bottom of skirt 3 is []^{a,c} m []^{a,c}.
- b) Both values of pressure loss as given in the RAI above for Part b are correct, but they are different because they apply to different conditions. The response to RAI-35, which indicates a pressure loss of []^{a,c} kPa, is based on ABWR accident analysis initial conditions. This pressure loss is associated with the steady-state initial operating conditions during a 90% flow state.

The response to RAI-44, which indicated a maximum pressure loss of []^{a,c} MPa ([]^{a,c} kPa), is based on an ABWR under LOCA conditions. This pressure loss is much higher due to the high rate of flow from the LOCA blowdown. This is a maximum designed pressure differential, and therefore, the actual pressure loss is expected to be less, such as the []^{a,c} kPa expected during 90% flow operating conditions.

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

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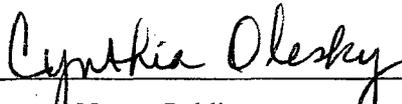
COUNTY OF BUTLER:

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 10th day of May 2011


Notary Public

COMMONWEALTH OF PENNSYLVANIA

Notarial Seal
Cynthia Olesky, Notary Public
Manor Boro, Westmoreland County
My Commission Expires July 16, 2014
Member, Pennsylvania Association of Notaries

- (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 WEC-NINA-2011-0009 P-Enclosure, "South Texas Project Units 3 & 4 Supplemental Response to RAI's 34 and 35 for WCAP-17116-P" (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 the ABWR ECCS analysis methodology in support of Westinghouse ABWR fuel products.

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

- (a) Assist the customer in obtaining NRC review of the Westinghouse ECCS analysis methodology as applied to ABWR plant designs.

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 ECCS analysis 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 ECCS analysis methodology.
- (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.