PROPRIETARY

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

October 16, 2012
U7-C-NINA-NRC-120065

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 Nos. 52-012 and 52-013
Questions from the October 2, 2012 Meeting with ACRS

On October 2, 2012, we met with the ACRS ABWR Subcommittee to present a summary of our position on Long Term Cooling and to review one remaining open item from the previous meetings. During that meeting, we agreed to follow up with answers to several ACRS questions. These answers are provided in Attachments 1 through 4. Note that the information in Attachment 4 summarizes the High Pressure Core Flooder and Bypass Flow analyses that were performed as defense-in-depth calculations. These do not replace the licensing basis which is the performance of a downstream fuel test as outlined in COLA Appendix 6C.

Page two of the response in Attachment 1 contains information proprietary to Nuclear Innovation North America (NINA). This information is requested to be withheld from public disclosure in accordance with the affidavit in Attachment 5.

The response in Attachment 4 contains information proprietary to Westinghouse Electric Corporation. Since this response involves 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. The affidavit requesting this information be withheld from disclosure is provided in Attachment 6.

Correspondence with respect to the copyright or proprietary aspects of this information or the

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supporting Westinghouse Affidavits should reference letter CAW-12-3555 and should be addressed to: J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, Suite 428, Cranberry Township, Pennsylvania, 16066.

Page two of Attachment 1 and Attachment 4 are considered to be proprietary in their entirety and non-proprietary versions are not attached.

If the proprietary information in Attachments 1 and 4 become separated from this letter, the letter is no longer proprietary.

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 10/16/12

Scott Head
Manager, Regulatory Affairs
Nuclear Innovation North America LLC

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Attachments:

1. ACRS Item 102 (NINA Proprietary)
2. ACRS Item 103
3. ACRS Item 104
4. ACRS Item 105 (Westinghouse Proprietary)
5. Request for Withholding of Proprietary Information (NINA)
6. Request for Withholding of Proprietary Information (Westinghouse)

cc: w/o attachment 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
1600 E. Lamar Blvd
Arlington, TX 76011–4511

Kathy C. Perkins, RN, MBA
Assistant Commissioner
Division for Regulatory Services
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

Alice Hamilton Rogers, P.E.
Inspection Unit Manager
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

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

*Tom Tai
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852

(electronic copy)

*George F. Wunder
*Tom Tai
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

ACRS Item 103

At the ACRS meeting on 10/2/12, the ACRS requested additional information on the surrogate, the surrogate size, and the basis for the surrogate for each debris type that will be used in the downstream fuel test. The following table lists the types of debris to be simulated in fuel debris capture testing. Surrogate materials identified in this table are based on current state-of-the-art test methods. The surrogates have the characteristics of being readily available commercially or, in the case of chemical surrogates, easily purchased or produced in sufficient quantities to support testing, and have been evaluated to provide conservative (maximum pressure drop) test results.

Debris	Assumed Passed by Strainer	Debris Load per Assembly	Debris Used for Test	Surrogate	Size Distribution	Basis for Surrogate [(1), (2)]
Epoxy Coatings	38 lb_m	0.04 lb_m	0.07 lb_m	Silicon Carbide	10 ± 2 microns	Surrogate proposed by the PWR Owners Group for fuel debris capture testing; accepted by the NRC for this type of testing. This surrogate is considered to provide higher debris packing factors that result in maximum head loss.
Sludge	195 lb_m	0.22 lb_m	0.38 lb_m	Silicon Carbide	10 ± 2 microns	Surrogate proposed by the PWR Owners Group for fuel debris capture testing; accepted by the NRC for this type of testing. This surrogate is considered to provide higher debris packing factors that result in maximum head loss.
Dust / Dirt	150 lb_m	0.17 lb_m	0.29 lb_m	Silicon Carbide	10 ± 2 microns	Surrogate proposed by the PWR Owners Group for fuel debris capture testing; accepted by the NRC for this type of testing. This surrogate is considered to provide higher debris packing factors that result in maximum head loss.

Debris	Assumed Passed by Strainer	Debris Load per Assembly	Debris Used for Test	Surrogate	Size Distribution	Basis for Surrogate [1], [2]
Rust Flakes	50 lb_m	0.06 lb_m	0.1 lb_m	Silicon Carbide	10 ± 2 microns	Surrogate proposed by the PWR Owners Group for fuel debris capture testing; accepted by the NRC for this type of testing. This surrogate is considered to provide higher debris packing factors that result in maximum head loss.
RMI Shards	926 ft^2 (75.8 lb_m)	1.1ft^2 (0.087 lb_m)	1.8 ft^2 (0.15 lb_m)	Silicon Carbide	10 ± 2 microns	Surrogate proposed by the PWR Owners Group for fuel debris capture testing; accepted by the NRC for this type of testing. This surrogate is considered to provide higher debris packing factors that result in maximum head loss.
Latent Fiber	1 ft^3	1.98 in^3	3.37 in^3	NUKON™	Distribution based on CCI strainer bypass testing.	Surrogate fiber accepted by Industry and NRC for both Strainer and Fuel Assembly Debris Capture Testing. This surrogate is considered to provide higher debris packing factors that result in maximum head loss.
Aluminum Precipitate	0.11 lb_m	0.00013 lb_m	0.00021 lb_m	Aluminum Oxy-hydroxide	Size of anhydrous surrogate material generated by WCAP-16530-NP-A methods.	Chemical effects surrogate identified by PWROG in WCAP-16530-NP and accepted by NRC in their Safety Evaluation Report (SER) to simulate post-accident corrosion products that, when collected on a fiber bed, result in maximum head loss through the debris bed.

Debris	Assumed Passed by Strainer	Debris Load per Assembly	Debris Used for Test	Surrogate	Size Distribution	Basis for Surrogate [1], [2]
Zinc Precipitate	58.6 lb_m	0.07 lb_m	0.11 lb_m	Aluminum Oxy-hydroxide	Size of anhydrous surrogate material generated by WCAP-16530-NP-A methods.	Chemical effects surrogate identified by PWROG in WCAP-16530-NP and accepted by NRC in their Safety Evaluation Report (SER) to simulate post-accident corrosion products that, when collected on a fiber bed, result in maximum head loss through the debris bed.

Notes:

(1) The selection of surrogates is based on best currently available information. Testing will be conducted 18 months prior to fuel load. Industry activity on surrogates for sump strainer and fuel debris capture will be followed, along with an assessment of the appropriate surrogates to use for STP Units 3 and 4 fuel assembly debris capture testing, and communicated to NRC 6 months prior to performing tests.

(2) All debris used in the STP Units 3 and 4 fuel debris capture testing is sufficiently small as to pass through the STP Units 3 and 4 strainers.

ACRS Item 104

During the October 2, 2012 ACRS ABWR Subcommittee meeting there was a discussion of the protocol to be used in the downstream fuel testing. The protocol is described in COLA Subsections 6C.3.1.9.2 and 6C.3.1.9.3. These subsections are provided on pages 2, 3, and 4 of this attachment and describe the flow rates, pressure, temperature, and the addition of particulate debris, fibrous debris, and chemical surrogates. This represents our current plans for performing the downstream fuel test. Additional detail on the test approach, protocol for debris preparation and addition, and pressure monitoring are provided in the references documented in the following pages, specifically References 6C-14 and 6C-15. Preparation of the surrogate material is described in Reference 6C-16. However, as we have previously discussed, prior to performing the testing we will review industry experience with downstream fuel testing for the adoption of lessons learned. The downstream fuel test procedure reflecting this review will be provided to the NRC for their review at least 6 months prior to conducting the test. The commitment in COLA Section 6C.3.1.9 to incorporate lessons learned into the final test procedure is provided on page 5 of this attachment. The references in these subsections are also identified on page 5 of this attachment.

6C.3.1.9.2 Test Plan

A test facility is comprised of a fuel assembly mock-up, a pump, associated recirculation piping, and a mixing tank to add the debris. The test is conducted with a single partial height fuel assembly, including a fuel inlet nozzle, any integral debris filters, lower tie plate and fuel spacer grids. The cross-section of the fuel is modeled exactly; the length of the fuel assembly is reduced. The fuel assembly is unheated. The bypass flow paths are blocked for this test.

As described below, the testing will follow the test plan developed and implemented for the PWR Owners Group (PWROG) fuel debris capture testing with regard to debris preparation, addition of debris and monitoring pressure drop. This PWROG test plan is consistent with and accounted for revised NRC guidance for PWR's to respond to Generic Letter 2004-02 (Reference 6C-14). Several tests will be performed at a range of flow rates of 1 to 5 kg/sec (15.9 to 79.3 gpm) and at atmospheric pressure and ambient temperature. These flow rates are representative of the flow at recirculation conditions. The atmospheric pressure and ambient temperature result in a viscosity that is conservative with respect to pressure drop due to debris blockage. The test is initiated at clean conditions to establish a flow representative of post-LOCA recirculation conditions. The flow is injected at the fuel assembly inlet. Once a steady state has been established, the debris (described in 6C.3.1.9.3) is added to the system in a manner consistent with NRC guidance identified in Item 5(a) in Section 6.2.2, Appendix A of Reference 6C-15. The particulate debris is added first and in such a way that it does not coagulate and therefore would be able to block more of the potential fiber mat interstices. Next, fibrous debris is added. The fiber is also added slowly and in small amounts so as to ensure that the fibrous debris does not coagulate but remains as individual fibers. Once all of the particulate and fibrous debris has been added, chemical surrogate debris is added. The chemical surrogate material is added in batches and slowly so that it does not coagulate. As described in 6C.3.1.9.3, below, the particulate debris surrogate is the same as was used in the PWROG fuel debris capture tests; silicon carbide having a dimension of 0.01 mm (10 microns) and the chemical surrogate debris is prepared using the method identified in WCAP-16530-NP-A (Reference 6C-16). The pressure drop across the inlet and the entire fuel assembly is monitored. In addition, the flow rate and coolant temperature are monitored. The test is run until all debris has been deposited in the system and a steady state pressure drop condition has been achieved. The above steps are consistent with the manner in which the PWROG fuel debris capture tests were performed.

6C.3.1.9.3 Debris Assumptions for Downstream Test

The test is conducted using conservative assumptions regarding the debris that would be present in the suppression pool following a LOCA. The following debris types are included: (1) Coatings, (2) Sludge, (3) Dust/Dirt, (4) Rust Flakes, (5) RMI shards, (6) Latent Fiber, and (7) Aluminum oxy-hydroxide as a surrogate for potential non-particulate zinc and aluminum corrosion products. As noted previously, the aluminum oxy-hydroxide used as a chemical surrogate is prepared using the method identified in WCAP-16530-NP-A (Reference 6C-16). The first four debris types are conservatively assumed to be particles smaller than 2.1 mm and are therefore all assumed to pass through the ECCS strainers. For the RMI shards and latent fiber, an assessment of the amount of the debris passing through the strainer is performed. Based on the size distribution of stainless steel RMI destroyed during jet testing (and shown in Figure 3-7 of NUREG/CR-6808), 4.3% of the RMI within the break zone of influence is assumed to be shards smaller than 2.1 mm, and therefore small enough to pass through the strainers. Latent fiber debris upstream of the strainers is conservatively assumed to be 1 ft^3 of destroyed fibrous insulation fibers (fines) and therefore is all assumed to pass through the strainers.

The fibrous debris used in the test is prepared in the same manner as was done for the PWR Owners Group tests so as to be of a similar size (length) distribution. The particulate debris surrogate used in the test is the same as the particulate debris surrogate used for the PWR Owners Group tests and is silicon carbide having a nominal dimension of about 0.01 mm (10 microns). This particulate debris is a surrogate for all forms of particulate debris that are assumed to pass through the strainers. The use of small particulate debris in the test is conservative because, should a debris bed form, the small particulate provides for a densely packed debris bed that maximizes potential pressure drop.

The total debris amounts that are the basis for the test are shown below:

Debris Type	Debris Assumed in Downstream Fuel Effects Test
Coatings	38 lbs. (Note 1)
Sludge	195 lbs
Dust/Dirt	150 lbs.
Rust Flakes	50 lbs.
Stainless Steel RMI	926 ft^2
Latent Fiber (fines)	1 ft^3
Aluminum Precipitate	0.11 lbs. (Note 2)
Zinc Precipitate	58.6 lbs. (Note 2)

Note 1: The URG value of 85 lbs of coatings is reduced by the mass of inorganic zinc primer (47 lbs.) that is accounted for by 58.6 lbs of zinc oxide precipitate

Note 2: Aluminum oxy-hydroxide is used as a surrogate for both zinc and aluminum corrosion products

Since there are 872 fuel assemblies in the core, the above debris amounts are reduced by a factor of 1/872. The test assembly debris load will be increased by a factor based upon the hot assembly power factor to account for the possibility of non-uniform debris deposition and non-uniform flow between assemblies.

6C.3.1.9 Downstream Fuel Effects Test

For the initial fuel load, a downstream effects test for the fuel is performed to ensure that small debris passing through the suction strainers does not impair the flow to the core. The detailed test procedure will be provided to the NRC at least six months prior to performing the test and will reflect industry experience with performance of such tests, for example consideration of fuel assembly geometry, debris addition and test protocol, number of tests, and provisions for assessing test variability (COM 6C-2). The following discusses the test plan, the analysis basis, and the debris assumptions used in this test.

6C.6 References

6C-14 Letter from W. H. Ruland (NRC) to A. R. Pietrangelo (NEI), 'Revised Guidance for Review of Final Licensee Responses to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," dated March 28, 2008, ADAMS Accession Number ML080230112.

6C-15 Enclosure 1 to ML080230112, "NRC Staff Review Guidance Regarding Generic Letter 2004-02 Closure in the Area of Strainer Head Loss and Vortexing," dated March 2008, ADAMS Accession Number ML080230038.

6C-16 WCAP-16530-NP-A, "Evaluation of Post-Accident Chemical Effects in Containment Sump Fluids to Support GSI-191," Westinghouse Electric Company LLC, dated March 2008.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)		
	)		
Nuclear Innovation North America LLC	)	Docket Nos.	52-012
	)		52-013
South Texas Project	)		
Units 3 and 4	)		

AFFIDAVIT

I, Scott Head, being duly sworn, hereby depose and say that I am Manager, Regulatory Affairs, of the South Texas Project Units 3 & 4 (STP 3&4); that I am duly authorized to sign and file with the Nuclear Regulatory Commission (NRC) this affidavit on behalf of Nuclear Innovation North America LLC (NINA); and state:

1. I am authorized to execute this affidavit on behalf of NINA, Nuclear Innovation North America Investments Holdings LLC ("NINA Holdings"), Nuclear Innovation North America Investments LLC ("NINA Investments"), NINA Texas 3 LLC ("NINA 3") and NINA Texas 4 LLC ("NINA 4").

2. NINA 3 & NINA 4 are providing the accompanying information in response to an ACRS question related to and in support of the Combined License (COL) Application for STP 3 & 4. Specifically, the information being submitted in the accompanying Attachment 1 contains proprietary information related to STP 3 & 4 that should be held in confidence by the NRC pursuant to the policy reflected in 10 CFR2.390(a)(4), because:
    i. This information is and has been withheld in confidence by NINA 3, NINA 4 and their affiliates.
    ii. This information is of a type that is customarily held in confidence by NINA 3, NINA 4 and their affiliates, and there is a rational basis for doing so because it contains sensitive financial information related to NINA 3 and NINA 4.
    iii. This information is being transmitted to the NRC voluntarily, in confidence and under the provisions of 10 CFR 2.390(a)(4) and it is to be received in confidence by the NRC.
    iv. This information is not available in public sources and could not be gathered readily from other publicly available information.
    v. Public disclosure of this information would create substantial harm to the competitive position of NINA 3, NINA 4, and their affiliates by disclosing internal business and financial information.

3. The information provided in Attachment 1 and requested to be withheld has substantial commercial value and provides sensitive information related to inspection information from an operating plant. Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of NINA 3 and NINA 4, NINA Investments, NINA Holdings and NINA itself because it would enhance the ability of competitors to gain knowledge of our costs and our commercial strategies.

4. The information on page two of Attachment 1 is proprietary in its entirety and has been appropriately marked as proprietary.

5. Information proprietary to NINA 3, NINA 4, and their affiliates included on the second page of Attachment 1 to this letter is appropriately marked at the top of the page with "Proprietary Information" in accordance with the NRC's guidance on categories of proprietary information defined in 10 CFR 2.390 and clarified by Regulatory Issue Summary 2004-11.

6. Accordingly, NINA requests that page two of Attachment 1 accompanied by this affidavit be withheld from public disclosure pursuant to 10 CFR 2.390(a)(4).

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

STATE OF TEXAS)
)
COUNTY OF MATAGORDA)

Subscribed and sworn to before me, a Notary Public in and for the State of Texas, this 16 day of October, 2012.

LOREE ESTHER ELTON
MY COMMISSION EXPIRES
October 18, 2015

Loree Esther Elton
Notary Public in and for the
State of Texas

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 16th day of October 2012

Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Anne M. Stegman, Notary Public
Unity Twp., Westmoreland County
My Commission Expires Aug. 7, 2016
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 LTR-LAM-12-100, Attachment 1, "Summary of Downstream Defense-In-Depth Analyses Assuming Fuel Assembly Inlet is Blocked" (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 ACRS review of long term cooling methodology in support of the COL Application for South Texas Project Units 3&4 and may be used only for that purpose.

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

(a) Assist the customer in obtaining NRC and ACRS review of the long term cooling methodology as applied to 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 ABWR long term cooling analyses for 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 long term cooling 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 evaluation justifications 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 is the proprietary version of a document furnished to the NRC in connection with requests for generic and/or plant specific review and approval. The document is to be considered proprietary in its entirety.

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