Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6206
Direct fax: 724-940-8505
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006
Our ref: DCP_NRC_002899

May 28, 2010

Subject: AP1000 Response to Request for Additional Information (SRP6.2.2)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 6.2.2. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

A response is provided herein for RAI SRP6.2.2- SRSB-42.

Pursuant to 10 CFR 50.30(b), proprietary and non-proprietary versions of the response to the request for additional information on SRP Section 6.2.2 are submitted as Enclosures 3 and 4. Also enclosed is one copy of the Application for Withholding, AW-10-2826 (non-proprietary) with Proprietary Information Notice, and one copy of the associated 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 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 affidavit or Application for Withholding should reference AW-10-2826 and should be addressed to James A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company, LLC, P. 0. Box 355, Pittsburgh, Pennsylvania 15230-0355.

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NRO

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

D. A. Lindgren /for

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosures

1. AW-10-2826 "Application for Withholding Proprietary Information from Disclosure," dated May 28, 2010

2. AW-10-2826, Affidavit, Proprietary Information Notice, Copyright Notice dated May 28, 2010

3. Response to Request for Additional Information on SRP Section 6.2.2, RAI-SRP6.2.2- SRSB-42 (Proprietary)

4. Response to Request for Additional Information on SRP Section 6.2.2, RAI-SRP6.2.2- SRSB-42 NP (Non-Proprietary)

cc:	D. Jaffe	- U.S. NRC	4E
	E. McKenna	- U.S. NRC	4E
	P. Donnelly	- U.S. NRC	4E
	T. Spink	- TVA	4E
	P. Hastings	- Duke Power	4E
	R. Kitchen	- Progress Energy	4E
	A. Monroe	- SCANA	4E
	P. Jacobs	- Florida Power & Light	4E
	C. Pierce	- Southern Company	4E
	E. Schmiech	- Westinghouse	4E
	G. Zinke	- NuStart/Entergy	4E
	R. Grumbir	- NuStart	4E
	D. Lindgren	- Westinghouse	4E
	D. Behnke	- Westinghouse	4E

ENCLOSURE 1

AW-10-2826

APPLICATION FOR WITHHOLDING
PROPRIETARY INFORMATION FROM DISCLOSURE

Westinghouse Electric Company
Nuclear Services
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Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
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Direct tel: 412-374-6206
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e-mail: sisk1rb@westinghouse.com

Your ref: Docket Number 52-006
Our ref: AW-10-2826

May 28, 2010

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: Submittal of Proprietary and Non-Proprietary Technical Document Information, Response to Request for Additional Information (RAI) on SRP Section 6.2.2

The Application for Withholding 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 RAI response. In conformance with 10 CFR Section 2.390, Affidavit AW-10-2826 accompanies this Application for Withholding, setting forth the basis on which the identified proprietary information may be withheld from public disclosure.

Accordingly, it is respectively 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 this Application for Withholding or the accompanying affidavit should reference AW-10-2826 and should be addressed to James A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company, LLC, P.O. Box 355, Pittsburgh, Pennsylvania, 15230-0355.

Very truly yours,

James W. Winters, Manager
Passive Plant Technology

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ENCLOSURE 2

Affidavit

AW-10-2826
May 28, 2010

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

Before me, the undersigned authority, personally appeared James W. Winters, 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:

James W. Winters, Manager
Passive Plant Technology

Sworn to and subscribed
before me this 28th day
of May 2010.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Linda J. Bugle, Notary Public
City of Pittsburgh, Allegheny County
My Commission Expires June 18, 2013
Member, Pennsylvania Association of Notaries

Notary Public

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(1) I am Manager, Passive Plant Technology, 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" 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 RAI-SRP6.2.2- SRSB-42, in support of the AP1000 Design Certification Amendment Application, being transmitted by Westinghouse letter (DCP_NRC_002899) and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse for the AP1000 Design Certification Amendment application is expected to be applicable in all licensee submittals referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application in response to certain NRC requirements for justification of compliance of the safety system to regulations.

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

(a) Manufacture and deliver products to utilities based on proprietary designs.

(b) Advance the AP1000 Design and reduce the licensing risk for the application of the AP1000 Design Certification

(c) Determine compliance with regulations and standards

(d) Establish design requirements and specifications for the system.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for purposes of plant construction and operation.

(b) Westinghouse can sell support and defense of safety systems based on the technology in the reports.

(c) The information requested to be withheld reveals the distinguishing aspects of an approach and schedule 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 digital technology safety systems 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.

ENCLOSURE 4

Response to Request for Additional Information on SRP Section 6.2.2

RAI SRP6.2.2- SRSB-42

(Non-Proprietary)

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP6.2.2-SRSB-42
Revision: 0

Question:

During the March 22-24, 2010 audit, it was found that the AP1000 long-term cooling (LTC) sensitivity analysis Cases 4 through 10 were analyzed using the advance first core analysis program (AFCAP) core design as described in APP-SSAR-GSC-732, Revision 0, "AP1000 AFCAP Post-LOCA Long-term Core Cooling Analysis," November 11, 2009. Westinghouse indicated that the LTC analyses performed with the AFCAP core design bound the AP1000 DCD core design analyses. The staff requests the following information to justify that conclusion:

(1) Describe the differences between the AFCAP core design and the DCD core design.
(2) Describe the differences between the two core designs with respect to WCOBRA/TRAC LTC modeling.
(3) Discuss how the LTC analysis performed with the AFCAP core design bounds the analysis using the DCD core design, including the expected difference in the core inlet dP for Case 10.

Westinghouse Response:

(1) Describe the differences between the AFCAP core design and the DCD core design.

The AFCAP core design differs from the DCD Chapter 4 core design in areas such as [ ]^{a,c} The AFCAP core design differences result in NO changes to the [ ]^{a,c} modeled in the WCOBRA/TRAC reference case analysis of the AFCAP core design compared to the DCD Revision 17, Chapter 15 large break LOCA analysis reference case.

The following fuel assembly characteristics in the active fuel region are unchanged in the AFCAP core design (and in the WCOBRA/TRAC model for AFCAP analyses) compared to the DCD Revision 17 core design:

[

]^{a,c}

A trivial change is identified in the [

]a,c

The AFCAP core design exhibits the following revised [

]a,c

[		
		]a,c

(2) Describe the differences between the two core designs with respect to WCOBRA/TRAC LTC modeling.

In the AFCAP analysis WCOBRA/TRAC input deck there are no changes to flow area, wetted perimeter, etc. in the core channels and gaps in the active fuel region, nor in the vertically adjacent sections inside the reactor vessel. The only non-negligible changes in fuel assembly hardware with respect to the modeling in WCOBRA/TRAC are [

]a,c Other WCOBRA/TRAC [

]a,c are considered to be insignificant for long-term cooling calculations.

The net effect of input differences associated with the AFCAP model is evident from the respective steady-state balance WCOBRA/TRAC cases, which match within the established tolerances the following desired core outlet pressure drop values from core midplane into the hot leg: in the AFCAP base deck used for the APP-PXS-GLR-001, Revision 4, Sensitivity Case 10 LTC analysis, the vessel pressure drop from midcore to hot leg equals [ ]a,c , whereas for the DCD Revision 17, Chapter 15 large break LOCA analysis the vessel pressure drop from core midplane to hot leg equals [ ]a,c at the same core flow rate.

The core power distribution [

]^{a,c}

and is applied in the Sensitivity Case 4 through 10 LTC analyses. The core decay power function remains the 10CFR50 Appendix K function for those LTC analyses.

In summary, the only AFCAP core design-related changes that are modeled in the APP-PXS-GLR-001, Revision 4, Sensitivity Cases 4-10, WCOBRA/TRAC LTC input deck are related to [

]^{a,c}

(3) Discuss how the LTC analysis performed with the AFCAP core design bounds the analysis using the DCD core design, including the expected difference in the core inlet dP for Case 10.

Historically, the significant sensitivity of the LTC ECCS performance of advanced plants designed with an ADS-4 depressurization system to the venting flow path resistance encountered by the steam generated via core boiloff has been well established from AP600 onward, with high flow resistance being more conservative. This steam venting situation is similar to that observed during the core reflood phase of PWR large break LOCA events.

Table 4-1 of APP-PXS-GLR-001, Revision 4 (included below) presents as Cases 4-10 a series of cases performed using the AFCAP WCOBRA/TRAC input with different added resistances at the core inlet elevation.

Table 4-1 AP1000 LTC Sensitivity Analysis With Added Debris Head Losses

Case	LOCA	Time After LOCA (hr)	Added Resistance(1) Core (K/A^2)	Added Resistance(1) Screen (K/A^2)	Core Flow (lb/sec)	PXS A Flow (lb/sec)	PXS B Flow (lb/sec)	Core Debris DP (psi)	ADS 4 Quality	Max Core Boron Conc (ppm)
DCD	DEDVI PXS Rm	2.6	0.0	0.00	152.2	77.2	75.0	0.00	25%	4200
1	DEDVI PXS Rm	2.6	31.6	25.70	145.6	73.6	72.0	1.18	25%	4200
2	DEDVI PXS Rm	2.6	62.0	51.39	136.5	69.0	67.5	2.08	25%	4200
3	DEDVI PXS Rm	2.6	158.2	51.39	111.0	56.0	55.0	3.50	35%	4700
4	DEDVI PXS Rm	8.6	331.2	0.00	88.0	44.0	44.0	3.40	36%	4800
5	DEDVI PXS Rm	8.6	430.6	0.00	80.0	40.0	40.0	3.80	37%	4800
6	DEDVI RV	8.6	430.6	0.00	83.0	29.0	54.0	4.10	37%	4800
7	DEDVI PXS Rm	8.6	546.5	0.00	72.0	36.0	36.0	4.00	42%	5300
8	DEDVI RV	8.6	546.5	0.00	76.0	27.0	49.0	4.40	41%	5100
9	DEDVI RV	8.6	645.8	0.00	70.0	25.0	45.0	4.50	45%	5600
10	DEDVI RV	8.6	761.8	0.00	65.0	23.0	42.0	4.10	49%	6100
11	DEDVI RV	8.6	1.13	0.00	214.5	76.0	138.5	2.00	10%	3300

Notes:

(1) The added flow resistances (K/A^2) have units of ft^{-4}.

The intent of the APP-PXS-GLR-001, Revision 4, debris head loss Sensitivity Cases 4-10 is to establish the flow/pressure drop acceptance criterion for the AP1000 fuel assembly core inlet blockage test program at which successful LTC performance is demonstrated for cold leg and DVI line break scenarios; the AP1000 fuel assembly test program has investigated a wide range of post-LOCA containment debris scenarios and measured the resulting increases in pressure drop due to blockage at the core inlet. The AFCAP WCOBRA/TRAC model predicts in Sensitivity Case 10 the core inlet flow rate (65 lbm/s) at which acceptable core cooling is maintained. This AFCAP model analysis considers a greater resistance to the venting of the steam generated in the core through the ADS-4 flow paths than does the DCD analysis WCOBRA/TRAC model. As a consequence, the net effect of the AFCAP model input changes is the prediction of a lower allowable core inlet pressure drop value than could be achieved with the DCD WCOBRA/TRAC model, at the required core inlet flow rate.

In summary, the APP-PXS-GLR-001, Revision 4, Sensitivity Case 10 analysis of the AFCAP fuel design provides a bounding low core inlet pressure drop test acceptance criterion at the required flow rate, relative to the DCD Chapter 4 core design. Westinghouse conservatively applies this Sensitivity Case 10 acceptance criterion in the AP1000 fuel assembly debris blockage test program.

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None