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Nuclear Power Plants
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U.S. Nuclear Regulatory Commission
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Your ref: Docket No. 52-006
Our ref: DCP/NRC1675

January 26, 2004

SUBJECT: Transmittal of Responses to AP1000 DSER Open Items

This letter transmits the Westinghouse responses to Open Items in the AP1000 Design Safety Evaluation Report (DSER). A list of the DSER Open Item responses transmitted with this letter is Attachment 1. The proprietary responses are transmitted as Attachment 2. The non-proprietary responses are provided as Attachment 3 to this letter.

The Westinghouse Electric Company Copyright Notice, Proprietary Information Notice, Application for Withholding, and Affidavit are also enclosed with this submittal letter as Enclosure 1. Attachment 2 contains Westinghouse proprietary information consisting of trade secrets, commercial information or financial information which we consider privileged or confidential pursuant to 10 CFR 2.790. Therefore, it is requested that the Westinghouse proprietary information attached hereto be handled on a confidential basis and be withheld from public disclosures.

This material is for your internal use only and may be used for the purpose for which it is submitted. It should not be otherwise used, disclosed, duplicated, or disseminated, in whole or in part, to any other person or organization outside the Commission, the Office of Nuclear Reactor Regulation, the Office of Nuclear Regulatory Research and the necessary subcontractors that have signed a proprietary non-disclosure agreement with Westinghouse without the express written approval of Westinghouse.

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January 26, 2004

Correspondence with respect to the application for withholding should reference AW-04-1784, and should be addressed to James A. Gresham, Manager of Regulatory Compliance and Plant Licensing, Westinghouse Electric Company, P.O. Box 355, Pittsburgh, Pennsylvania, 15230-0355.

Please contact me at 412-374-4728 if you have any questions concerning this submittal.

Very truly yours,



R. P. Vijuk, Manager
Passive Plant Engineering
AP600 & AP1000 Projects

/Enclosure

1. Westinghouse Electric Company Copyright Notice, Proprietary Information Notice, Application for Withholding, and Affidavit AW-04-1784.

/Attachments

1. List of the AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Responses transmitted with letter DCP/NRC1675
2. Proprietary AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Responses dated January 26, 2004
3. Non-Proprietary AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Responses dated January 26, 2004

DCP/NRC1675
Docket No. 52-006

January 26, 2004

Enclosure 1

**Westinghouse Electric Company
Application for Withholding and Affidavit**



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

January 26, 2004

AW-04-1784

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. John Segala

**APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE**

SUBJECT: Transmittal of Westinghouse Proprietary Class 2 Documents Related to
AP1000 Design Certification Review Draft Safety Evaluation Report (DSER)
Open Item Response

Dear Mr. Segala:

The application for withholding is submitted by Westinghouse Electric Company, LLC ("Westinghouse") pursuant to the provisions of paragraph (b)(1) of Section 2.790 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 documents. In conformance with 10 CFR Section 2.790, Affidavit AW-04-1784 accompanies this application for withholding setting forth the basis on which the identified proprietary information may be withheld from public disclosure.

Accordingly, it is respectfully requested that the subject information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.790 of the Commission's regulations.

Correspondence with respect to this application for withholding or the accompanying affidavit should reference AW-04-1784 and should be addressed to the undersigned.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'R. P. Vijuk'.

R. P. Vijuk, Manager
Passive Plant Engineering
AP600 & AP1000 Projects

/Enclosures

COMMONWEALTH OF PENNSYLVANIA:

SS

COUNTY OF ALLEGHENY:

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.

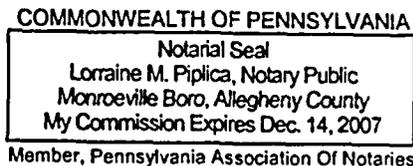


James W. Winters, Manager
Passive Plant Projects & Development
AP600 & AP1000 Projects
Nuclear Power Plants
Westinghouse Electric Company, LLC

Sworn to and subscribed
before me this 26th day
of January, 2004



Notary Public



- (1) I am Manager, Passive Plant Projects & Development, of the 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 rulemaking proceedings, and am authorized to apply for its withholding on behalf of the Westinghouse Electric Company, LLC.
- (2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.790 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 the Westinghouse Electric Company, LLC 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 2.790 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 which 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 2.790, 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 Attachment 2 as Proprietary Class 2 in the Westinghouse Electric Co., LLC document: (1) "AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Response."

This information is being transmitted by Westinghouse's letter and Application for Withholding Proprietary Information from Public Disclosure, being transmitted by Westinghouse Electric Company letter AW-04-1784 to the Document Control Desk, Attention: John Segala, CIPM/NRLPO, MS O-4D9A.

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

- (a) Provide documentation supporting determination of APP-GW-GL-700, "AP1000 Design Control Document," analysis on a plant specific basis
- (b) Provide the applicable engineering evaluation which establishes the Tier 2 requirements as identified in APP-GW-GL-700.

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 meeting NRC requirements for Licensing Documentation.
- (b) Westinghouse can sell support and defense of AP1000 Design Certification.

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 methodologies 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 for performing and analyzing tests.

Further the deponent sayeth not.

January 26, 2004

Copyright Notice

The documents transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies for the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.790 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond these 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.

January 26, 2004

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 2.790 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 2.790(b)(1).

January 26, 2004

Attachment 1

List of

Proprietary and Non-Proprietary Responses

Table 1 ‘List of Westinghouse’s Responses to DSER Open Items Transmitted in DCP/NRC1675’	
<p>3.8.5.1-1 Revision 2</p> <p>15.2.7-1P Item ADS4 Line Resistance Revision 1</p> <p>15.2.7-1 Item ADS4 Line Resistance Revision 1</p> <p>*Proprietary</p>	<p>19.1.10.2-6 Revision 2</p>

January 26, 2004

Attachment 3

AP1000 Design Certification Review
Draft Safety Evaluation Report Open Item Non-Proprietary Responses

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

DSER Open Item Number: 3.8.5.1-1 (Response Revision 2)

Original RAI Number(s): 230.23

Summary of Issue:

In DCD Tier 2 Section 3.8.5.1, the applicant states that the foundation is built on a mud mat, for ease of construction. The mud mat is lean, nonstructural concrete and rests upon the load-bearing rock. Waterproofing standards are described in DCD Tier 2 Section 3.4.1.1.1. In RAI 230.23, the staff raised a question that the non-structural concrete mud mat cannot withstand the very high toe pressure predicted in the applicant's seismic analysis. This may crush the non structural concrete mud mat and potentially affects the safety of the NI foundation mat under design basis combination of loads. Since the applicant did not provide a response to the RAI, this issue is designated as Open Item 3.8.5.1-1.

In the telephone call on August 22, 2003, the NRC requested inclusion of the functional requirements for the mud mat in the DCD.

In the telephone call on January 21, 2004, the NRC requested additional clarification in the DCD.

Westinghouse Response (Revision 2):

Additional information was provided in the RAI 230.023 Response transmitted by Westinghouse letter DCP/NRC1588, dated May 13, 2003.

The mud mat is a thin layer of lean, nonstructural concrete sandwiched between the rock and the underside of the basemat. Lean concrete in this confined condition will be capable of withstanding the high toe pressures conservatively predicted in the Westinghouse liftoff analysis. The DCD is being revised as shown below so that the Combined License applicant submits information demonstrating that the design of the mudmat will withstand the structural loads.

Design Control Document (DCD) Revision:

The last two sentences of subsection 2.5.4.6.3 were revised in DCD Revision 8. The following revisions to subsection 3.8.5 will be included in Revision 9.

3.8.5.5.1 Nuclear Island Maximum Bearing Pressures

The hard rock foundation will be demonstrated to be capable of withstanding the bearing demand from the nuclear island as described in subsection 2.5.4.5.6.

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

3.8.5.6 Materials, Quality Control, and Special Construction Techniques

The materials and quality control program used in the construction of the nuclear island structures foundation are described in subsection 3.8.4.6.

There are no special construction techniques used in the construction of the nuclear island structures foundation. Subsection 2.5.4.5.3 describes information to be provided by the Combined License applicant related to excavation, backfill and the mudmat.

PRA Revision:

None

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

DSER Open Item Number: 15.2.7-1 Item ADS4 Line Resistance (Response Revision 1)

Original RAI Number(s): None

Summary of Issue:

In a telecon with the NRC staff on 12/18/03 to discuss DSER OI 15.2.7-1 the reviewer requested additional information related to the calculation of line resistance for the Stage 4 ADS lines.

Westinghouse Response (Revision 1):

The incorrect proprietary markings in the original response are corrected in the response below. This is the only change in Revision 1 of this response.

Westinghouse Response:

The ADS valves are discussed in DCD Tier 2 information in Sections 5.1.3.7, 5.4.6, and 6.3.2.2.8.5. The line resistance for the Stage 4 ADS lines are provided in DCD Tier 1 information in Table 2.1.2-4, Item 8.d)

The approach to calculate the Stage 4 ADS line resistances used in the plant safety analysis and in the ITAACs is:

- Divide the line into sections of the same size and schedule
- Pipe routing information for each section is determined from plant line routing drawings
- Conservative maximum resistance for each line segment is calculated using conservative loss factors (L/D's) for the components in each segment
- Individual line segment resistances are added together to determine the total line resistance.

The line resistance calculation uses the conservative loss factors for piping, pipe fittings (elbows, tees, etc.) and entrance and exit losses that are provided in Crane Technical Paper 410. In addition, the head loss equations used to calculate the line resistance, are also provided in the Crane paper. The loss factors for the Stage 4 ADS valves are provided in the Westinghouse valve specification sheets for these valves.

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Draft Safety Evaluation Report Open Item Response

The following information is taken from the calculation note methodology section:

[] a,c

The following pages develop the maximum / minimum / best estimate line resistances for each line section. These resistances are expressed in "ft/gpm²" units because that is independent of fluid temperature and because resistances of different size lines can be easily added together. The Darcy equation is used to relate flow, resistance and head loss:

$$\text{Head Loss} = [0.00259 * f L/D * Q^2] / d^4 = R * Q^2$$

$$\text{Resistance} = [0.00259 * f L/D] / d^4$$

Attachment 1 provides the detailed line resistance calculation for the Stage 4 ADS line segments and a summary table that compiles the individual line resistances. This information has been taken from the AP1000 calculation note.

Each table identifies the line segment, the associated line size and schedule, line ID, and friction factor used in the resistance calculation. The table then lists the number of each type of component in the line, including margins as discussed previously, and calculates a conservative total loss factor for the line. The total loss factor is then used to calculate the maximum line resistance for the segment, along with minimum and best estimate resistances.

The total maximum resistance without single failure for each Stage 4 ADS line is used for the ITAAC acceptance criteria in Table 2.1.2-4 of the DCD Tier 1 information. The calculated maximum line resistance value is rounded down to two significant figures so that the ITAAC acceptance criteria bounds the maximum line resistances used in the safety analysis.

Design Control Document (DCD) Revision:

None

PRA Revision:

None

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

Attachment 1 - ADS Line Resistance Calculation Note Tables

ADS 4 th Stage (Loop 1)

40-41 HL to ADS A,C Tee

a.c

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41-42 Tee to ADS A Reducer

a.c

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42-43

Reducer to V-004A

a,c



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41-44 ADS A,C Tee to V-004C

a,c

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ADS 4th Stage (Loop2)

40-41 HL to ADS B,D Tee

a,c

AP1000 DESIGN CERTIFICATION REVIEW
Draft Safety Evaluation Report Open Item Response

41-42 Tee to ADS B Reducer

a,c



AP1000 DESIGN CERTIFICATION REVIEW
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42-43

Reducer to V-004B

a,c

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41-44 ADS B,D Tee to V-004D

a,c

[Empty response area]

AP1000 DESIGN CERTIFICATION REVIEW
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Total Maximum ADS 4 Line Resistances

a,c



AP1000 DESIGN CERTIFICATION REVIEW
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Isometric for Stage 4 ADS Valves RCS-014A/C and -004A/C



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Isometric for Stage 4 ADS Valves RCS-014B/D and -004B/D



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ADS Line Routing for Stage 4 ADS Valves RCS-014A/C and -004A/C

a,c

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

ADS Line Routing for Stage 4 ADS Valves RCS-014B/D and -004B/D

a,c

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

DSER Open Item Number: 19.1.10.2-6 (Response Revision 2)

Original RAI Number(s): 720.038

Summary of Issue:

Shutdown Fire Risk Evaluation

The applicant submitted the AP1000 shutdown fire risk evaluation on 3/28/03. The AP1000 fire risk analysis has a different grouping of fire areas and different combustible loadings than the AP600 shutdown fire risk evaluation, Therefore, the adequacy of the AP1000 shutdown fire risk evaluation is still being reviewed by the staff. This is Open Item 19.1.10.2-5,

Westinghouse Response:

Westinghouse believes that the AP1000 shutdown fire risk evaluation provided in the PRA Chapter 57 Fire Risk Assessment revision 3 issued on 05/16/03 is adequate.

Westinghouse believes existing Items 13,14,15,16,17,18,19,20,21,22,48,52,66,67,75 and new item 80 of Table 59-18 address fire risk insights. New item 80 is provided in OI 19.1.10.1-2 response revision 1.

NRC Comment during 12/17/03 Open Item status meeting:

An insight item should be added to AP1000 PRA Table 59-18 regarding establishing a fire watch for fire areas breached during maintenance.

Westinghouse Response (Revision 2):

AP1000 DCD section 9.5.1.8 and Sheet 24 of PRA Table 59-18 will be revised as shown below.

Design Control Document (DCD) Revision:

9.5.1.8 Combined License Information

The Combined License applicant will address qualification requirements for individuals responsible for development of the fire protection program, training of firefighting personnel, administrative procedures and controls governing the fire protection program during plant operation, and fire protection system maintenance.

The Combined License applicant will provide site-specific fire protection analysis information for the yard area, the administration building, and for other outlying buildings consistent with Appendix 9A.

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

The Combined License applicant will address BTP CMEB 9.5-1 issues identified in Table 9.5.1-1 by the acronym "WA."

The Combined License applicant will address updating the list of NFPA exceptions after design certification, if necessary.

The Combined License applicant will provide an analysis that demonstrates that operator actions which minimize the probability of the potential for spurious ADS actuation as a result of a fire can be accomplished within 30 minutes following detection of the fire and the procedure for the manual actuation of the valve to allow fire water to reach the automatic fire system in the containment maintenance floor.

The Combined License applicant will address the process for identifying deviations between the as-built installation of fire barriers and their tested configurations.

The Combined License applicant will establish procedures to address a fire watch for fire areas that are breached during maintenance.

PRA Revision:

Table 59-18 (Sheet 24 of 24)	
AP1000 PRA-BASED INSIGHTS	
Insight	Disposition
79. Combined License applicants referencing the AP1000 certified design will provide resolution for generic open items and plant-specific action items resulting from NRC review of the I&C platform.	7.1.6
80. The Combined License applicant will provide an analysis that demonstrates that operator actions which minimize the probability of the potential for spurious ADS actuation as a result of a fire can be accomplished within 30 minutes following detection of the fire and the procedure for the manual actuation of the valve to allow fire water to reach the automatic fire system in the containment maintenance floor.	9.5.1.8
81. The Combined License applicant will establish procedures to address a fire watch for fire areas that are breached during maintenance.	9.5.1.8