October 6, 2006

MEMORANDUM TO: Laura A. Dudes, Chief
New Reactor Licensing Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Sunil D. Weerakkody, Chief **/RA/**
Fire Protection Branch
Division of Risk Assessment
Office of Nuclear Reactor Regulation

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING WESTINGHOUSE AP1000 PRE-COMBIED OPERATING LICENSE APPLICATION WORK TECHNICAL REPORT APP-GW-GLR-027, REVISION 1, "OPERATOR ACTIONS MINIMIZING SPURIOUS AUTOMATIC DEPRESSURIZATION SYSTEM (ADS) ACTUATION" (TAC NO. MD2495)

The Fire Protection Branch reviewed the AP1000 Pre-Combined Operating License Application Work Technical Report APP-GW-GLR-027, Revision 1, "Operator Actions Minimizing Spurious ADS Actuation," submitted by Westinghouse Electric Company. The technical report was reviewed in accordance with the fire protection program requirements of Title 10 of the *Code of Federal Regulation*, Part 50, Section 48 (10 CFR 50.48), "Fire Protection," and General Design Criteria 3, "Fire Protection."

As the result of the review, we identified several areas where additional information is needed in order to determine the validity and adequacy of the analysis submitted in the technical report. Enclosed is a request for additional information (RAI).

Our effort on this task (TAC No. MD2495) is being continued. If you have any questions regarding the RAI, please contact us.

Enclosure:
As stated

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(301) 415-2149

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REQUEST FOR ADDITIONAL INFORMATION

WESTINGHOUSE AP1000 PRE-COL APPLICATION WORK TECHNICAL REPORT APP-GW-GLR-027, REVISION 1, "OPERATOR ACTIONS MINIMIZING SPURIOUS AUTOMATIC DEPRESSURIZATION SYSTEM (ADS) ACTUATION" TAC NO. MD2495

Westinghouse's AP1000 standard combined license technical report APP-GW-GLR-027, Revision 1, "Operator Actions Minimizing Spurious Automatic Depressurization System (ADS) Actuation," addresses (1) AP1000 Design Control Document (DCD) Combined Operating License Information Item 9.5-5 on fire water alignment to the containment maintenance floor automatic suppression system, and (2) Final Safety Evaluation Report Combined Operating License Action Item 9.5.1-4 on minimizing spurious ADS actuation.

The ADS system consists of parallel paths, each path having two motor-operated valves in series. To minimize the potential for spurious ADS actuation in the event of a fire, the AP1000 DCD requires physical separation of control circuits for the two series valves of each flow path and provides for operator actions to remove power from the affected fire area. This technical report provides the analysis to demonstrate that the required post-fire operator actions can be accomplished within 30 minutes from the onset of a postulated fire.

The Fire Protection Branch has reviewed the technical report and requests that the following clarifications be provided for the determination of the validity and adequacy of the submitted analysis in meeting the fire protection program requirements in accordance with Title 10 of *Code of Federal Regulation*, Part 50, Section 48 (10 CFR 50.48), "Fire Protection," and General Design Criteria 3, "Fire Protection":

1. The AP1000 DCD indicates that the potential for spurious actuation of the series motor-operated valves is minimized by the provision of physical separation between potential hot short locations. This technical report, however, did not specify the provided form of physical separation. Is physical separation achieved by electrical raceway fire barrier systems (ERFBS) or distance? If ERFBS, what is their rating? If distance, how far are the control cables separated from each other without intervening combustibles? Has or will the physical separation be justified via a fire model?

2. The AP1000 DCD assumes that "no postulated fire can spread to the hot short locations before the operator can remove power from the fire zone." The analysis provided in this technical report indicated that operator manual actions required for isolating all electrical power in the area of the target control circuits can be performed within 30 minutes after the detection of a fire. Does this imply that hot shorts which may cause spurious ADS actuation can occur as soon as 30 minutes after a fire is detected? If not, what is the available time margin, and how was the time margin assessed or calculated? Also, what is the postulated time period between fire initiation and fire

detection? Furthermore, to effectively assess the risk, the technical report

should discuss the consequences of not being able to perform the prescribed operator manual actions as part of defense in depth and safety margin evaluation.

3. The analysis concluded that no additional operator manual action is required for a fire initiated in the Main Control Room (MCR) due to the transfer of control to the remote shutdown workstation. However, it is not clear if the transfer switch scheme would electrically isolate the effects of the potential hot shorts just downstream of the MCR control switches. If the design does not adequately isolate these potential hot shorts, how would spurious ADS actuation, specifically, and other spurious equipment actuations, in general, be mitigated?

4. In an event of a fire that spreads to multiple rooms in the same fire area, how would an equipment operator perform the manual actions in a room which was or is on fire? For example, the Division A Instrumentation and Control Room (Room 12301) and the Division A DC Equipment Room (Room 12201) are in the same Fire Area 1202 AF 04. If a postulated fire spread from Room 12301 to Room 12201, the equipment operator may not be able to enter Room 12301 to isolated power to the Power Management System Cabinets as prescribed for a fire in Room 12201.

5. What is the rational for performing manual actions both remotely and from the MCR for certain equipment when a fire starts in a particular room and not for others?

6. Are the assumptions related to potential spurious actuations for this technical report consistent with Regulatory Issue Summary (RIS) 2005-30, "Clarification of Post-Fire Safe-Shutdown Circuit Regulatory Requirements," RIS 2006-10, "Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions," and draft GL 2005-xx, "Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations?"

7. Has the procedure for manual alignment of fire water to reach the automatic fire suppression system for the containment maintenance floor been submitted for review? The Nuclear Regulatory Commission Staff needs to review the subject procedure in order to evaluate the feasibility of the manual actions and the impact, if any, on the AP1000 fire protection program. This technical report indicates that this procedure has been written. However, no such procedure is included in the report.