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Your ref: Docket No. 52-006
Our ref: DCP/NRC2157

June 10, 2008

Subject: AP1000 Response to Requests for Additional Information (TR 45)

Westinghouse is submitting a response to the NRC requests for additional information (RAIs) on AP1000 Standard Combined License Technical Report (TR) 45, APP-GW-GLR-027, "Operator Actions Minimizing Spurious ADS Actuation". 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 for RAI-TR45-024, as sent in an email from Perry Buckberg to Sam Adams dated March 12, 2008. This response completes all requests received to date for Technical Report 45. A Revision 1 response for RAI-TR45-017 was submitted under letter DCP/NRC2139 dated May 20, 2008. Revision 1 responses for RAI-TR45-008 and RAI-TR45-016 were submitted under letter DCP/NRC2135 dated May 14, 2008. Revision 0 responses for RAI-TR45-001 through -023 were submitted under letter DCP/NRC1960 dated July 13, 2007.

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. C. Lindgren / FOR

Robert Sisk, Manager
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D063
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/Enclosure

1. Response to Requests for Additional Information on Technical Report 45

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ENCLOSURE 1

Response to Requests for Additional Information on Technical Report 45

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR45-024
Revision: 0

Question:

BTP CMEB 9.5-1, Position C.5.b(1), states that fire protection features should be provided for structures, systems, and components important to safe shutdown that are capable of limiting fire damage so that one train of systems necessary to achieve and maintain hot shutdown is free of fire damage. Acceptable approaches for meeting the guidelines of Position C5.b(1) are provided in Position C.5.b(2). If the guidelines of Positions C5.b(1) and C5.b(2) cannot be met, then alternative or dedicated shutdown capability and it s associated circuits, independent of cables, systems or components in the area, room, or zone under consideration should be provided.

Consistent with the BTP and FSER Section 9.5.1.5.c, Table 9.5.1-1(item 76) of the DCD states that the passive core cooling (PXS) and passive containment cooling (PCS) systems are used as an alternative/dedicated shutdown method, and that automatic suppression is provided in those fire areas outside containment where a fire could damage the normal shutdown capability, or result in a spurious operation of equipment that could result in a venting of the RCS.

Please provide information necessary to confirm that automatic suppression is provided in fire areas identified as having the potential to cause a spurious ADS actuation as a result of fire damage. In addition, although the PCS and PXS systems are credited for mitigating the effects of a spurious ADS actuation, equipment needed to assure their proper operation in the event of a fire-induced spurious ADS actuation, do not appear to be included in the safe shutdown equipment list. As a result it is not clear if these systems have been assured to remain free of fire damage. Please clarify.

Westinghouse Response:

Per NUREG 1512, Section 9.5.1.1.d, the NRC staff concluded that the safety-related passive core cooling system (PXS) and passive containment cooling system (PCS) used to achieve and maintain safe shutdown following a fire in AP600 are acceptable as an alternative/dedicated shutdown method for fire areas where the normal shutdown systems have not been protected in accordance with the guidance prescribed in BTP CMEB 9.5-1. The NRC staff found the design did remain consistent with the staff's position for AP1000 in NUREG 1793, the AP1000 FSER.

The statement provided for item 76 of table 9.5.1-1 and in section 9A.2.7 of the AP1000 DCD was taken verbatim from the NRC criteria stated in NUREG 1512, Section 9.5.1.5.c. This criteria was unique to AP600, as established per RAI 280.32F. The following are two documents to note regarding the response to RAI 280.32F:

1. Westinghouse letter DCP/NRC1232 (NSD-NRC-98-5543) dated January 28, 1998

2. NRC letter dated March 6, 1998 (NRC/DCP1064)– Summary of the February 24, 1998, Meeting With Westinghouse Electric Company to Resolve Issues Related to the AP600 Fire Protection Design

This correspondence provides the positions held by Westinghouse in regard to the Fire Protection design, changes that were made to the SSAR at in accordance with the response, and the resolution required by the NRC to close the open items and find the Fire Protection design acceptable.

The meeting minutes identify open item 9.5.1-1 pertaining to the automatic suppression needed regarding the NRC criteria, taking into account RAI 280.32F response, and the required resolution. These meeting minutes for open item 9.5.1-1 state:

> The use of the first stage ADS as described above is acceptable as an alternative shutdown method provided the normal shutdown equipment and circuits are provided with automatic suppression or are located in separate fire areas.

Resolution actions for this open item were applied to revision 23 of the AP600 SSAR, which were carried over to the certified AP1000 design and DCD. The statement:

> "To enhance the survivability of the normal safe shutdown and cold shutdown capability in the event of a fire, and to reduce the reliance on the infrequently utilized safety-related passive systems, automatic suppression will be provided in those fire areas outside containment where a fire could damage the normal shutdown capability or result in a spurious operation of equipment that could lead to a venting of the RCS."

was added to Table 9.5.1-1 Item 76 and Section 9A.2.7.1 of revision 2 of the AP1000 DCD to confirm the acceptability of the Fire Protection design in accordance with the NRC criterion as identified in the AP600 documentation listed above and NUREG 1512. Verbatim compliance with this criterion was not required by the NRC and the combination of automatic suppression and separation for these items was deemed to be adequate for certification of the AP1000 Fire Protection System design.

In accordance with the acceptance of the AP1000 design regarding the above NRC criteria, Westinghouse will revise the DCD to correctly reflect the AP1000 design as indicated in the appropriate section below.

The AP1000 standard plant design does not, nor has it ever, included automatic fire suppression capability in the areas where a potential for spurious ADS actuation could occur. AP1000 does not utilize any fire suppression mediums other than water, and inadvertent actuation of a water suppressant system may damage electrical equipment. The fire areas

where spurious actuation of ADS could occur (listed in RAI-TR45-008 and shown below) are comprised of electrical cabinets, cabling, and/or batteries (with the exception of the Main Control Room).

The minimization of potential inadvertent ADS actuation during a fire that affects any of these areas is accomplished through the actions described in Technical Report 45 (Ref. 1). The fire protection methodology described in Appendix 9A of the DCD provides the requirements for automatic fire suppression to be placed in a fire zone/area. Fire detection, manual hose stations, and portable fire extinguishers are located in every fire area identified in the table below. These areas meet the requirements of NFPA 804 and meet the criteria stated in NFPA 13 for electrical equipment areas that do not require sprinklers (with the exception of the MCR).

Room	Fire Area	Room #	Other Rooms in Area	FPA Reference
Main Control Room	1242 AF 01	12401	none	9A.3.1.2.5.1
Div. A I&C Room	1202 AF 04	12301	12101, 12201	9A.3.1.2.1.1
Div. B I&C Room	1201 AF 02	12304	12104, 12204, 12207	9A.3.1.2.2.1
Div. C I&C Room	1202 AF 03	12302	12102, 12202, 12203, 12312, 12313	9A.3.1.2.3.1
Div. D I&C Room	1201 AF 03	12305	12105, 12205	9A.3.1.2.4.1
Div. A Penetration Room	1242 AF 02	12412	none	9A.3.1.2.1.2
Div. C Penetration Room	1202 AF 03	12313	12102, 12202, 12203, 12302, 12312	9A.3.1.2.3.1

The applicable valves associated with safe shutdown using the PCS and PXS are listed in table 9A-2 of Appendix 9A in the DCD, as noted in RAI-TR45-016.

References:

1. APP-GW-GLR-027, Operator Actions Minimizing Spurious ADS Actuation, Technical Report 45.

Design Control Document (DCD) Revision:

Table 9.5.1-1 (Sheet 13 of 33)
AP1000 FIRE PROTECTION PROGRAM COMPLIANCE WITH BTP CMEB 9.5-1

76. Alternative or dedicated shutdown capability.	C.5.c	NC	In Generic Letter (GL) 86-10, the staff stated its position that, for the purpose of analysis to Section III.G.2 of Appendix R to 10 CFR Part 50 criteria, the safe shutdown capability is defined as one of the two normal safe shutdown trains. The safety-related PXS and PCS are used to achieve and maintain safe shutdown following a fire and are acceptable as an alternative/dedicated shutdown method for fire areas where the normal shutdown systems have not been protected in accordance with the guidance prescribed in the BTP. The criteria concerning cold shutdown capability deviates from the criteria applied to the evolutionary reactor designs, but is consistent with the criteria applicable to existing plants. To enhance the survivability of the normal safe shutdown and cold shutdown capability in the event of a fire, and to reduce the reliance on the infrequently utilized safety-related passive systems, automatic suppression or physical separation is provided in those fire areas outside containment where a fire could damage the normal shutdown capability~~, or result in a spurious operation of equipment that could result in a venting of the RCS~~. This criterion does not ensure that the normal shutdown capability will be free of fire damage, or that the equipment necessary to achieve and maintain cold shutdown can be repaired within 72 hours.

9A.2.7 Safe Shutdown Evaluation

This subsection describes the methodology for evaluation of the effects of postulated fires in each fire area on the ability of the operator to achieve a safe shutdown of the plant. The criteria and assumptions upon which the evaluation is based are described in subsection 9A.2.7.1. The safety-related features of the plant designed to provide the safe shutdown capability are described in subsection 9A.2.7.2.

As indicated in subsection 9.5.1, this evaluation is based upon satisfying the requirements of BTP CMEB 9.5-1. This basis includes using safe shutdown as defined in Section 16.1 in lieu of cold shutdown wherever stated in BTP CMEB 9.5-1. The automatic depressurization system is not used as the method for achieving safe shutdown after a fire and spurious actuation of the automatic depressurization system is avoided. The passive residual heat removal heat exchanger is used to remove decay heat for safe shutdown as described in subsection 7.4.1.3.

In addition, the plant has enhanced capability to achieve cold shutdown following a fire as discussed in subsection 9.5.1. This capability is not relied upon in the fire evaluation contained in Appendix 9A.

The criteria concerning cold shutdown capability deviates from the criteria applied to the evolutionary reactor designs, but is consistent with the criteria applicable to existing plants. To enhance the survivability of the normal safe shutdown and cold shutdown capability in the event of a fire, and to reduce the reliance on the infrequently utilized safety-related passive systems, automatic suppression or physical separation is provided in those fire areas outside containment where a fire could damage the normal shutdown capability~~, or result in a spurious operation of equipment that could result in a venting of the RCS~~. This criterion is unique to the AP1000 and does not ensure that the normal shutdown capability will be free of fire damage, or that the equipment necessary to achieve and maintain cold shutdown can be repaired within 72 hours.

PRA Revision:
None

Technical Report (TR) Revision:
None