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Your ref: Docket No. 52-006  
Our ref: DCP/NRC2139

May 20, 2008

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

Westinghouse is submitting a revised response to the NRC requests for additional information (RAI) 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 revised response is provided for RAI-TR45-017, as sent in an email from Perry Buckberg to Sam Adams dated March 12, 2008. This response completes 26 of 27 requests received to date for Technical Report 45. Revision 1 responses for RAI-TR45-008 and RAI-TR45-016 were submitted under letter DCP/NRC2135 dated May 20, 2008. Revision 0 responses for RAI-TR45-001 through -023 were submitted under letter DCP/NRC1960 dated July 13, 2007. A response to RAI-TR45-024 is scheduled to be completed by May 23, 2008.

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,

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

DU63  
NRC

/Enclosure

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

cc:	P. Buckberg	- U.S. NRC	1E
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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)

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RAI Response Number: RAI-TR45-017  
Revision: 1

### **Question:**

#### Original RAI sent May 2007:

A. *The 30-minute time frame assumed to be available to perform operator actions outside the MCR, appears to be based on the physical separation of control circuits. That is, appropriately-separated circuitry could survive an ongoing fire for 30 min., allowing time for operators to de-energize those circuits. However, the analysis does not provide any information that describes the physical separation of these circuits in each of the affected fire areas or how this separation will be assured for future plants. Please provide.*

B. *In addition, for each of the affected fire areas / rooms, the estimate of the time available should account for unique fire-related uncertainties that could affect that estimate, such as:*

- *nature of the fire (e.g., whether the fire is a fast energetic fire, failing equipment quickly, or a slow developing fire with little or no equipment failures for some time)*
- *variations in fire detector response times and sensitivities*
- *variations in air flows that could affect the fire and its growth*
- *specific fire initiation location relative to important targets*
- *presence (or lack thereof) of temporary transient combustibles*

#### Follow-up RAI request sent February 2008:

A 30-minute time frame is assumed to be available for operators to perform required actions outside the MCR. This time frame appears to be based on the provision of physical separation (barriers) between potential hot short locations. Provide information to confirm that the physical separation is adequate to ensure that the ADS will not actuate as a result of fire for at least 30 minutes.

### **Westinghouse Response:**

A. Spurious actuation from control room dedicated switches which could lead to a breach of reactor coolant system pressure boundary, is prevented by the use of dual two-pole, energize-to-actuate, ungrounded dc circuits, which require at least four simultaneous hot shorts of proper polarity for spurious actuation. These circuits run in separate cable trays. Internal faults within these cables cannot initiate a spurious ADS actuation.

AP1000 is a standard design with a standard Design Certification. Any modifications to the vital area boundary, fire hazards analysis, addition of the first safe shutdown operator action or other modification affecting the assumption on operator response to a fire will receive an appropriate review as required by 10CFR52.

B. As the start time for the analysis is upon fire detection, the type, severity, and location of the fire and fire detector response variations is irrelevant to the evaluation. The combustible

# AP1000 TECHNICAL REPORT REVIEW

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loading (in-situ and transient combustibles) of each fire zone/fire area can be found in the Fire Protection Analysis (FPA) located in DCD section 9A, Table 9A-3, which evaluates for the nature, severity, and duration of a postulated fire in the respective zone/area. This table and the associated fire protection analysis text (such as 9A.3.1.2.4.1) indicates that these rooms are "a light fire hazard area and the rate of fire growth is expected to be slow". Fire dampers in ventilation ductwork and rated fire barriers mitigate the spread of smoke and fire.

### Follow-up RAI response sent May 2008:

The ADS stages 1, 2, and 3 have MOVs that are in series and have controls in separate ILC cabinets. The ILC cabinets are physically separated by the space of at least one other cabinet. A fire will not spread from one ILC cabinet to another ILC cabinet without detection because it would have to travel through double steel cabinet walls as well as the adjacent cabinet. There are minimal combustible materials in the cabinets and therefore over current conditions are limited to melting wire insulation which would do no more than produce smoke. There are smoke detectors in the cabinets so that the operator would get advance notice of a potential fire long before it could attempt to spread to another cabinet.

The physical separation as described above, of the potential hot short locations, is such that it would easily take at least 30 minutes following detection for a fire to spread to another cabinet, and most likely, not be able to spread at all. This would allow operators at least 30 minutes to de-energize the affected equipment. The ADS stage 4 valves are squibs whose arm and fire controls are also in separate ILC cabinets, separated just like the MOV controls. It is next to impossible for a fire to spread from one ILC cabinet to another, let alone in the proper sequence to fire a squib valve. Therefore in the case of the 4<sup>th</sup> stage ADS valves 30 minutes is a justifiable time frame to de-energize the hot circuits when it is highly unlikely that the fire will even occur, let alone spread.

### Reference:

1. APP-GW-GL-700, Revision 16, Design Control Document.

### **Design Control Document (DCD) Revision:**

None

### **PRA Revision:**

None

### **Technical Report (TR) Revision:**

None