

**Question 6:**

**Provide Licensing Basis for manual actions.**

**Response:**

The use of manual actions to achieve safe shutdown is part of the original Sequoyah design and licensing basis for Appendix R. The licensing basis documents summarized on Attachment 1 illustrate some of the discussions between NRC and Sequoyah concerning the use of manual actions to operate equipment which may have its remote control capability impaired by a fire. As documented in the following, manual actions to operate equipment in lieu of Appendix R, Section III.G requirements was determined to be acceptable by the NRC without deviations specific to an interaction. Although the documentation updated (2002) as part of the Sequoyah reanalysis effort provides additional detail on the manual actions that are credited, the safe shutdown methodology remains essentially unchanged from the design basis approved by the restart SER in May 1988. Attachment 2 provides a summary of pertinent regulatory guidance documents.

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**SEQUOYAH LICENSING BASIS DOCUMENTS****TVA letter to NRC dated October 01, 1987**

TVA letter to NRC dated October 01, 1987 transmitted a copy of calculation

SQN-SQS4-127, Revision 6 in response to the NRC project manager's request to support the NRC review of the fire protection program. Enclosure 1 of SQN-SQS4-127, Rev. 6 clearly identified manual actions which were credited to achieve safe shutdown and which formed the basis for the NRC SER issued for restart under NUREG 1232 in May 1988.

**TVA Letter to the NRC dated 4/13/88, Enclosure 2, which states in part:**

*"Specific cable/equipment interactions were identified (Interaction Identification Forms) for locations not meeting 10 CFR 50, Appendix R, section III.G.2, requirements. Corrective actions were identified to provide alternate methods to mitigate possible fire damage. These corrective actions included operator action, cable reroute, and fire protective wrap."*

**May 10, 1988 Appendix R – Enforcement Conference**

During the May 10, 1988 Appendix R Enforcement Conference, the use of operator actions was discussed. SQN SOI-26.2 Revision 7, Section III. "Conditions For Operation" (which was provided as a handout) was also discussed. The following excerpts from the SQN SOI-26.2 are provided:

*SQN SOI-26.2, Rev. 7, Section III. "Conditions For Operation"  
"B. The unit's staffing is such that manual manipulation of components can be achieved."*

*SQN SOI-26.2, Rev. 7, Section IV. "Precautions"  
"A. Fires in certain areas may cause spurious valve operation or prevent equipment from operating. In the event of spurious operation deenergization of the power supply (i.e., pull fuses, may allow the subject component to fail safe)."*

**April 8, 1988, NRC Inspection Report Nos. 50-327/88-24 and 50-328/88-24**

The objective of this team inspection was to evaluate the adequacy of SQN's Appendix R program and its compliance with Appendix R, Sections III.G, III.J, III.L, and III.O. This inspection report formed the basis for the restart SER, NUREG-1232 issued in May 1988. This inspection report contains the following references to manual operator actions.

Section 4.0 Spurious Actuation – This section deals with SQN's treatment of fire induced spurious actuations. The last two sentences of the second paragraph read as follows:

Each interaction was documented on Interaction Identification forms which include recommended corrective actions to provide alternate methods of protection. Such alternate methods typically include the rerouting and/or protective fire wrapping of interacting cables or procedural revisions which require additional operator actions, necessary to mitigate the possible effects of fire induced faults.

Section 4.7 Interaction No. 86 – This interaction discusses the potential cable damage that could prevent isolation of normal and excess letdown. In the third paragraph of the revised disposition the NRC states "the licensee has committed to revise existing procedures to require the isolation of the instrument control air to containment during any event which results in an unanticipated loss of pressurizer level."

Section 8 Heating Ventilation and Air Conditioning – This section includes a reference to the two rooms that may require temporary ventilation (480 V Transformer Rooms 2A and 2B). It concludes stating the "NRC has reviewed the HVAC data developed by TVA and the actions proposed and considers them to be sufficient to preclude adverse temperature effects."

Enclosure 1 to the Inspection Report is the NRC's Safety Evaluation Report concerning TVA's responses to questions raised by the Alleger. The discussion for several questions makes reference to manual actions.

Evaluation of Question 5

This question concerned the crediting of control air systems during an Appendix R fire. The second paragraph of the evaluation reads as

follows.

The licensee's safe shutdown analysis did not credit the use of air systems to reach safe shutdown. However, if air remained available, it would be used to normally operate valves. Manual actions are taken as a backup to manipulate devices in the event the air system is not available."

The evaluation concludes "the NRC staff has reviewed the licensee's analyses and concurs with them."

#### Evaluation of Question 12

This question concerns the protection of cables from spurious actuation. It discusses the original reviews TVA performed and notes that "TVA has agreed to install additional fire detectors and suppression systems in the annulus area,...and change the procedures to include certain operator actions." The NRC concluded that TVA had adequately addressed the issue.

## REGULATORY REFERENCES

**July 2, 1982, from R. Mattson to R. Vollmer (Vollmer Memo).**

*“Section III.G.1 of Appendix R states that one train of systems needed for hot shutdown must be free of fire damage. Thus, one train of systems needed for hot shutdown must be operable during and following a fire. Operability of the hot shutdown systems, including the ability to overcome a fire or fire suppressant induced maloperation of hot shutdown equipment and the plant’s power distribution system must exist without repairs. Manual operation of valves, switches and circuit breakers is allowed to operate equipment and isolate systems and is not considered a repair. However, the removal of fuses for isolation is not permitted. All manual operations must be achievable prior to the fire or fire suppressant induced maloperations reaching an unrecoverable plant condition.”*

Although the title of the Vollmer Memo refers to “Alternate Shutdown”, it is clear from other documents as well as the context of the memo that the discussion of “free of fire damage” applies to both redundant safe shutdown and “Alternate Shutdown” locations.

**SECY 83-269 (July 5, 1983) Attachment C “NRC Staff Positions on Post Fire Shutdown Capability”, section b:**

*“...Section III.G.1 of Appendix R states that one train of systems needed for hot shutdown must be free of fire damage. Thus, one train of systems needed for hot shutdown must be operable during and following a fire. Operability of the hot shutdown systems, including the ability to overcome a fire or fire suppressant induced maloperation of hot shutdown equipment and the plant’s power distribution system must exist without repairs. Manual operation*

*of valves, switches and circuit breakers is allowed to operate equipment and isolate systems and is not considered a repair. However, the removal of fuses for isolation is not permitted. All manual operations must be achievable prior to the fire or fire suppressant induced maloperations reaching an unrecoverable plant condition.”*

**Regulatory Guide 1.189, Section 5.3**

*“One success path of equipment necessary to achieve hot standby (PWR) or hot shutdown (BWR) from either the control room or emergency control stations should be maintained free of fire damage by a single fire, including an exposure fire. Manual operation of valves, switches, and circuit breakers is allowed to operate equipment and isolate systems and is not considered a repair.”*

An emergency control station is defined (see Glossary, p. 108 of the Reg. Guide) as a “location outside the main control room where actions are taken by operations personnel to manipulate plant systems and controls to achieve safe shutdown of the reactor.”