

Fire Protection Facilitated Workshop

Fire Protection

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Outcome and Purpose of Workshop

- To identify the most risk significant associated circuit configurations so the EGM can be withdrawn and inspections can resume in a risk informed manner.
- To identify other associated circuit configurations which require further research before focusing inspection in these areas.
- To identify the least risk significant associated circuit configurations so that inspection resources will not be expended on low risk/ small consequence items.
- We are risk-informing the inspection process (Not changing the regulations).
- Nothing in this Workshop changes a plant's licensing basis.
- Plants' licensing basis are different



Associated Circuit Issue

- Licensing basis
- Regulation
- NEI 00-01, Draft D
- Draft NUREG
- Reg Guide
- Inspection Guidance

History of Associated Circuits

- Browns Ferry Fire-1975
 - Illustrated the impact of common-mode failures due to fire.
 - Circuit failures caused equipment to operate in unexpected ways, significantly impeded the operators' ability to monitor and control reactor safety functions.
- SECY-80-438A, "Rule on Fire Protection Program for Nuclear Power Plants Operating Prior to January 1, 1979," dated 9/30/80
 - The need to evaluate the effects of fire on circuits associated with safe shutdown systems not explicit in Appendix A to BTP 9.5-1
 - Required in Appendix R
 - Implementation issues led to unclear expectations



Regulation (Continued)

Section III.G.2

- “Where cables or equipment including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits or shorts to ground of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the safe fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided...”



Definition of Associated Circuits

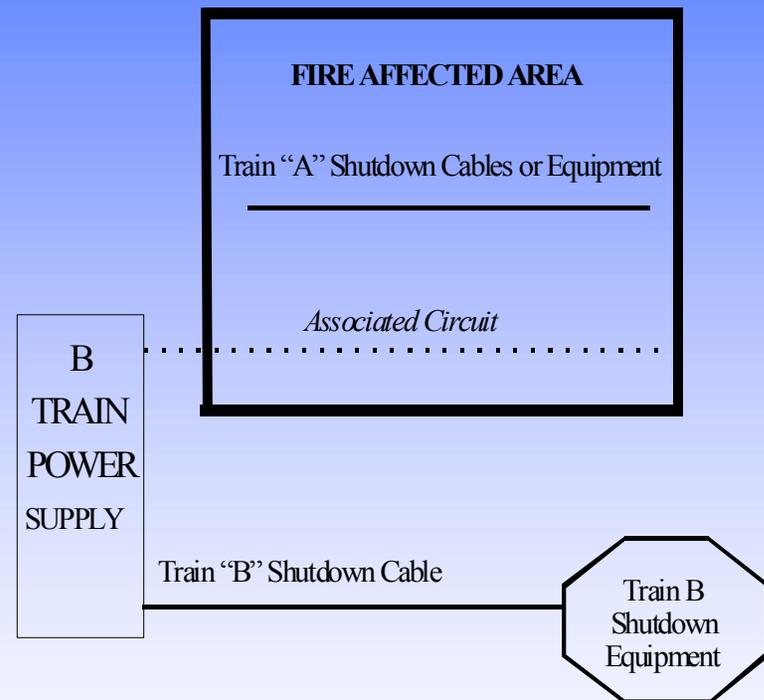
Regulatory Guide 1.189

- Circuits that do not meet the separation requirements for safe shutdown systems and components and are associated with safe shutdown systems and components by common power supply, common enclosure, or the potential to cause spurious operations that could prevent or adversely affect the capability to safely shut down the reactor as a result of fire-induced failures (hot shorts, open circuits, and shorts to ground).
- Circuits/cables of equipment that, if damaged by fire could impact the shutdown capability (non-essential or non-safety circuits of concern)



History of Associated Circuits (Continued)

- Clarification of GL 81-12, dated April 1982
 - Enclosure 2, Diagram 2B (Reference Diagram on Right)
 - Manual Actions covered in III.G.3
- GL 86-10, "Implementation of Fire Protection requirements," dated April 24, 1986



Examples of Associated Circuits

- While operation of the PORV in a PWR may not be needed to ensure the operation of a defined shutdown system (i.e.. CVCS), its maloperation due to fire damage to connected cabling could have a significant impact on the plant's overall shutdown capability.
- Non-essential circuits which share a common power supply (i.e.. Motor control center) with circuits of equipment required to achieve and maintain safe shutdown
- Non-essential circuits which share a common enclosure
- Cables and circuits that have a connection to equipment whose spurious operation would adversely affect the shutdown capability.



Conclusion

- Focus Inspection Resources on the Most Risk Significant
- Withdraw EGM
- Resume Inspections
- Identify associated circuits for further research
- Identify least risk significant
 - Efficient and Effective use of Inspection Resources
- Reactor oversight process (ROP) provides for identifying conditions adverse to quality (safety).



Ranking Criteria

Cable Functional Class	Number Faults Leading to Core Damage or Nonrecoverable Condition	Fault Type	Installation	Number of Conductors	Control Power Transformer or Current Limiting Device	Armor/Ground Wire	Ground
1.Power	1. One	1. Short to Ground	1. Covered Closed Tray	1. Single Conductor	1. CPT or Current Limiting Invertor	1. Armored	1. Grounded
2 Control	2. Two or More	2. Hot Short	2. Open Tray	2. Multi-Conductor	2. None	2. Grounding Wire or Shield	2. Floating Potential (ungrounded)
3.Instrument		3. High Impedance	3. Conduit			3. None	
			4. Air Drop				