Fire Protection Program RAIs for Bellefonte COLA

Fire Protection Branch
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Office of New Reactors

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Background

- Three of the issues raised in the subject RAIs are based on similar key issues being addressed for existing reactors
- The staff has been actively working with industry to resolve these issues for several years – some are still unresolved
- Identifying and resolving these issues now for new reactors will:
  - Ensure plant safe shutdown in the event of a fire
  - Provide clear direction for licensees prior to design implementation
  - Avoid the large expenditure of resources by both staff and industry, as well as potential hardware costs, that are required to resolve these issues for existing reactors

RAI 09.05.01-1
Self Approval of FPP Changes

- Existing reactors have a unique FP license condition for self-approval of changes that could impact the fire protection program.
- RG 1.189 Regulatory Position 1.8.1 states that this license condition does not apply to new reactors.
  - The LC for existing plants facilitated the implementation of new fire protection regulations to existing plants following the Browns Ferry fire – this does not apply to new reactors.
  - New reactors should apply the same regulatory requirements for change approval to the FPP as for the rest of the plant.

RAI 09.05.01-3
Post-Fire Operator Manual Actions

- Crediting operator manual actions (outside the main control room) for post-fire safe shutdown is acceptable (but should be minimized).
- Since the feasibility and reliability of OMAs is subjective, the staff wants to review the licensees' approach and document commitments for the acceptance criteria.
- One acceptable approach is described in NUREG-1852
- If no OMAs are credited for post-fire safe shutdown, the application should confirm this.

RAI 09.05.01-4
Electrical Raceway Fire Barrier Systems

- ERFBS's are an acceptable means of providing separation of divisions (but should be minimized)
- DCD Appendix 9A identifies use of ERFBS's in specific fire areas
- COL application should identify any additional use of ERFBS's or include a statement that none will be used.
- COL application should identify the methods for testing and qualifying the ERFBS's.
- RG 1.189, Appendix C provides acceptable guidance for testing and qualifying ERFBS's.

RAI 09.05.01-2
Final FHA and Safe Shutdown Analysis

- Scope of an acceptable fire hazards analysis is provided in RG 1.189, Reg Position 1.2 (similar to NFPA 804)
- The FHA and SSD analysis are an integral part of the programmatic aspects of the fire protection program
- Final FHA must be based on as-built configurations and as-purchased materials and equipment
- Includes the amounts, types, configurations and locations of flammable and combustible materials as well as ignition sources.
- Includes the layout and configurations of SSC's important to safety
- Includes accessibility and the level of congestion as they apply to access for manual fire fighting activities, as well as the location and type of manual firefighting equipment.

RAI 09.05.01-2
Final FHA and Safe Shutdown Analysis

- Final post-fire safe-shutdown circuit analysis should be performed in general accordance with industry guidance provided in NEI 00-01.
- Draft Rev 2 of NEI 00-01 provides guidance for evaluating potential multiple spurious actuations.

Multiple Spurious Actuations

- RAI is being prepared to address this issue
- The potential for fire-induced MSA's to occur in rapid succession has been demonstrated in both industry and NRC cable fire test programs.
- The "one-at-a-time" approach to MSA's documented in the DCD may be inadequate for some cable configurations and materials.
- For example, the DCD evaluations of MSA's associated with Passive Containment Cooling System Valve Actuation and Reactor Trip Switchgear credit the one-at-at-time assumption without demonstrating that MSA's are not credible.
- Consequently, the staff needs to review the details of each application of this assumption, including the potential consequences of MSA's.

Effects of Fire/Smoke on Digital I&C

- RAI being prepared on this issue.
- The DCD assumes failure of digital I&C equipment in each fire area, but does not adequately address potential MSA's
- Several NUREG's document tests performed on digital components that show potential for spurious actuation's caused by smoke exposure (primarily due to bridging of circuit traces as a result of the conductivity of smoke).
- The applicant should identify potential failures of digital system components (e.g. control and instrumentation components) due to smoke exposure that could adversely impact safe shutdown and describe how those potential failures will be prevented or mitigated.