

Insights on Fire PRA Methods

NRC-Industry Meeting on Risk-informed Regulatory Initiatives

January 25, 2008

Background

- Development of fire PRAs to support the transition to NFPA-805 has occurred very rapidly
- First full applications of the methods from NUREG/CR-6850/EPRI TR-1011989
- Initial implementations have yielded many insights worthy of discussion
- NEI and EPRI summary paper describes key insights to date and provides suggestions on the path forward

Summary

- NUREG/CR-6850 has enhanced fire PRA methods in a number of areas:
 - Process for Component Selection
 - Structure for Fire Ignition Sources
 - Tools for Scoping and Detailed Fire Modeling
 - Approaches to Circuit Analysis
 - Approach to Sensitivity and Uncertainty Analysis

Summary (Cont.)

- FAQ process has resulted in an evolution of the technical methods
- Initial applications have identified challenges in a number of areas:
 - Quantification of Fire Ignition Frequencies
 - Fire Severity Factors and Heat Release Rates
 - Quantification of Hot Short Susceptibility
 - Credit for Fire Suppression
 - Post-Fire Human Reliability Analysis

Summary (Cont.)

- Initial indications inconsistent with operating experience
 - Occurrence of precursors,
 - Effectiveness of detection and suppression
 - Occurrence of large fires
 - Occurrence of MSOs
- Conservatism complicates the risk-informed decision-making process for both NFPA-805 and other risk-informed applications

Technical Implications

- Initial indications do not align with industry experience
- Risk-informed decision-making relies on a realistic assessment
- Need to ensure important risk contributors are addressed
- Current methods complicate risk-informed decision-making beyond NFPA-805

Regulatory Implications of PRA Conservatism

- NFPA-805 introduces numerical results into on-going plant licensing basis
- Requirement to ensure on-going regulatory compliance using PRA will be a challenge
- Creates complications for other risk-informed applications
- Applying conservative assumptions to beyond design basis conditions can have significant long-term implications

Path Forward

- Need for refinement not unexpected
- Industry and NRC must continue to work together
- Rapid response required to support enforcement discretion schedule
- Key technical resources must be made available to achieve timely resolution

Path Forward (Cont.)

1. Immediate focus on key technical issues arising from pilot applications. For example,
 - Treatment of oil fires
 - Electrical cabinet HRR
 - Credit for incipient detection
2. Adapt the FAQ process to support timely resolution of potential conservatisms identified by pilots and initial applicants
3. Update of NUREG/CR-6850/EPRI TR 1011989 as soon as feasible
4. Feedback to other non-NFPA-805 applications and risk-informed decision-making

Discussion

- Industry has committed resources to address these needs
- NRC engagement necessary
- Need to define a timely process