



# **CURRENT PRA LESSONS LEARNED IN NFPA-805 REVIEWS**

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# Pilot Fire PRA Review

- **Per RG 1.205, Revision 1, NRC staff reviewed the fire PRAs at both Harris and Oconee**
  - **Harris subsequently had a focused scope peer review before SE issued**
- **Multiple rounds of RAIs**
- **Multiple Site-visits**
- **Parallel development of LAR and SE templates only partially successful because of complexity of processes, and scheduling and resource constraints (e.g., Appropriate framework developed but details within sections may be application specific)**

# Pilot SE PRA Conclusions

- **Harris: Submitted May 2008: SE issued June 2010**
  - **“the NRC staff finds that the technical adequacy and quality of the HNP PRA is sufficient for the fire risk evaluations that support the proposed license amendment.”**
  - **“Self approved, risk-informed changes may not be made ...until the Harris Fire PRA model has been modified to incorporate an NRC-accepted method for modeling incipient detection”**
- **Oconee: Submitted May 2008: SE issued December 2010**
  - **“the NRC staff finds that the internal events PRA has sufficient technical adequacy that the results can be relied upon to support the determination that the transition to NFPA805 will result in a decrease in risk.”**
  - **“the NRC staff finds that the Fire PRA has sufficient technical adequacy that the results can be relied upon to support the determination that the transition to NFPA-805 will result in a decrease in risk”**
  - **(Self-approved, risk-informed changes not authorized for ONS)**

## **SRP 19.2 Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance**

- **When licensees use RG 1.200 in support of an application, it should obviate the need for an in-depth review of the base PRA by NRC reviewers for those PRA aspects addressed, allowing the staff to focus their review on the**
  - **1) application-specific impacts,**
  - **2) key assumptions, and**
  - **3) areas identified by peer reviewers and self-assessments as being of concern that are relevant to the application.**

# 1) Application Specific Impacts

- **Following is needed to compare to acceptance guidelines**
  1. **RG 1.174: Total fire risk and total change in risk**
    - (Going forward risk – “Compliant” Risk)
    - Rule Item: Initial estimates part of acceptance review
  2. **RG 1.174: Combined Change Request**
    - (Going forward risk - Going forward risk w/o voluntary mods)
  3. **NFPA 805 Additional risk from recovery actions**
    - (Going forward risk – Going forward risk w/o recovery)
    - Rule Item: Initial estimates part of acceptance review
- **Sensitivity Studies should provide information on Item 1. Final estimates with acceptable methods and acceptable results eventually needed for Items 1, 2, and 3**

## **2) Key Assumptions**

- **Key Assumptions of interest here are sources of model uncertainty**
- **LAR's need to report all deviations from acceptable methods**
  - **NUREG/CR-6850**
  - **FAQs**
  - **NRC accepted UAMs**
- **Staff audits indicate some differences in interpretation of acceptable methods and their application**
- **All deviations need a sensitivity study on both total and delta risks**
  - **Qualitative sensitivity study ill defined for these issues**
  - **If a deviation could potentially influence the decision it needs a quantitative sensitivity study**
  - **“Sensitivity Study” may need to become part of the baseline**

### **3) Areas identified by peer reviewers (Findings )**

- **Findings of most interest are sources of model uncertainty**
- **LARs need to report all Findings, some of which question the application of acceptable methods at the plant**
- **Resolutions may need a sensitivity study on both total and delta risk**
  - **Qualitative sensitivity study possible with non-model uncertainty Findings**
  - **If proper application could potentially influence the decision it needs a quantitative sensitivity study**
  - **“Sensitivity Study” may need to become part of the baseline**

# **UAM Panel Resolutions Method Review**

- **The UAM Panel issued consensus positions on four FPRA methods**
- **A fifth method not processed by UAM Panel review was EPRI-SAIC Heat Release Rates for Cabinet Fires**
  - **NRC does not accept this method**
  - **NRC-RES plans experimental effort with stakeholder participation**



# **NRC Positions on UAM Panel Resolutions**

- **NRC, in a letter to NEI, established the following positions:**
  - **1. Frequencies for Cable Fires from Welding/Cutting**
    - **NRC accepts this method**
  - **2. Clarification for Transient Fires**
    - **NRC accepts this method with minor enhancements**
  - **3. Alignment Factor for Pump Oil Fires**
    - **NRC accepts this method philosophically, but provides alternative numerical values**
  - **4. Electrical Cabinet Fire Treatment Refinement Details**
    - **NRC does not accept this method**

# **BACKUP SLIDES**

- **Illustrations of methodological issues encountered during review of current applications**

# **Source of Model Uncertainty 1/3**

## **Magnitude of Fire**

- **Reducing heat release rates directly (e.g., from 317kW to 69Kw)**
- **Not spreading fires to near-by combustibles**
- **Credit manual suppression to quickly extinguish fires (10 minutes)**
- **Using partial height walls, suppression, and separation as partition boundaries**

# **Source of Model Uncertainty 2/3**

## **Frequency of fires at location**

- **Defining new “fraction factors” for transient and hot work fire frequencies**
- **Removing “inapplicable” fire events from data base**
- **Reducing “bin” frequencies**
  - **Based on plant having fewer SSCs than “normal”**
  - **Re-evaluation of generic fire events instead of fire modeling to modify electrical cabinet damaging fire frequency**
- **Not updating generic data with plant specific data**

# **Source of Model Uncertainty 3/3**

## **Effects of Fire**

- **Heavy credit for “incipient detection” – including in manned locations**
- **Sensitive electronics damage threshold**
- **Main Control room abandonment from loss of control not usually modeled**
- **Credit for control power transformer (CPT) to reduce the likelihood of spurious operation**
- **Loss of instrumentation not generally modeled in any detail.**