

Fire Protection SDP – Application Training for New Analysis Procedure

Training presented by:

Steve Nowlen

Sandia National Laboratories

spnowle@sandia.gov

(505)845-9850

Outline

Day 1:

- Module 1: Overview of the changes
- Module 2: Concepts and terminology
- Module 3: Overview of the new process
 - A quick once through Phases 1 and 2

Day 2:

- Module 4: Details of Phase 1
- Module 5: Details of Phase 2

Day 3:

- Module 5 (continued): Special Topics
- Module 6: Tabletops
- Discussion and Closing
 - We can go back and cover anything you want to cover in more detail

Module 1: Overview of Changes

- Objective: Outline what hasn't changed, and what has
 - This section provides a very brief and high level comparison of the original and new processes
 - You'll see lots of changes at a detailed level

What hasn't changed

- Entry Conditions (what is a finding?)
- Risk significance (color assignment) criteria
- Duration factor plays the same role
- Focus on credible scenarios
 - You still are asked to develop one or more credible fire scenarios
- Most of the original guidance on degradations is retained
 - Enhanced guidance provided in several areas
- Use of the plant notebooks for post-fire safe shutdown
- Your use of judgment is still critical!

What has changed

- Process is tied more directly to fire PRA
 - Simplified versions of common PRA methods
 - “The equation” is the PRA equation – that just means we multiply factors directly instead of adding their exponents
 - Scenarios are tied to a timeline
 - Timing of critical events drives Phase 2 in particular
 - Time to damage versus time to suppression
- More steps, but each step is more focused
 - Each step is aimed at a specific bit of information needed to quantify risk change

What has changed (cont.)

- More aggressive efforts to identify green findings as soon as information is sufficient to justify
 - Low degradation findings are automatically green
 - “Screen to green” checks included in most steps
- Much more supporting guidance
 - That’s why the “book” is so thick!
 - Most inputs come from look up tables

What has changed (cont.)

- The NRR Fire Dynamics Tools (FDT) are used to support analysis:
 - Set of Excel spreadsheets (must use Excel!)
 - Temperature conditions in the fire plume and hot gas layer
 - Fire detection/suppression actuation times
 - Cable fire spread
 - Pool fires and radiant heating

What the changes should mean

- More quickly identify green findings
- If a finding is potentially greater than green, the Phase 2 analysis will be:
 - More systematic
 - More repeatable
 - More accurate
 - More defensible
- Reduce analysis burden at all levels (Phase 1, 2, 3)

We have not solved all your SDP problems (yet)

- Some issues remain pending in context of SDP treatment – the guidance for assessment is just not there
- This is not unique to new process – issues were not really addressed in old version either
- If you hit one of these, and can't call it green, you are probably heading towards Phase 3

Issues that remain pending

- “Cross-cutting issues”
 - We assume finding is tied to one (or more) fire areas
 - Some findings cut across many fire areas
 - The new process works for these, but you need to select a representative set of fire areas to analyze risk change
 - Area selection guidance has not been developed
 - Examples:
 - Broad performance issues for manual fire fighting
 - Some circuit analysis issues
 - Some manual actions issues

Issues that remain pending (cont.)

- MCR fires and MCR abandonment guidance is incomplete
 - No explicit guidance on how to assess conditional probability of MCR abandonment
 - There are worksheets for alternate and remote shutdown
 - MCR fire frequency is nominally covered, but guidance on partitioning is a bit weak
 - Likelihood of a fire in a specific panel or cabinet
 - MCR manual suppression is covered by a suppression curve, but key is failure of prompt suppression, and that guidance is still lacking

Issues that remain pending (cont.)

- Complex manual actions
 - Worksheets are provided to assess manual actions but, due to simplified approach, won't give much credit to complex action sets
 - Complex actions sets may require additional analysis (e.g., Phase 3)

Issues that remain pending (cont.)

- There are processes underway to address most of these issues – SDP will incorporate guidance as it develops:
 - Manual fire fighting
 - Circuit analysis
 - Manual actions

A word about complexity

- The new process looks complex – I hope to convince you it's really pretty straight-forward
- The original approach faced all the same analytical challenges, but with less structure and guidance
- The systematic structure and supporting guidance should improve efficiency and effectiveness
- You may not be fully convinced this week, but I hope you will come to see this as you become more expert in the process
 - Practice and regular use will be a key
 - If only do an SDP once a year, you may struggle