

March 31, 2003

MEMORANDUM TO: David Lew, Acting Branch Chief
Probabilistic Risk Analysis Branch
Division of Risk Analysis and Application
Office of Nuclear Regulatory Research
Nuclear Regulatory Commission

FROM: J.S. Hyslop /RA/
Probabilistic Risk Analysis Branch
Division of Risk Analysis and Application
Office of Nuclear Regulatory Research
Nuclear Regulatory Commission

SUBJECT: MINUTES OF FIRE PROTECTION SDP REVISION TASK GROUP
ACTIVITIES - TASK A: FIRE FREQUENCY, SEVERITY, AND DATA
BASE

TASK A MEMBERS: J.S. Hyslop, NRC - Team Lead
Gareth Parry, NRC
Dan Frumkin, NRC
Jim Houghton, NRC
Ching Guey, FP&L
Steve Nowlen, SNL
Bijan Najafi, SAIC

On February 4, 2003, task A members discussed by teleconference activities coincident with the agenda in attachment A. An overview of the team activities; including selecting a fire events database for the SDP, selecting the fire frequency event population, determining fire ignition frequencies, developing curves for the fire duration, deciding credit to give for compensatory measures, and deciding the adjustments to fire frequency for findings against transient materials, was discussed. (See attachment B for additional general information on these activities). In particular, the importance of the fire duration curves, and the interfaces between task A and the other task groups were described. Jim Houghton, primary developer of the NRC database, and Bijan Najafi, primary developer of the EPRI database, then led a general discussion of database issues. The primary action item from this meeting was for J.S. Hyslop to interface with EPRI to determine if EPRI would allow its database to be used in the fire protection SDP. The attendees agreed to have a follow-up meeting on February 21 at NRC headquarters in Rockville, Md.

On February 21, 2003, a public meeting was held by task A members, and also attended by Dale Rasmuson of NRC. Steve Nowlen presented task A members with a discussion of the progress of other tasks in the SDP revision. No developments in the other tasks would impact the path team A was taking.

J.S. Hyslop presented the following information on the availability of the NRC and EPRI databases and the disclosure of the analysis results:

- NRC could make public analysis results generated by the task A members based upon NRC analysis of proprietary data from either the NRC or EPRI fire events database.
- NRC cannot make public the proprietary raw event information from either the NRC or EPRI database. Details of specific events can only be made public if this information is included in public records (e.g. Licensee Event Report, Information Notice).
- The NRC and EPRI database can be distributed within the NRC.
- All U.S. utilities are currently EPRI members and hence have access to the EPRI database.

The remainder of the meeting was dedicated to discussing various aspects of the databases. At the end of the meeting a vote was taken by team A members to identify the database each person preferred to support the fire protection SDP. The choices were (1) NRC database, (2) EPRI database, and (3) no preference. Five votes were cast for the EPRI database. The remaining two team members cast votes for the NRC database.

Common reasons cited for selecting the EPRI database were:

- The EPRI database enables one to assess severity more accurately. Several objective and subjective criteria exist, some of which are combined to determine severity. The NRC database assesses severity based only upon fire duration. As such, the EPRI database looks more closely at the potential that a fire may have become severe. For example, the EPRI database may characterize fires put out quickly by multiple fire extinguishers, or fires which propagate through many relays in a switchgear cabinet as potentially severe even though the fire duration was short.
- The EPRI database provides a narrative description of the fire. The NRC database does not provide a narrative. The narrative description in the EPRI database enables the analyst to use subjective criteria to determine fire severity. For example, fires which are characterized as producing substantial smoke, or adequate heat to cause damage (in a different plant setting) can be identified in the EPRI database, and retained as severe. The narrative in the EPRI database also benefits from licensee interviews in addition to records.
- The EPRI database enables the fire watch to be explicitly credited on a plant specific basis, which is consistent with the current SDP framework. Since the EPRI database enables fire events for which a fire watch responds to be distinguished between severe and non-severe, the fire watch credit can be applied separately. The NRC database does not enable the analyst to draw this distinction. (Note that the NRC database does not identify the suppression means for pre-1986 data, which poses difficulty in determining explicit suppression credit if pre-1986 events are desired).

Less common reasons cited for those voting for the EPRI database were:

- Pre-1986 data which is excluded from the NRC database may be valuable under certain conditions.
- If NRR and the licensee use same database, it likely will be easier to resolve differences that arise in analysis results.
- Fire ignition frequencies derived from the EPRI fire events database are generally expected to be more conservative (larger) than those from the NRC database.

No discussion was held on the other areas in the attached agenda (attachment C) during this February 21 meeting.

cc: See-Meng Wong, NRR/SPSB
 Gareth Parry, NRR/DSSA
 Dan Frumkin, NRR/SPLB
 Jim Houghton, NRR/OERAB
 Ching Guey, FP&L
 Steve Nowlen, SNL
 Bijan Najafi, SAIC

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NAME	JHyslop		HHamzehee		DLew	
DATE	03 / 24 / 03		03 / 24 / 03		03 / 24 / 03	

Agenda for Phone Call
Topic: Revision of Fire Protection SDP; Task A
Date and time: Feb 4; 11 a.m. to 1 p.m.

- 11:00 a.m. Overall discussion of issues to be resolved
- Ensure everyone is clear on issues to be resolved
 - Brief discussion of challenges related to these issues
- 11:45 a.m. Discuss database issue
- Jim Houghton, NRC, and Bijan Najafi, SAIC, have the lead for the discussion of NRC and EPRI databases.
- 12:30 p.m. Confirm upcoming meeting at NRC Headquarters on 2/21 (all of morning and perhaps first of afternoon)
- Good timing since nearly everyone will be in town for meetings that week. Really necessary to meet NRR schedule.
- 12:40 p.m. Action Items for meeting - (& assignment to individuals)
- 1:00 p.m. End phone call

Team Assignments
Team A: Fire Ignition Frequency Team
1/14/03

Lead Coordinator: J.S. Hyslop

Overview of Assignment:

The Fire Ignition Frequency Team is responsible for all tasks related to the analysis of event data including the following:

- Pick a population of fire events (from a fire event database) upon which the fire ignition frequencies will be based.
- Estimating fire ignition frequency for various fire ignition sources.
- Develop fire duration/likelihood curves.
- Determine how findings that may increase fire frequency will be defined and treated.
- Determine how compensatory measures relating to fire frequency will be treated.

The Fire Ignition Frequency Team must interact with other teams on the following issues:

- Fire Scenario Development Team:
 - Establish fire ignition source bins to be used (Fire Scenario Team lead)
 - Correlate fire intensity and a severity factor for maximum anticipated/credible fire scenarios. This task is a Fire Scenario Team lead item, but the fire frequency team may be able to provide support through some event data analysis.
- Fixed Detection & Suppression System Team:
 - Ensure that fire duration/likelihood estimates reflect credit for fixed suppression systems (Fire Ignition Frequency Team lead)

Team Task: Picking the Fire Frequency Event Population

The fire frequency team must pick an event population for use in data analysis. This task involves three primary issues:

- Pick a database (EPRI or NRC).
- Determine how many years of data will be used (i.e., how far back do we go).
- Set criteria for the screening of individual events as relevant (or not relevant) to the SDP fire frequency calculations.

The following are recommended as an initial strawman for discussion of event screening criteria:

- Only include fires that occur during plant start-up or Mode 1 power operations
- Eliminate fire events during construction, cold shutdown, refueling, etc.

- Include any fire event that, if left alone, had the potential to become a threatening fire. That is, retain any fire event that required some active intervention in order to prevent the fire from becoming a potential threat.
 - Prompt suppression of a fire is not a criteria for elimination from the event set. The question to ask in such cases is “if prompt suppression had not occurred, could the fire have become a threat?”
 - All suppression credit will be taken separately from the fire ignition frequency. For example, fire watches will be credited with an appropriate prompt suppression likelihood (we will need a value for this).

Team Task: Set Fire Ignition Frequencies

Develop Fire Frequency tables for each fire ignition source category (e.g., panels, motors, pumps, batteries, etc.). Key questions/issues:

- Fire ignition source categories must match those defined by the Fire Scenario Development Team.
- How far we can go with component-based fire frequencies?
- Where we fall back on fire area based fire frequencies, we need partitioning guidance.

Team Task: Fire Duration Curves

Develop generic curves of the fire duration versus likelihood for various categories of fires. Key questions/issues:

- Given the data, these curves will mainly cover manually suppressed fires because the vast majority of fires in the database are manually suppressed. Hence, we also need specific guidance on how to credit fixed fire suppression systems (interface with fixed suppression team for input to this task).

Team Task: Administrative Findings That Impact Fire Frequency

Some inspection findings, generally administrative controls issues, will impact risk through their potential to increase fire frequency. The fire ignition frequency team needs to define these and determine how they will be quantified. Key questions/issues:

- Define degradation levels for administrative issue findings.
- Determine quantification approach and values.
- Is there a screening approach for these findings?

Team Task: Credit for Compensatory Measures

Some compensatory measures may reduce fire frequency. A method to define and credit such measures is needed. Key questions/issues:

- Define those compensatory measures whose impact is measured by a reduction in fire frequency
- Define how such measures are to be credited.

Agenda for Meeting
Topic: Revision of Fire Protection SDP; Task A
Date and time: Feb 21; 8 a.m. to 2 p.m.

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| 8:00 a.m. | Report from other meetings of SDP revision |
| 8:15 a.m. | Discuss database issue
Key questions
Any other preparations for voting?
Vote for database |
| 9:15 a.m. | Discussion
Fire frequencies
Fire duration curves
Administrative findings that affect frequency
Compensatory measures |
| noon | Lunch |
| 1 p.m. | Wrap up |
| 2 p.m. | Adjourn |