March 3, 2003

MEMORANDUM TO: Christopher I. Grimes, Director
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

FROM: Peter C. Wen, Project Manager ***/RA/***
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

SUBJECT: SUMMARY OF FEBRUARY 20, 2003, MEETING WITH NUCLEAR ENERGY INSTITUTE (NEI) REGARDING FIRE PROTECTION SIGNIFICANT DETERMINATION PROCESS (SDP) METHODOLOGY

On February 20, 2003, the NRC staff held a public meeting with the Nuclear Energy Institute (NEI) to discuss the Phase 2 fire protection SDP methodology. Those attending the meeting are listed in Attachment 1.

P. Lain of NRR started the meeting with introductory remarks on the purpose and objectives of the meeting. This was the latest in a series of public "focus group" meetings intended to improve the fire protection SDP methodology, the last of which was held on November 6-8, 2002. (Refer to ADAMS Accession Number ML023450610 for a summary of that meeting). The meeting focused primarily on discussions of Task Group B and Task Group C's activities in (1) the fire scenario development and (2) the modeling of fixed fire detection and suppression systems.

1. Discussion of Fire Scenario Development (Task Group B)

S. Nowlen of SNL provided a summary of the technical issues concerning the current version of the fire protection SDP. N. Iqbal of NRR discussed the correlations being developed by NRR to calculate the effects of fire. These correlations can be used by the inspectors to define fire detection and suppression activation times and help develop fire scenarios. R. Ladd of NMC discussed an excel spread sheet he developed to calculate fire time/temperature curves.

The team discussed the tools from the Fire-Induced Vulnerability Evaluation methodology and the tools EPRI had available, and decided that the NRC Fire Dynamic Tools are very similar and would be better since they will be publicly available. It was discussed that the time temperature curve will probably be developed in a step-by-step fashion with the first step being the initiating component burning, then adding on targets until the target of interest (fire damage state) is reached. The Heat Release Rate (HRR) provided can be the peak HRR, with the fire building up to this peak HRR and returning to zero over sometime frame or an average HRR burning for a specified period of time or until the combustibles are consumed. The steps will overlap and the time temperature curve at the target can be developed. EPRI has developed a way of evaluating a fire moving from a component, such as a switchgear, up through a stack of cable trays stacked above the component. Another application would be the way to calculate the time to reach the critical damage temperature for a hot layer of redundant cable tray that is located across the fire area.

R. Fuhrmeister, NRC Region 1, proposed a number of fire initiators that would need the associated HRRs to be developed. The team discussed binning the initiators into four or five HRR levels. It was also discussed that an average expected and a maximum expected HRR were needed for components to incorporate the high consequence/low probability fires. The higher HRR and the fire severity factor will be used to characterize these fire scenarios. The expected scenario would have a 1.0 severity factor and it was proposed the maximum expected scenario would use a .05 severity factor.

Damage profiles were discussed. This concept can be called a column/ball approach. For each HRR, a certain size column, around and above a component is within an area that is susceptible to damage by the fire plume. In addition, for each HRR, a ball of a certain radius around the component on fire is susceptible to damage by the radiant heat of the fire. These damage profiles may help the inspector determine the continuity of combustibles to map the fire growth to a target of interest (e.g., redundant cable tray).

Component damage thresholds were discussed and concluded that data for most components was not available. Temperatures for the onset of cable damage are established, but discussions that cables may continue to function even though the insulation is damaged. It was suggested that cables may last a long period of time at the damage threshold or remain functioning for short periods of time at temperatures well above the damage threshold. A method to credit cable function past critical damage temperatures was discussed.

2. Discussion of Modeling of Fixed Fire Detection and Suppression Systems (Task Group C)

The team discussed SDP methodology and how detection and suppression degradations should be integrated into the tool. The team decided on three levels of degradation (low/no, moderate, high) and related each to a time line. Where a time (X) to activation could be calculated for low/no degradation, then a delay time (Y) could be added for moderate degradation, and no credit for highly degraded systems. It was discussed that moderate degradation would be defined as in the existing SDP (i.e., 10% to 25% of the system is inoperable), but would be effective at controlling the fire growth and spread when activated. Highly degraded would be greater than 25% inoperable. A system reliability from 95 to 98% was discussed for the low/no and moderate degradation levels, based on the type of system. Reflash of a fire after a gaseous system dissipated was discussed and problems with water supplies would need to be handled separately, since it could be a common failure for both fixed and manual suppression strategies. Manual activation over automatic needs to be considered because it adds time to the initial activation time. Compensatory measures were discussed and further discussions are needed.

Continued interaction between the industry and the staff on this issue is anticipated. Having completed discussion of the agenda items, the group adjourned.

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NRC/NEI MEETING ON FIRE PROTECTION SDP METHODOLOGY
LIST OF ATTENDEES
February 20, 2003

NAME	ORGANIZATION
Paul Lain	NRR/DSSA/SPLB
Daniel Frumkin	NRR/DSSA/SPLB
Naeem Iqbal	NRR/DSSA/SPLB
Roy Fuhrmeister	NRC/Region 1
Steve Nowlen	SNL
Robert Ladd	NMC
Dennis Henneke	Duke Energy
James Oldham	Duke Energy
Cliff Sinopole	Exelon
Bijan Najafi	SAIC (EPRI)

ATTACHMENT 1