



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001**

February 15, 2011

MEMORANDUM TO: ACRS Members

FROM: John Lai, Senior Staff Engineer */RA/*
Reactor Safety Branch – B
Advisory Committee on Reactor Safeguards

SUBJECT: CERTIFICATION OF THE MINUTES OF ACRS SUBCOMMITTEE
ON RELIABILITY AND PRA REGARDING THE CURRENT
STATE OF LICENSEE EFFORTS ON THE FIRE PROTECTION
PROGRAM TRANSITION TO NFPA-805 ON DECEMBER 13-14,
2010, IN ROCKVILLE, MARYLAND

The minutes for the subject meeting were certified on February 11, 2011. Along with the transcripts and presentation materials, this is the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc w/o Attachment: E. Hackett
C. Santos
A. Dias
Y. Diaz

cc w/ Attachment: ACRS Members

Certified By: John W. Stetkar
Certified on: February 11, 2011

**ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON RELIABILITY AND PRA
REGARDING THE CURRENT STATE OF LICENSEE EFFORTS ON THE FIRE
PROTECTION PROGRAM TRANSITION TO NFPA-805
ON DECEMBER 13-14, 2010 IN ROCKVILLE, MARYLAND**

INTRODUCTION

On December 13-14, 2010, the ACRS Subcommittee on Reliability and PRA held a meeting in Room T-2B1, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was for the Subcommittee to review the current state of licensee efforts on the fire protection program transition to NFPA 805. Mr. John Lai was the designated federal official for this meeting. The subcommittee received no written comments from external stakeholders. The subcommittee received no request from the public to make oral statements. The subcommittee chairman convened the meeting at 8:33 am and adjourned at 6:12pm in day 1. The subcommittee chairman convened the meeting at 8:30 am and adjourned at 4:48pm in day 2.

ATTENDEES

ACRS Members

John Stetkar, Subcommittee Chairman
Dennis Bley, Member
William Shack, Member
Dana Powers, Member

ACRS Consultant

Mardy Kazarians, Kazarians & Associates

ACRS Staff

John Lai, Designated Federal Official

NRC Staff

Christiana Lui, RES
Samson Lee, NRR
Donald Harrison, NRR
Alexander Klein, NRR
Mark Salley, RES
Sunil Weerakkody, NRR
David Stroup, RES
Susan Copper, RES
Steven Laur, NRR
Nathan Siu, NRR
Andrew Howe, NRR
Harry Barrett, NRR
Charles Moulton, NRR
Stephen Dinsmore, NRR
Dan Frumkin, NRR
Ray Gallucci, NRR
Margaret Stambaugh, NRR
Jeff Circle, NRR

See Meng Wong, NRR
Naeem Iqbal, NRR
Jigar Patel, NRR
Nick Melly, RES
J S Hyslop, RES
Y. Chang, RES (Dec. 13 only)
Fernando Ferrante, NRR (Dec. 13 only)
Jonathan Evans, NRR (Dec. 13 only)
Hugh Woods, RES (Dec. 13 only)
Robert Moody, NSIR (Dec. 14 only)
Gary Demoss, RES (Dec. 14 only)

Others

Biff Bradley, NEI
Ken Canavan, EPRI
Jim Chapman, SCIENTECH
Doug True, ERIN Engineering
Paul Amico, SAIC
Kiang Zee, ERIN Engineering
Steve Nowlen, SNL
David Miskiewicz, Progress Energy
Patrick Baranowsky, ERIN Engineering
Dan Pace, FENOC (Dec. 13 only)
James Belfiore, FENOC (Dec. 13 only)
Richard Stremple, FENOC (Dec. 13 only)
Tom Basso, NEI (Dec. 13 only)
John Butler, NEI (Dec. 13 only)
Rick Wachowiak, EPRI (Dec. 14 only)
Kevin McGrattan, NIST (Dec. 14 only)

The presentation slides and handouts used during the meeting are attached to the transcript. The presentations to the Subcommittee are summarized below.

OPENING REMARKS BY CHAIRMAN STETKAR

John W. Stetkar, Chairman of the ACRS Subcommittee convened the meeting by introducing the ACRS members present. Chairman Stetkar stated that the purpose of this meeting is for the Subcommittee to review the current state of licensee efforts on the fire protection program transition to NFPA 805. The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for the deliberation by the full Committee. The rules for participation in the meeting were announced as part of the notice of the meeting previously published in the Federal Register. Chairman Stetkar acknowledged that the Subcommittee has received no written comments or request for time to make oral statements from members of the public.

Chairman Stetkar stated that the purpose of this two-day Subcommittee meeting is to elaborate on more details of some of the issues discussed in the November meeting so that the Subcommittee members can understand a bit more of the technical issues. He would like to characterize this two-day meeting as a combination of presentations, normal Subcommittee discussions, and also a bit of a working session if the industry and staff can identify some of those technical topics that merit more detailed discussion.

SUMMARY OF THE MEETING

Day 1

Fire PRA and Other Impacts to NFPA 805 Transitions

Biff Bradley of NEI outlined the industry presentations. Tom Basso and Biff will discuss the regulatory process and policy issues concerning NFPA-805. Dan Pace of FirstEnergy will discuss the impact on NFPA-805 transition. Doug True of ERIN Engineering and Ken Canavan of EPRI will discuss the industry technical report provided to the Committee a couple of weeks ago. Biff stated that the industry will discuss the fire events database (FEDB) and ignition frequency work, incipient fire detection, transient fires, and electrical cabinet fires which were identified at the November 16 Subcommittee meeting. On the frequently asked question (FAQ) process, the industry will try to clarify their perspective and discuss why they have expressed some concerns with that process. The industry will discuss the research coordination between NRC and EPRI through the memorandum of understanding (MOU), as well as discuss some near-term improvements that can improve the fire PRA (FPRA) and achieve better realism within the next several months to a year.

There are currently 23 plants that will have submittals due six months after the issuance date of the Oconee safety evaluation (SE). The industry proposed a staggered submittal schedule on November 15, 2010.

He mentioned that any deviation of the fire PRA model from NUREG/CR-6850 and the approved FAQs needs to be justified and he also stated that the second pilot plant (Oconee) needs a peer review regarding the methods which may have deviated from NUREG/CR-6850 and the FAQs after the issuance of the SE.

Biff stated that the industry needs additional time to achieve reasonably realistic Fire PRAs for NFPA 805. The industry can develop and revise interim methods for some of the key areas by the 4th quarter of 2011. He mentioned that the intended use of the fire PRA peer review process is to provide technical review to the Standard using a team of experts and to look for real insights and issues in the model.

Biff stated that in the June 1, 2009 letter to NEI, the staff stated that "FAQs must give appropriate consideration of the balance between realism and conservatism in the fire PRA." The process really wasn't aimed at realism. It was aimed at a balance of conservatism and realism.

Biff mentioned that other elements of the risk-informed regulatory process such as defense-in-depth and safety margins in RG 1.174 provided conservative elements. The expectation for conservatism in PRA seems to be a new direction for risk-informed applications.

Tom Basso of NEI discussed the emerging issues with potential impact on NFPA 805 transition. He said that the NRC staff offered some changes to the wording of FAQ 08-0054, that helped to resolve the "safe and stable" issue.

He described the benefits of staggered submittals and the impact of the compressed post-pilot submittal schedules as mentioned by Biff Bradley.

Biff concluded his presentation by saying two things that are essential for the successful NFPA-805 transition. One is time, and the other is a process that's focused on achieving realistic results.

Management Perspectives on Adequacy of Fire PRAs to Support Licensees Transition to NFPA 805

Sunil Weerakkody of NRR stated that the staff is supportive of industry's initiatives to reduce uncertainties with fire PRAs. He mentioned that the fire PRAs have matured sufficiently to enable NRC to make licensing decisions with respect to NFPA 805. The licensee should identify the key assumptions for the application and identify appropriate sensitivity studies per RG 1.200.

He outlined the subjects that the staff is going to present: fires characterized in NUREG/CR-6850 not appearing to conform with the operating experience; ROP experience inconsistent with prediction; FAQ process; extra time for staggered submittals requested by the industry to address FPRA issues.

Post-Pilot Transition to NFPA 805 - An Industry Perspective

Dan Pace of FirstEnergy stated the reasons why FirstEnergy decided to go with the NFPA 805 transition. The reasons included opportunity to improve nuclear safety through a risk-informed fire protection program, potential to resolve industry legacy fire protection issues, standardize fleet approach to fire protection, and use improvements in PRA models and PRA staff to support other risk applications.

He discussed some of the transition issues. He stated that using conservative methods lead to unrealistic modeling outputs and results are not comparable to experience.

He gave examples using the same HRR in the FPRA model for both a small and a large panel according to NUREG/CR-6850, and the same HRR for a small and a large motor because of the same grouping suggested by NUREG/CR-6850.

He then gave an example of using the 98th percentile HRR for transient fires and indicated it is overly conservative for many areas.

He stated that the ignition frequencies in NUREG/CR-6850 were significantly greater than the recent data from EPRI.

He supported the staggered submittal approach for post-pilot transition plants.

He stated that NFPA-805 resources need to be targeted more towards plant improvements than analysis with limited usefulness for other risk applications.

Roadmap for Attaining Realism in Fire PRAs

Doug True of ERIN Engineering showed the skyline chart (Page 3 of the slides) which was presented in the November meeting. It was obvious that the most important contribution is from electrical cabinet fires. The next slide (Page 4) showed the fire CDF contribution without electrical cabinets. It showed that other sources can also be important.

Doug said that from the spurious operations predicted by FPRA, we should be seeing across the U.S. fleet, an event involving spurious operations every one or two years. Yet none was observed since the Browns Ferry fire in 1975.

Doug showed the results of the predicted frequencies of "significant precursor" (CCDP > 1E-3) and "high CCDP" (CCDP > 1E-4) events from the FPRA calculations. The results indicated that a "significant precursor" event should be seen once every one to ten years,

and a "high CCDP" event should be seen one, two or three times each year. In reality, there are no "significant precursor" events since Browns Ferry and no "high CCDP" events from 2001-2009 based on SECY 10-0125.

Doug summarized the insights as the following:

The manner in which fires are characterized in NUREG/CR-6850 does not conform with operating experience; the level of quantified risk is overstated, as compared to operating experience; and the uneven level of conservatism may mask key risk insights and confound decision making.

A '6850' Author's Perspective on the NEI 'Roadmap' Report

Steve Nowlen of SNL pointed out that one should consider the fuel burnout in a panel. The fuel should have been burned out quickly for a small panel, such as the example given in Dan Pace's presentation. For trash fires, the distributions of the HRRs should be the key consideration.

He gave his views on the NEI roadmap report. He identified some examples in the report and stated his views on those examples.

He concluded that NUREG/CR-6850 - EPRI 1011989 can be improved and he believed that it is a workable method.

Input to Staff Response to NEI PRA Task Force Comments

Jeff Circle of NRR stated that ROP findings were performance deficiencies that impact mitigating systems. That includes the fire response, not on fires directly.

ROP findings also depend on several factors; an event will not be in the ROP severe findings if the consequence is low (low CCDP). An example is a Vermont Yankee 2004 fire which damaged a transformer but the consequence was low, so it was not recorded as "Yellow" or "Red" in ROP.

Fire Events Database Update and Fire Ignition Frequency Analysis

Pat Baranowsky of ERIN Engineering discussed the event classification in the new EPRI database for fire ignition frequency. There is a new classification called "challenging" fires and a classification called "not challenging". Both are rigidly defined. Data from 1990 to 2000 were preserved in the old database.

For the most current data ranging from post-2000 and beyond, data are collected using the new database keyword list. He described how the data are recorded into the database.

He showed the fire event trends (Page 17 of the slides). The trends from the NRC "severe" fire events frequency are similar to those of the FEDB "challenging" fire events frequency. He also showed a comparison of fire ignition bin frequencies between the updated FEDB and NUREG/CR-6850 (Page 17 of the slides). The updated frequencies are generally a factor of two lower.

He showed the comparison results of using different prior distributions for predicting the fire ignition frequency (Page 20 of the slides). Next, he showed the comparisons with an additional hypothetical fire in each of those events (Page 21 of the slides). It showed that the means remain close for both studies.

He stated that the EPRI technical report will be ready by early 2012.

Fire Events Database Enhancement Effort - NRC Team Perspectives

Steve Nowlen of SNL stated briefly the history of fire database development.

He discussed the NEI report which showed variations of numbers of electrical cabinets counted in plants. He acknowledged that refinements on ignition frequencies are needed.

He mentioned that the NRC team recommends using the FEDB to support incipient fire growth and detection while the industry is proposing to pre-screen these from the FEDB.

He supported the development of the new EPRI database. He stated that all his presentations are his own view.

Discussion of NUREG/CR-6850 Treatment of Transient Fires

Doug True of ERIN Engineering discussed how the transient ignition frequencies are obtained using NUREG/CR-6850.

Doug also presented how the HRRs were calculated in NUREG/CR-6850. Table G-7 in NUREG/CR-6850 presented peak HRRs, and lists the HRR values at the 75th and 98th percentiles. The basis for these sources and tests was also discussed. FAQ 08-0052 also provided transient fire growth rates. Doug stated that all these HRRs did not really match what the industry has observed in these events. The guidance did not really address how the distributions were derived.

Doug also addressed the questions previously raised by the Subcommittee. The total CDF contribution from transient combustibles is less than 10%. The problems of allocation of transient combustibles should be refined and further account for administrative controls.

The transient combustible heat release rates did not reflect the operating experience. To “work-around” the values in NUREG/CR-6850, one could use the lower HRR for administratively controlled areas or apply severity factors to account for ignition sources.

Perspectives on the Treatment of Transient Fires

Steve Nowlen of SNL gave his views on the transient fire modeling. He said that the 75th and 98th percentiles of the HRRs were the bounding values. He explained the rationale to develop the weighting factors for transient fires based on maintenance, occupancy, and storage.

Effectiveness of Adopting NFPA 805 in Transition to the Current Fire Protection Program

Mardy Kazarians, the ACRS consultant, stated that his main mission was to find out if the current fire PRA methodology leads to inappropriate conclusions during the transition to NFPA 805 and if there are other issues impeding the transition process.

He contacted various stakeholders including the NRC staff, Licensees, consultants and National Institute of Standards and Technology (NIST) to get their inputs on this issue.

The CDFs from fire PRAs range between mid-10⁻⁵ to low 10⁻⁴. These values included the modifications that have been or will be applied to the plant.

He stated that the HRR numbers at the 75th and 98th percentiles were possible, but one should look into other issues such as separation of cables in the room.

For the fire ignition frequency, the model in NUREG/CR-6850 included simplifications that introduced a level of uncertainty. For example, standby equipment has the same frequency as normally running equipment.

For transient fires, the numerical range of ranking factors may be too narrow for certain rooms.

Mardy stated that multiple spurious operations (MSOs) development had minimum impact on resources according to his interviews.

There is a wide variation in adhering to NUREG/CR-6850 and the FAQs. One licensee chose not to include any FAQs. In another case, FDS was used in modeling a fire inside an electrical cabinet. Some people assume that NUREG/CR-6850 does not allow fire decay. One consultant re-evaluated the raw data and came up with new probability values.

Regarding the peer review process, Mardy stated that there were difficulties in early stages due to lack of experience. Peer review teams had identified and challenged unacceptable or erroneous analyses. He stated that team members' experience has proven to be an important factor and difficulties in scheduling qualified peer reviewers has impacted the Fire PRA completion process.

Mardy described some other observations and stated that the level of effort to perform the transition to NFPA-805 using NUREG/CR-6850 has proven to be enormous.

In conclusion, Mardy stated that no single source of conservatism was brought forward by the interviewees. The fire risk model is based on a chain of inter-related parts (e.g., ignition frequency and fire propagation). There is an element of uncertainty in the level of compatibility among the different parts of a Fire PRA.

He emphasized that analysts should refrain from re-interpreting the raw fire event data, and the use of qualified peer reviewers is essential to ensure that unacceptable methods are not used.

Day 2

Electrical Cabinet Fires

Doug True of ERIN Engineering stated that the frequency from the data in EPRI 1016735 is about a factor of two lower than that in NUREG/CR-6850 for bin 15 (Electrical cabinet).

He stated that the HRRs are anchored to two key percentiles at 75th and 98th. He stated that there was no evidence that these postulated fires, even at the 75th percentile, are consistent with operating experience.

To discuss the ignition source and fire growth rate, he referred back to the presentation given at the Subcommittee meeting on November 16, 2010. He showed that the HRR ramped up to the peak at around 12 minutes and stayed constant for about 25 minutes and tailed off (Page 17 of the November slides). He also discussed the five tests results shown on page 18 of the slides. He stated that the fire growth rates are influenced by using accelerants or flame sources and open cabinets, and there is no evidence that these growth rates are consistent with operating experience.

He then discussed the vertical cabinet results from NUREG/CR-4527. He suggested that qualified cable cabinets and vertical cabinets that have qualified cable probably deserve a different distribution of heat release rates.

He stated that the vast majority of electrical cabinet fires in the FEDB are manually suppressed and that should be taken into consideration for fire suppression.

He discussed the compounding effects on FPRA. He felt that the frequency of fires is overstated and the growth rates are too large. In certain cases, the peaks are too large, and the damage doesn't really comport with the operating experience such that we end up pushing the fire PRA in a direction that departs from reality.

Rick Wachowiak of EPRI discussed the near-term EPRI research projects. He stated that the updated FEDB will improve the understanding of the ignition frequencies, manual suppression, fire growth and fire damage. For the refined binning structure of electrical cabinets, it will provide an improved basis for peak HRRs for different cabinet types and allow more realistic fire damage zones.

Perspectives on the Treatment of Cabinet Fires

Steve Nowlen of SNL described the history of data collection for electrical cabinets and the nature of these data.

He mentioned that HRR is important, but he suggested that all other contributing factors also need to be looked at.

He also gave his opinions on the NEI report regarding the HRR issues.

Enhancing Fire PRA Realism Using Original Guidance from NUREG/CR-6850-EPRI 1011989

Harrold Barrett of NRR staff stated that there are cases where people have deviated from NUREG/CR-6850. The staff has to look at what they have done. If they have provided a reasonable engineering justification, the staff tends to accept the enhancements.

Ray Gallucci of NRR gave one example of how people can use HRR distributions to reduce the probability of damage. In a second example, he showed the reduction of probability of damage if a surrogate step function at scaled t for the t^2 growth profile was used.

NRC Perspective on the NFPA 805 Frequently Asked Question Process

Chuck Moulton of NRR stated the history of the FAQ process. It is a process to include the lessons learned from the pilot plants and provide interim staff approval of changes to NEI 04-02 guidance.

Revision 1 of RG 1.205 endorsed revision 2 of NEI 04-02 which included the closures of about 18 FAQs.

Chuck then described the PRA-related FAQs (also known as MOU-FAQs). Because the time spans for consensus resolution of these FAQs were long, the NRR management decided there was a need to close-out these outstanding PRA-related issues.

He stated that the closures of some of these FAQs were not jointly agreed by the industry and NRC, rather by resolving only the public comments before closure by the NRC.

NRC Review of NEI “Roadmap for Attaining Realism in Fire PRAs”

Ray Gallucci of NRR discussed the NFPA-805 FAQ process. The FAQs provided some significant “relaxations” to the first-order guidance to facilitate use of Fire PRA in the short-term for NFPA-805 transition. He described a few examples of relaxations including the refined (mostly reduced) fire ignition frequencies – excluding the electrical cabinets, and probabilities across the spectrum of spill sizes for oil fires – limited by consensus to main feedwater pumps.

He described the AC “Hot Short” durations using experimental results (CAROLFIRE). DC was deferred by consensus pending completion of the DESIREE-FIRE tests. The DC portion was removed from the FAQ, so the FAQ was closed excluding the DC hot short issues.

He described the transient fire growth rate as one area where experts had disagreements on the issue. As the result of the discussions, the FAQ was clarified for the main control room and “trash” fires, but not extended to other type of transients.

Ray concluded that, given the accelerated agenda for relaxing NUREG/CR-6850 guidance and limited test results available at the time, the FAQ process should be viewed as a success.

Fire PRA FAQ Process

Ken Canavan of EPRI discussed those FAQs which still need resolutions. Eight out of the nine FAQs using the alternate resolution path are on EPRI’s action plan for further research.

He discussed the remaining issues that the industry is working on to find resolutions: the determination of HRR from non-vented cabinets; HEAF for bus ducts, which is a Zone of Influence issue; propagation from electrical cabinets; and location of fire ignition in electrical cabinets, which is related to fire modeling.

For pump oil fires, the feedwater pump oil fires were resolved, but how to apply this to other pumps and components remains to be resolved.

For incipient fire detection systems, installations within a specific cabinet configuration was resolved, but other installations different from the one installed in Harris need to be resolved.

For spurious operation, there is a need to interpret the DC circuit fire test data and to develop hot short probabilities and durations, including extension of the lessons learned for AC circuit hot shorts.

For fire ignition frequency, most utilities have not used this resolution from the FAQ because one needs to do traditional defense-in-depth and deterministic evaluations if the frequency changes produce less conservative values closer to the borderline of the risk profile. The industry proposes to use the more recent database.

For cable tray propagation, more configurations will be needed to address the fire issues. For manual non-suppression probability, the new database may provide additional data.

Ken mentioned that the transient fire growth rate has already been discussed in detail at the previous presentations.

Fire PRA Research Coordination

Ken Canavan of EPRI gave an overview of the fire PRA industry organization.

Rick Wachowiak of EPRI discussed the categories of fire PRA research. The three categories are the development of methods and models, testing to support the methods and models, and tools to implement methods and models. He stated that methods and models drive the testing and tools. He then described in detail all the research proposed in these categories.

Rick discussed the fire PRA action plan for all three categories, i.e., fire initiation, detection, and suppression for Category 1; fire damage assessment for Category 2; and plant impact, fire PRA scenarios, and quantification for Category 3.

Fire events database, non-suppression probabilities, cabinet heat release rates, transient fire heat release rates, oil fires, and propagation of fires within the electrical cabinets are high priority activities which EPRI plans to work on.

NRC Perspective on Fire PRA Research

Christiana Lui of RES stated that the main focus of RES is to support the needs of other regulatory offices, and RES worked closely with other offices in shaping the research program. She stated that the MOU process was used to get public involvement in the RES projects.

Mark Henry Salley of RES presented the current activities of RES programs. He talked about high priority activities including fire PRA training with EPRI, NUREG/CR-6850 update with EPRI, fire model application guide development with EPRI and NIST, DC circuit testing with EPRI, fire events database update with EPRI, and Kerite cable performance testing.

He also talked about the effects of fire-retardant coatings and cable tray covers, and incipient fire detection.

For medium priorities, he talked about HRA, electrical cabinet HRRs, and fire protection program meeting support. He also gave a few examples of the low-priority activities including observing industry fire testing, low power and shutdown fire PRA, smoke damage on I&C circuits, gaseous fire extinguishing agents, and documenting regulatory history of radiant energy shields and fire resistant cables.

Fire PRA Results and Operating Experience

Sunil Weerakkody of NRR stated that the staff cannot meaningfully address the inconsistent issues (Operating experience versus Fire PRA results) without knowing the details of plant specific fire PRAs.

Impact of Fire PRA Uncertainties on Other PRA applications

NRC staff made the following observations:

For the Maintenance Rule program, fire risk can be addressed qualitatively.

There are no fire impacts on risk-informed ISI program.

There are no requirements to use fire PRA to perform surveillance frequency extension request.

There could be impacts on risk-informed Tech Specs changes if a conservative fire PRA is used.

DISCUSSION OF AGENDA ITEMS

Day 1

Member Bley asked how the uncertainties in fire PRA are analyzed. Dave Miskiewicz of Progress Energy said that they were treated qualitatively.

Member Bley asked why people doing the individual PRAs didn't turn to address the conservatism in FPRA early on. Doug said that NUREG/CR-6850 wasn't fully tested and the industry didn't realize the ramifications of this until the end of 2007 when Harris and Oconee started their fire PRA. There was a strong tendency to follow the safe path which is the methodology in NUREG/CR-6850.

Member Bley asked if there is a need for development of guidance for the treatment of HRR in small panels or cabinets. Donnie Harrison of NRR stated that Harris plant did perform some refinements on the model. It went through a few RAI processes, but it could be done.

Chairman Stetkar asked about the uncertainty range in the fire ignition frequencies of the FEDB. Pat Baranowsky replied that it is about a factor of two. Chairman Stetkar asked whether each plant used plant-specific data and performed Bayesian updates. Dave Miskiewicz replied that Harris evaluated the Bayesian update but chose to use the generic data. Ken Canavan stated that only about 30 to 40 percent of all plants provided data to the old EPRI database. The industry is collecting 100% of plant data from 2000 to April 2009 this time.

Member Bley asked if there is any plan for the electrical cabinet bin refinement because it was treated as a single bin at this moment. Ken Canavan replied that the industry will look into this more.

Member Powers asked if there are concerns about what a fire inside an electric cabinet can do. Steve Nowlen stated that there is some guidance on how to look at the cabinet but improvements are needed.

Day 2

Chairman Stetkar asked if the lower frequency from EPRI 1016735 for bin 15 is a real reduction in fire frequency or is it based on a revised screening evaluation of a larger number of fire events available in the ERPI report. Pat Baranowsky of ERIN Engineering replied that it is a real reduction based on his judgment.

Doug True and Steve Nowlen discussed the guidance for electrical cabinet HRRs. With unknown fuel load, Steve stated that HRR is obtained by taking a 12-minute ramp-up, 12-minutes steady state, and let it burn out.

Steve Nowlen discussed how the parameters on the HRR distribution were calculated. He stated that using the values at 75th and 98th percentiles, alpha and beta factors are determined by using the Gamma distribution.

Chairman Stetkar discussed the re-evaluation of HRRs of cabinet fires with the meeting attendees. Paul Amico of SAIC stated that they have looked at the analytical model and plugged in the characteristics of the cabinets that were tested to see if the model can predict the results reasonably and accurately. Chairman Stetkar asked if this model has been validated. Paul Amico replied that the predictions of the model and test results were reasonably correlated and the methodology will be going through an independent peer review process.

Member Powers asked if there are any other databases for cabinet fires other than nuclear plants. Rick and Ken said they are not aware if there are any. Member Powers asked if using detailed calculations might help resolve issues of scaling experiments to specific applications. Rick replied that once the fire gets beyond a certain threshold, everything is burning away.

Chairman Stetkar asked what locations in the plant are driving the results of electrical cabinets. Dave Miskiewicz said it depends on the arrangement of the plant designs. One plant may have all its switchgear in one room; other plants divide it up with 4160 or other lower voltage cabinets.

Chairman Stetkar discussed the limitations of modification / implementation once the SER is approved. Harold Barrett said there may be limitations on the ability for the licensee to do post-transition self-approval based upon the current state of their PRA. The licensee will have to convert their PRA model to the accepted model if they chose to do self-approval.

Member Bley discussed supplement 1 of NUREG/CR-6850 - EPRI 1019259 with the staff. Ray Gallucci stated that some of the resolutions of the FAQs which were not agreed upon by the NRC and industry had been divided or dropped. Only those resolutions agreed by both the industry and NRC were included in supplement 1. For those dropped, independent resolutions are being pursued.

Chairman Stetkar asked what happens if the frequencies that have been accepted in the FAQ result in measurably different values from the NUREG/CR-6850 frequencies? Ray Gallucci replied that the decision would fall back to some of the other provisions of Regulatory Guide 1.174 for defense-in-depth, safety margins, and the other considerations.

Chairman Stetkar asked why we are concerned about the location of a fire in an electrical cabinet. Rick Wachowiak replied that we are concerned about the ones that propagate outside the cabinet.

Chairman Stetkar discussed the reasons why there were no more PRA-related FAQ submittals since 2009. Ken Canavan said the process stopped because there were difficulties to reach consensus in an open environment with a large number of participants.

Member Shack asked if the medium and low priority research on EPRI's action plan will drop off the chart because there are many high priority activities. Rick replied that those won't drop off, they will stretch out.

Chairman Stetkar discussed the schedule and rationale on the activities in EPRI's action plan. Rick and Ken explained the thought process for developing those charts.

Biff Bradley of NEI expressed his concerns for the ROP program if a conservative fire PRA model is to be used.

SUBCOMMITTEE DECISIONS AND ACTIONS

Following the presentations from industry, staff and the ACRS consultant, Chairman Stetkar stated that the Subcommittee will write a report and submit the report to the full Committee. The full Committee will meet in February 2011 to hear the most important issues from both the staff and the industry.

The full Committee plans to draft a letter report to the Commission in response to the SRM.

Chairman Stetkar then adjourned the meeting by thanking everyone for attending the meeting.

BACKGROUND MATERIALS PROVIDED TO THE SUBCOMMITTEE

1. NEI/EPRI Technical Report on NFPA 805 Transition, December 2010 (ML103430372)
2. M. Kazarians, Draft Report of Fact-finding on NFPA 805 Transition, December 2010 (ML103470748).
3. Biff Bradley, "Fire PRA Impacts to NFPA 805 Transitions", Slides Presentation, Nov. 16, 2010 (ML103330270)
4. Ken Canavan, "EPRI Perspectives on Current Fire PRA Methods", Slides Presentation, Nov. 16, 2010 (ML103330270)
5. Doug True, "Roadmap For Attaining Realism in Fire PRAs", Slides Presentation, Nov. 16, 2010 (ML103330270)
6. Jim Chapman and Doug True, "Insights from Industry Fire PRAs", Slides Presentation, Nov. 16, 2010 (ML103330270)
7. Alex Klein, "Status of Transition to NFPA 805, Methodology and Issues Impacting the Transition", Slides Presentation, Nov. 16, 2010 (ML103330270)
8. Donnie Harrison, "Fire PRA Related Methodological and Other Issues Impeding the Transition Process", Slides Presentation, Nov. 16, 2010 (ML103330270)
9. Letter to E. Leeds, "Successful Transition of Plants Implementing NFPA-805 to Meet 10CFR50.48(c)", NEI, November 15, 2010 (ML1013360406)

NOTE:

Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, MD, (301) 415-7000, downloading or view on the Internet at <http://www.nrc.gov/reading-rm/doc-collections/acrs/> or it can be purchased from Neal R. Gross and Co., 1323 Rhode Island Avenue, NW, Washington, D.C. 20005, (202) 234-4433 (voice), (202) 387-7330 (fax), nrgross@nealgross.com (e-mail).
