UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 29, 2016

MEMORANDUM TO: Greg A. Casto, Chief
Fire Protection Branch
Division of Risk Assessment
Office of Nuclear Reactor Regulation

FROM: Daniel M. Frumkin, Sr. Fire Protection Engineer ***/RA/***
Fire Protection Branch
Division of Risk Assessment
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE JUNE 8, 2016, CATEGORY 2 MEETING BETWEEN THE NUCLEAR REGUALTORY COMMISSION AND NUCLEAR ENERGY INSTITUTE MANAGEMENT REGARDING FIRE PROTECTION TOPICS

On June 8, 2016, the U.S. Nuclear Regulatory Commission (NRC) staff held a public teleconference meeting with the Nuclear Energy Institute (NEI) and the public to discuss fire protection topics. The meeting notice was made available at Agencywide Document Access and Management System (ADAMS) Accession No. ML16147A076. A list of attendees is provided in Enclosure 1.

For the first topic of the meeting, the NRC provided a status of its review of license amendment requests submitted by licensees to transition to the performance-based fire protection rule – Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48(c) – National Fire Protection Association Standard (NFPA) 805. The NRC staff issued sixteen non-pilot NFPA 805 amendments, with St. Lucie and Diablo Canyon issued since February 2016. Of the ten additional reviews, the NRC staff expects to complete eight more reviews by the end of the calendar year, with the ninth review to be completed by the end of calendar year 2017. The last of the ten reviews has not yet been submitted.

The second agenda topic addressed the following fire protection technical topics:

1. Fire protection staff level meetings,
2. Fire protection inspections,
3. Response to industry letter on the subject of multiple spurious actuations,
4. Revision of NEI 00-01,
5. Probabilistic risk assessment update with new information,
6. NFPA 805 frequently asked question on monitoring, and
7. Industry plans to pilot the very early warning fire detection system guidance provided in NUREG-2180.

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1. Fire Protection Staff Level Meetings – industry representatives suggested that the NFPA 805 fire protection related frequently asked questions (FAQ) meetings be merged with staff level meetings on fire induced circuit failures. The NRC staff agreed with this suggestion. Industry representatives noted that the fire probabilistic risk assessment (Fire PRA) meetings would not be merged with the circuits and NFPA 805 fire protection meetings.

2. Fire Protection Inspections – Industry stakeholders commented that the fire protection triennial inspection, Inspection Procedures (IP) 71111.05T and 71111.05XT, require a lot of licensee resources and were not as effective as they could be. NRC management responded that representatives of the Division of Regional Inspection and Support (DIRS) of the Office of Nuclear Reactor Regulation (NRR) would need to be involved in such a discussion. Industry stakeholders indicated that a white paper on the topic was under development and would be provided to the NRC. Industry stakeholders commented that there is a similar effort ongoing with the Component Design Basis Inspection procedure, IP 71111.21.

3. Response to Industry Letter on the Subject of Multiple Spurious Actuations – Industry stakeholder queried the staff regarding an NRC response to NEI's June 24, 2014 letter (ML14178B223). The NRC staff responded that the response is part of a larger effort that is currently awaiting a legal opinion.

4. Revision of NEI 00-01 – Industry stakeholders are developing a revision to industry implementing guidance for safe shutdown analyses including circuit failure analysis. Industry stakeholders indicated that the product is nearly complete but some technical issues, such as the response to the letter above, are still outstanding and may change the results of the document. NRC staff recommended that instead of waiting for outstanding information that industry stakeholders put what they believed to be the best available information into their document, and the NRC staff could then provide feedback. NRC staff recommended that the a draft be provided for the next staff level fire protection meeting, see Item 1, planned for mid-July 2016.

5. Probabilistic Risk Assessment (PRA) Update with New Information – Discussion focused on NFPA 805 FAQ 16-0076, PRA maintenance and update procedures described in Section 1-5 of the ASME/ANS PRA Standard and R.G. 1.200 Rev. 2. Industry representatives stated that licensees need to be able to use new information, as appropriate, and make the decision whether to include new information in their PRA calculations. NRC staff comments to the FAQ described NRC's expectations regarding the use of new information in the phases of NFPA 805, and in particular, indicated that new information should be evaluated for an application even if it is accepted and becomes available within a relatively short timeframe before the application is to be submitted. NRC staff noted that Section 1-5 of the PRA Standard and R.G. 1.200, describes when new information must be used. Industry agreed with NRC's citing of this section of the PRA Standard, and NRC committed to clarifying the FAQ for the next NFPA 805 FAQ meeting. The NRC staff has an action item from the last working level meeting to provide comments on this FAQ. See ML16133A410 for details.

6. NFPA 805 Frequently Asked Question on Monitoring – Industry stakeholders indicated that during the next working level meeting industry and NRC staff experts on the maintenance rule should participate in the discussion of monitoring for NFPA 805. The next meeting is scheduled to occur mid-July.

7. Industry plans to pilot the very early warning fire detection system guidance provided in NUREG-2180 – Industry stakeholders indicated that they planned to pilot draft NUREG-2180, “Determining the Effectiveness, Limitations, and Operator Response for Very Early Warning Fire Detection Systems in Nuclear Facilities,” to be completed by July 31, 2016. NRC management indicated that the NRC would delay publishing NUREG-2180 until after July 31, 2016, to allow for the inclusion of insights from the pilot as needed. NRC management offered for the NUREG’s authors to be available for questions, if questions arise during the pilot. Information about the pilot and schedule is included in the NRC staff’s June 10, 2016 letter, ML16162A198.

For the third agenda topic the NRC staff highlighted that Regulatory Issue Summary (RIS) 2015-17, “Review and Submission of Updates to Final Safety Analysis Reports, Emergency Preparedness and Fire Protection Documents,” encourages the submittal of complete electronic versions of fire protection documents. Industry stakeholders at the meeting indicated that they understood the information in RIS 2015-17.

The fourth and final agenda topic was to discuss the path forward for generic issue related to aluminum components in high energy arcing faults. Enclosure 2 includes the slide presentation that NRC staff presented during the meeting. Questions from the industry stakeholders during the meeting focused on, possible bias in only looking at extreme events, the impact on secondary targets in operating experience, and the arc duration in operating experience. The NRC is in the early steps of the generic issue process. NRC staff will engage industry stakeholders as part of generic issue process. This engagement is expected to include questions for the industry about the extent of condition (how much aluminum is out there?), identifying knowledge gaps, and determining if additional testing is needed.

An opportunity for public comment was provided near the end of the meeting. No public comments were received. The meeting was then adjourned.

Enclosures:
As stated

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DISTRIBUTION:

DRA R/F	JGiitter	GCasto	JSHyslop
CMoulton	DFrumkin	SRosenberg	RCorreia
MHSalley	NMelly		

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Office	NRR/DRA/AFPB	NRR/DRA/AFPB	NRR/DRA/APLA
Name	DFrumkin	GCasto	SRosenberg
Date	06 / 27 / 2016	06 / 28 / 2016	06 / 29 /2016

OFFICIAL RECORD COPY

NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805
NRC/NEI MANAGEMENT MEETING
LIST OF ATTENDEES

June 8, 2016

U. S. Nuclear Regulatory Commission Staff

J. Giitter
R. Correia
G. Casto
D. Frumkin
M. Salley
J.S. Hyslop
S. Gardoski
N. Melly
R. Felts

Stakeholders

J. Ventosa – Entergy
T. Basso – Exelon
V. Anderson – NEI
M. Tschitz – NEI
J. Ertman – Duke
A. Lindeman – EPRI
M. Millen - Next Era Energy
J. Reed – NEI
J. Stone – Duke Energy
S. Hutchins – NEI/Exelon
Brenda Simril – TVA
D. Churchman – Southern Nuclear
L. Martin – Duke

ENCLOSURE 1

HIGH ENERGY ARC FAULTS (HEAF)

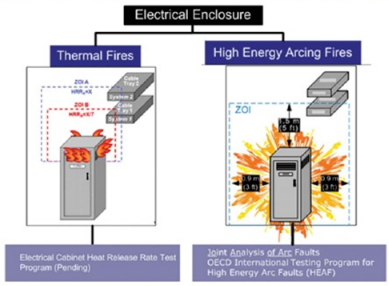
OPERATING EXPERIENCE AND PRELIMINARY EXPERIMENTAL RESULTS – INFORMATION BRIEFING FOR : NEI/NRC FIRE PROTECTION MANAGEMENT MEETING

Nick Melly, Mark Henry Salley
Fire and External Hazards Analysis Branch
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
June 8, 2016

Background and Operating Experience

- Provide High Level Overview of the Project
- Provide Discussion of Operating Experience
- Preliminary Test Results
- Discuss Potential Safety Implications
- Discuss Path Forward

Electrical Enclosures- Failure Modes



What is a HEAF?

- High Energy Arc Faults (HEAF) are energetic or explosive electrical equipment faults characterized by rapid release of energy in the form of heat, light, vaporized metal and pressure increases due to high current arcs between energized electrical conductors or between energized electrical components and neutral or ground.
  - First phase: short, rapid release of electrical energy which may result in projectiles (from damaged electrical components or housing) and/or fire(s) involving the electrical device itself, as well as any external exposed combustibles, such as overhead exposed cable trays or nearby panels, that may be ignited during the energetic phase
  - Second phase, i.e., the ensuing fire(s): is treated similar to other postulated fires within the zone of influence

Potential Safety Issue

- The recent international testing has shown that electrical components containing aluminum may have additional failure modes and be much more energetic than modeled in NUREG/CR-6850
- Potential new failure mode
  - Electrical shorting of equipment due to Aluminum combustion byproducts (i.e. plating out)
  - Copper exhibits a similar phenomena but to a much lesser extent

Example Recent US Electrical Enclosure Experience


Waterford, 1995


Prairie Island, 2001


Brunswick, Feb 7 2016

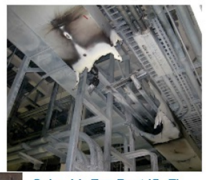
SONGS, 2001


Robinson, 2010

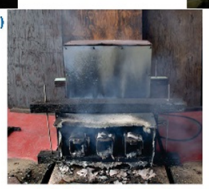
ENCLOSURE 2

Example of Recent US Bus Duct Experience

Diablo Canyon Bus Duct (OpE)
2000



Columbia Bus Duct (OpE)
2009



Zion Bus Duct (testing)
February 9th 2016

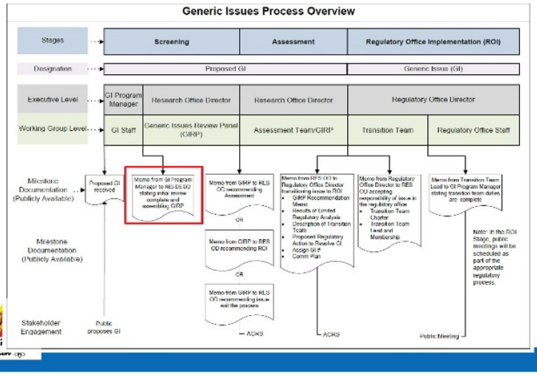
Proposed Immediate Actions

- Generic Issue
  - March 4, 2016, NRR analysis determined No immediate safety concern (ML16064A250)
  - May 6, 2016 RES entered the issue into Generic Issue Program (ML16126A091)
- Public Information
  - Presented at NEI fire forum last 2 years (no tests with aluminum at that time)
  - Presented at the RIC this year (mentioned aluminum test but no video)
    - FOIA from Union Concerned Scientists for Test Videos
- International Partners
  - Provided draft test report and video to OECD HEAF Project International Partners on April 20, 2016
  - Japanese Regulator considering Regulatory Action

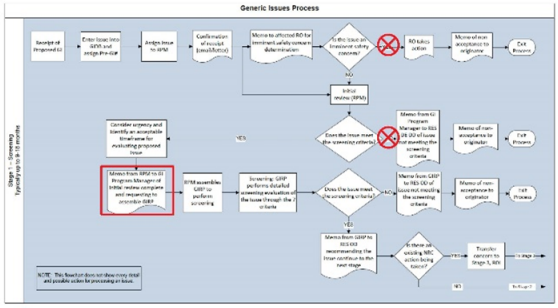
Generic Issues Program Status

- March 4, 2016, NRR analysis determined No immediate safety concern **(ML16064A250)**
- May 6, 2016 RES entered the issue into Generic Issue Program **(ML16126A091)**
- May 17, 2016 Initial screening results for PRE-GI-018 proposed generic issue on high energy faults involving aluminum components **(ML16132A415)**
- May 20, 2016 Request for Generic Issue review panel members for PRE-GI-018, proposed generic issue on high energy faults involving aluminum components **(ML16138A262)**

Stage In GI Process



Stage In GI Process



Proposed Longer Term Actions

- Continue in the Generic Issue Process
  - Generic Issues process will dictate how and in what format information is shared
- Potential interface with industry stakeholders using RES/EPRI Memorandum of Understanding
  - Information about extent of condition
  - RES will be in touch with EPRI
  - How much aluminum is installed in NPPs and materials facilities?