

September 19, 2006

MEMORANDUM TO: Sunil Weerakkody, Branch Chief  
Fire Protection Branch  
Division of Risk Assessment  
Office of Nuclear Reactor Regulation

FROM: Paul Lain, Fire Protection Engineer */RA/*  
Fire Protection Branch  
Division of Risk Assessment  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF JULY 24 & 25, 2006, CATEGORY 3 PUBLIC MEETING  
REGARDING THE NATIONAL FIRE PROTECTION ASSOCIATION  
(NFPA) 805 TRANSITION WORKSHOP

On July 24 & 25, 2006, the U.S. Nuclear Regulatory Commission (NRC) staff held a workshop with stakeholders and the public to discuss aspects of Donald C. Cook Nuclear Power Plant's (DC Cook) transition to the new risk-informed, performance-based fire protection licensing basis for nuclear power plants, pursuant to Title 10 of the *Code of Federal Regulations* Part 50.48(c) (10 CFR 50.48(c)). The meeting was held at the American Electric Power (AEP) Nuclear Generation Group's office in Buchanan, Michigan. DC Cook management and fire protection staff, their contractors, Callaway Nuclear Power Plant staff, and the NRC staff made presentations. Other Utilities, NRC Regional and Headquarter Staff, Nuclear Energy Institute (NEI), contractors, and the public were given opportunities to ask questions and join in the discussion through-out the workshop.

The NRC staff took the following issues for its consideration:

- Ability to complete transition within the 3 years of discretion with resource constraints.
- Updated RIS 2006-10 to reflect technical issues discussed at the June 9, 2006 mtg.
- Change analysis requirements for manual actions in III.G.1 and III.G.3 areas.
- Methodology for transitioning III.G.3 areas to NFPA 805 (safe today = safe tomorrow).
- Methodology for transitioning indicators (e.g., valve positions) to NFPA 805.
- Methodology for transitioning self-ignited cable fires.
- Performance-based transition, disconnected from the fire Probabilistic Safety Assessment.

The meeting agenda is attached as Enclosure 1, list of attendees is attached as Enclosure 2, meeting notes are attached as Enclosure 3, and the handouts are Enclosure 4 and are in ADAMS Accession # ML062370502.

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**NFPA 805 TRANSITION WORKSHOP**  
**July 24-26, 2006**  
**AEP Nuclear Generation Group - Buchanan Office**  
**AGENDA**

**PURPOSE:** To discuss aspects of Donald C. Cook Nuclear Plant's transitioning to the new fire protection licensing basis, 10 CFR 50.48(c) (NFPA 805 Rule).

**Monday July 24, 2006**

<b>1:00</b>	<b>Introduction</b>	Welcome, Introductions, Agenda, etc.
<b>1:15</b>	<b>Region 3 Plant Status</b>	Cook & Callaway Overview, Give other plants the opportunity to identify progress to date
<b>2:00</b>	<b>Regulatory Status</b>	NRC - RG 1.205, Enforcement Discretion, Regulatory Information Summaries, Generic Letters, etc
<b>3:00</b>	<b>Break</b>	
<b>3:15</b>	<b>Fundamental Elements Transition</b>	Prior Approvals, Code compliance/deviations, Alternate methods for GL 86-10's, Systems/features req. to meet Chap. 3
<b>4:30</b>	<b>Adjourn</b>	

**Tuesday July 25, 2006**

<b>8:30</b>	<b>Nuclear Safety Capability Transition</b>	III.G.1, 2 & 3 Area Transitions, deterministic vs. performance - based, need for change evaluation, etc
<b>9:30</b>	<b>Recovery Actions</b>	Existing manual actions and prior approval, HSD vs. CSD actions, Feasibility criteria, Regulatory Information Summary, Recovery actions identified during transition, Change evaluations for credited recovery actions, etc
<b>10:30</b>	<b>Break</b>	
<b>10:45</b>	<b>Non-Simple Fires</b>	Self-ignited cable fires, Transient Fires, Hot Work, High Energy Arcing Faults
<b>12:00</b>	<b>Lunch</b>	
<b>1:00</b>	<b>Fire PRA</b>	PRA Component list development, Fire ignition frequencies, PRA Model issues, Annunciation/alarm circuits
<b>2:30</b>	<b>Break</b>	
<b>2:45</b>	<b>Multiple Spurious Operations</b>	Double Break Design, Initial Risk Screening, Use of Fire Modeling, Expert Panel, Generic Letter
<b>4:30</b>	<b>Adjourn</b>	

**Wednesday July 26, 2006**

<b>8:00</b>	<b>Non-Power Operation</b>	Scope of systems and components, NEI 04-02 Appendix F changes, Level of analysis – Qualitative Approach, Shutdown PRA requirement
<b>9:15</b>	<b>Break</b>	
<b>9:30</b>	<b>Open Dialog with NRC</b>	Topics include Fire PRA Peer Reviews, NFPA 805 Standard License Condition, etc
<b>11:30</b>	<b>Adjourn</b>	

**DC COOK NFPA 805 WORKSHOP  
LIST OF ATTENDEES  
July 24 & 25, 2006**

**NRC**

J. Lara (RIII)	R. Langstaff (RIII)	P. Lain (HQ)
G. Hausman (RIII)	M. Mimir (RIII)	R. Gallucci (HQ)
D. Szwarc (RIII)	D. Passehl (RIII)	P. Koltay (HQ)
B. Olimene (RIII)	H. Abuseini (RIV)	A. Dahbur (RIII)
D. Schrum (RIII)	G. Peck (RIV)	

**Industry & Public**

D. Fadel (AEP)	W. Larson (EPM)	E. Kleinsorg (KG)
R. Gray (AEP)	R. Kalantari (EPM)	A. Ratchford (RDS)
D. MacDougall (AEP)	T. Jutras (EPM)	K. Zee (ERIN)
R. Pletz (AEP)	P. Ouellette (EPM)	S. Hunt (HAI)
S. Cherba (AEP)	R. Bertucio (Sciencetech)	F. Meister (TRI-ENS)
Y. Shen (AEP)	S. Meyer (Sciencetech)	S. Solhdoost (ARS)
R. Baradaran (AEP)	E. Hollis (Sciencetech)	P. Boulden (ARS)
M. Ma (AEP)	T Raimondo (NISYS)	A. Afzali (PG&E)
P. Schoepf (AEP)	J. Masterlark (NMC)	M. Unruh (NPPD)
A. Marion (NEI)	J. Olvera (NMC)	T. Shudak (NPPD)
P. Gaffney (Progress)	T. Swiecicki (NMC)	J. Reddington (FENOC)
J. Ertman (Progress)	D. Mershon (Nexus)	J. Fortman (Ameren-UE)
H. Barrett (Duke)		

## DC Cook Workshop Notes

Monday July 24, 2006

- 1:00 Introduction** Welcome, Introductions, Agenda, etc.  
Dan Fadel (DC Cook)
- 1:10 Region 3 Plant Status** Cook & Callaway Overview, Give other plants opportunity to identify progress  
Richard Gray (DC Cook)
- Likely will ask for 3-yr transition
- Joe Fortman (Callaway)
- No findings so far (at least not reportable)
  - Likely will ask for 3-yr transition
- Jim Masterlark (NMC) [no handout]
- Fire PSAs initiated in 2005, based on draft NUREG/CR-6850
  - Fleet transition team in place
  - Non-compliance identified and reported to Region 3
  - Point Beach on schedule for 3-yr transition
  - Prairie Island has requested 3.5 yrs
  - Monticello and Palisades have requested 4 yrs
  - Utilizing same databases as Cook and Callaway
  - Tracking non-compliances based on type (higher level are reportable and tracked programmatically for NRC); lower level ones tracked internally
  - Manual actions and circuits issues are driving transition (no need for formal cost/benefit analysis)
- 1:25 Regulatory Status** NRC - RG 1.205, Enforcement Discretion, RIS 2006-XX, GL 2006-XX, etc  
Paul Lain (NRC)
- RG 1.205 endorses both NEI 04-02 and NEI 00-01, Revisions 1
  - Currently NRC is not granting >3-yrs of NFPA-805 enforcement discretion (those who requested 2-yrs need to submit letter to extend to 3-yr); plants wanting >3-yr will be reviewed on plant-specific basis as 3-yr transition period nears its end
  - Inspection Procedures: "During transition" have been issued; "Post transition" are in draft
  - Next Pilot Plant Observation Visit is at Oconee, 10/16-18, for Fire PSA, with a public meeting on 10/19
  - FAQ Program: First meeting on 7/20; next meeting during week of 8/21
  - New RIS's issued: 2205-30 on Circuits Issues (12/2005) and 2006-10 on Manual Actions (6/2006)
  - New GL's: 2006-03 on Hemyc/MT (4/2006) and 2006-xx on Circuits Issues (expected 8/2006)
  - Non-controversial FAQs so far, mostly just updates to NEI 04-02 to align with RG 1.205 (4 given to NRC, 4 with NEI Task Force)
  - Revising RG 1.205 will require at least a year (CRGR, ACRS, etc.); FAQ program will enable interim "approval;" FAQ approval requires at least 3 months
  - Pilot meetings will not be public, but there will be a public meeting on the last day to summarize (e.g., 10/19), likely with handouts available from the pilot meeting
  - Possibly a Rev. 1 to RG 1.205 before majority of LARs are submitted
  - NRC will be overloaded with NFPA-805 LARs and new COLs in 2008-09 time frame, so we're hiring more people and using National Labs

- Project authorization has been approved for NSSS Owners Groups to develop draft FPSSA Peer Review Process by end of 2006
- **CRGR, ACRS, and Commission to review integration of multiple RIS's and GL's that are being issued fairly concurrently?**

1:45 Break

**2:05 Fundamental Elements Transition**

Prior Approvals, Code compliance / deviations  
 Alternate methodology/guidance for 86-10's  
 Systems/features required to meet Chapter 3  
 Handout #2 Dan MacDougall (DC Cook)

- Differences between Appendix R and NFPA 805: (1) all operating modes; (2) safe and stable fuel condition
- Chapter 4 review precedes Chapter 3
- FAQs are not final until incorporated in Revision of RG 1.205, but should be quite close
- Cook: Limited progress to date on mapping BTP 9.5-1, Appendix A, to Chapter 3 of NFPA-805; Column 2 of NEI 04-02, Table B-1, currently being completed (Columns 3 and 4 await) – see Handout #2
- Must be current as to plant configuration via walk-downs, not just paper review
- **Cook relying on approval of FAQ 06-0004, as proposed, to determine systems/features required to meet Chapter 3**
- FAQ 06-004 process allows deterministic transitions because risk is below threshold(s)
- Is multiple spurious operation being considered during this FAQ 06-0004 transition screening – not in the beginning, so it may be necessary to “unscreen” some of these initially screened systems/features that have been based on meeting risk threshold(s)
- **No non-compliances so far “as per licensing basis” (not evaluated vs. “new” RIS's and GL's)**
- SER approving Halon suppression at 5% for 10 minutes for deep-seated fires conflicts with NUREG/CR-3656 – must address post-approval (post-SER) basis; should this be an LAR or just part of the transition report (i.e., documented in Table B-1 of NEI 04-02)? **Plant change process is cleanest way to handle these, but licensees claim this will not be considered in the FPSSA**

**2:45 Nuclear Safety Capability Transition**

III.G.1, 2 & 3 Area Transitions, deterministic vs. performance based, Need for change evaluation, etc

Handout #3 Richard Gray (DC Cook)

- Shift in focus from Appendix A criteria
- Tried to follow table B-2 of NEI 04-02, but required an expansion to include aspects of NEI 00-01 (see Handout #2); new Table B.2-1 based on NEI 00-01, Section 3.0, in Column 1 instead of NFPA-805; pilot plants having same experience, possibly a new FAQ from both pilots and non-pilots
- Table B-3 from NEI 04-02 requires greater detail than indicated in NEI 04-02, although no new columns; instead of just listing documents, include relevant material from documents, at least in summary form; two phases: (1) concurrent evaluations, with “holes,” (2) return to table and fill in the holes
- Assessment worksheet accompanies Table B-3 for each analysis area

- Transition goals: (1) efficiency; (2) simple and streamlined; (3) performance based to address controversial issues (e.g., multiple spurious)
- III.G.1 fire areas (~30 over two units) will be transitioned deterministically to the extent possible (no plant change evaluations), given 3-hr barrier and one success path (includes exemptions)
- III.G.2 fire areas (~5 over two units) will be transitioned deterministically to the extent possible, as above, provided III.G.2 (a-c) provisions are met; no manual actions
- III.G.3 fire areas (~25 over two units) can be transitioned deterministically based on NEI 04-02, Section B.2.2, except where fire modeling is needed to address spurious actuations and manual actions via performance-based analyses; goal is to reduce need for manual actions for III.G.3 (via fire modeling)
- Transition summary for each fire analysis area
- Changes to transitioned, performance-based FPP will required plant change evaluations
- Long discussion on whether or not change in Appendix R assumption, but not change in actual configuration or credit, merits a plant change evaluation; if you make no changes to your completely compliant FPP, do you need a FPSA for transition (delta-risk is zero)?

3:45 Adjourn

**Tuesday July 25, 2006**

- 8:30 Recovery Actions** Existing manual actions and prior approval, HSD vs. CSD Actions, Feasibility Criteria and RIS 2006-XX, Recovery actions identified during transition, change evaluations for credited recovery actions, etc.  
Richard Gray (Cook) Handout #3
- NEI wants NRC to supplement RIS 2006-10 more formally
  - FAQ to address manual actions concerns
  - Long discussion on what constitutes feasible (and reliable) manual actions for transition without HRA (concern over whether some arbitrary time margin would be applied)
  - Unreliable manual action (e.g., HEP approaching 1) can still be part of a cutset with a very low CDF (due to low ignition frequency, etc.); is this manual action acceptable even if unreliable?
  - Do plants that cannot maintain hot shutdown indefinitely have to be able to go to cold shutdown? Some plants cannot maintain hot shutdown for 8 hours, and need to transition to cold shutdown; this may merit a FAQ (not really addressed in NEI 04-02)
  - "Allowed" III.G.3 manual action implies feasibility and reliability
- 9:25 Break**
- 9:45 Non-Simple Fires** Self-ignited cable fires, Transient Fires, Hot Work High Energy Arcing Faults  
Dan MacDougall (DC Cook) Handout #3 (Continued)
- Fire modeling effort will begin in 2007 with screening, based on feedback from pilot plants
  - Does NUREG/CR-6850 discount self-ignited cable fires in the same way that the FPSDP does (only possible in thermoplastic and non-qualified thermoset)? May need to be resolved after completion of NUREG/CR-

- 6850 pilots (no sooner than end of 2006)
- What voltage is the threshold for a “power cable” (can it go as low as 120V)? This is relevant to dismissing self-induced cable fires in power cables (or other cables as well)
- Point Beach has had to review nearly all cables, not just power, for self-ignition because they are unqualified (pre-date IEEE-383)
- If fire is impossible in an area that previously required postulating an Appendix-R fire for compliance, does this require a plant change evaluation?
- Safe shutdown analysis and FPPSA can be conducted “independently,” so long as both are wrapped together in the end to ensure that something that may have been eliminated by one but not by the other gets recaptured and returned to the transitioned FPP, and gets documented via a plant change analysis; SSA and FPPSA should serve as checks on one another, and the FPP should be the union, not intersection, of the items in both (reference Duke/Progress “Venn” diagrams showing overlap among SSA, FPPSA, etc.)
- Electrical engineers consider MCCs and load centers to be different and therefore can be treated differently with respect to high-energy arcing faults (MCCs can only generate 200kW secondary fires, not the initial high-energy arcing fault)
- NUREG/CR-6850 authors may revise it to limit HEAFs to >1000V non-MCC devices
- What if MCC also feeds more than just an MOV (e.g., FW pump)? Consider for 200W secondary fire, but not HEAF

11:05 Break

**11:30 Multiple Spurious Operations**

Double Break Design, Initial Risk Screening, Use of Fire Modeling, Expert Panel, GL 2006-XX

Richard Gray (Cook) Handout #3 (continued)

- “Double break” design for MOVs and SOVs (unique to Cook?); licensing basis excludes need to address multiple spurious operations (for MOVs and SOVs) due to low likelihood based on this design
- Double break design approved via SER
- Both intra- and intercable multiple shorting requires contacts between specific conductors in the cables

12:00 Lunch

**1:15 Fire PRA**

PRA Component List Development, Fire Ignition Frequencies, PRA Model issues, Annunciation/alarm circuits

Handout #3 (continued)

Jim Hawley (DC Cook) Handout #4

- Appendix R fire areas and zones are essentially compartments as required under NUREG/CR-6850 (or readily convertible into compartments)
- Internal events PSA F&O’s have all been addressed (with internal flooding pending)
- Cook, with an Ice Condenser containment, considers penetrations as small as 2-in in diameter for containment integrity; hydrogen explosion dominates LERF because of the low containment pressure (~12 psi)
- Containment spray, although not modeled in the FPPSA, will be cable-traced for the pump function to ensure they do not spuriously start



- LERF model may be updated from newly completed, detailed Level-2 model
- Frequency-based screening for spurious operations should already assume probabilities = 1 for any random failures that could be fire-induced; 1E-9/y screening criterion does not include CCDP; anything that does not get screened out requires cable tracing

2:30 Break

**2:50 Non-Power Operation**

Scope of systems and components, NEI 04-02 Appendix F changes, Level of analysis – Qualitative Approach, Shutdown PRA not required  
Dan MacDougall (DC Cook) Handout #3 (continued)

- Dry run for benchmarking high-risk evolutions during next outage
- Progress in non-power operation analysis for NFPA 805 transition will be addressed during upcoming NEI FPIF

**3:05 Open Dialog with NRC**

Fire PRA Peer Reviews, NFPA 805 Standard License Condition, etc.  
Handout #3 (continued)

- NEI has asked Owners Groups to develop FPSA Peer Review guidance, with draft by end of 2006
- NEI wants to request increase in enforcement discretion; one possibility is a 6-month window after the pilot LARs are approved; does voluntary nature of the rule allow more flexibility?
- NEI should develop staggered submittal schedule for LAR submittals to relieve burden on NRC staff
- Pilots need to be complete before others are comfortable to sign on
- Even though sign-up for NFPA 805 officially began in 2004, licensees did not seriously consider it until late 2005, beyond the budget cycle (early spring) for 2006, meaning many licensees have no budget available until 2007
- MCR evacuation will preclude re-establishing Westinghouse RCP seal cooling within 13-min time window, leading to a seal LOCA with probability ~ 0.2 (procedures dictate stoppage of charging pumps, perhaps inadvisably)

**3:50 Action Items**

1. NRC: update RIS 2006-10 to include conclusions from 6/9/06 public meeting on recovery actions
2. NRC & NEI: review guidance on self-ignited cable fires from various technical sources
3. NEI: enhance FAQ on manual actions
4. NRC: “Baggage” associated with converting a III.G.2 to III.G.3 area and adding manual actions that are, by regulation, allowed without prior NRC approval (or plant change evaluation); difference for pre- vs. post-79 plants?
5. NRC & NEI: increase enforcement discretion period
6. NEI: FAQ to modify Tables B-2 and B-3 in NEI 04-02

4:10 Adjourn

**NFPA 805 WORKSHOP**  
**July 24 & 25, 2006**  
**HANDOUTS**  
ADAMS No. ML062370502