fire protection information forum

August 27-31, 2006 • Argonaut Hotel, San Francisco, CA

August 27, 2006 – Sunday		
6:30 p.m. – 8:00 p.m.	•	**Reception**
August 28, 2006 – Monday		
8:00 a.m. – 9:00 a.m.	•	**Registration and Continental Breakfast**
9:00 a.m. – 10:00 a.m.	•	**Plenary One: Executive Perspective** **Welcome and Nuclear Industry Overview** Jay Thayer Vice President, Operations Nuclear Energy Institute **Industry Senior Management Perspective** Jack Keenan Sr. Vice President of Generation and Chief Nuclear Officer Pacific Gas & Electric Co. **NRC Perspective** Luis A. Reyes Executive Director for Operations Nuclear Regulatory Commission
10:00 a.m. – 10:15 a.m.	•	**Break**
10:15 a.m. – 11:00 a.m.	•	**Plenary Two: NRC High-level Plan to Bring Closure to Fire Protection Issues** Moderator: Alex Marion, NEI Jim Lyons, NRC Sunil Weerakkody, NRC
11:00 a.m. – 12:00 p.m.	•	**Plenary Three: Post Fire Safe-Shutdown Circuit Analysis** Objective: To provide insights and clarifications to post fire safe-shutdown circuit analysis issues Moderator: Steve Hardy, Progress Energy Robert Radlinski, NRC Chris Pragman, Exelon
12:00 p.m. – 1:00 p.m.	•	**Lunch**

1:00 p.m. – 2:15 p.m.	•	**Plenary Four: NFPA 805 Transition: Part 1** Objective: Update on NEI 805 transition task force/FAQ process, pilot plant progress, and transition experience Moderator: Jeff Ertman, Progress Energy Paul Lain, NRC Harry Barrett, Duke Energy Jim Riley, NEI David Miskiewicz, Progress Energy Elizabeth Kleinsorg, Kleinsorg Group
2:15 p.m. – 2:30 p.m.	•	**Break**
2:30 p.m. – 3:45 p.m.	•	**Plenary Five: NFPA 805 Transition: Part 2** Objective: Update on NFPA 805 transition and experience Moderator: Rebecca Price-Puckett, Entergy Paul Lain, NRC John Reddington, FirstEnergy Corp. Lee Eitel, AmerenUE Jim Masterlark, NMC Wade Larson, EPM
3:45 p.m. – 5:00 p.m.	•	**Plenary Six: Fire PRA Standard, Peer Review Process, and Maintenance Rule (a)(4)** Objective: To discuss the fire PRA standard, peer review process, and coordination of industry support group efforts Moderator: Biff Bradley, NEI Steve Dinsmore, NRC Dennis Henneke, GE Dave Finnicum, Westinghouse Kiang Zee, ERIN Greg Krueger, Exelon Biff Bradley, NEI
5:00 p.m. – 5:30 p.m.	•	**Plenary Seven: Utility/NRC Panel – Q & A** Objective: To discuss NFPA 805 transition details from both industry and NRC experts Moderator: Alex Marion, NEI <u>Panel:</u> Paul Lain, NRC Jeff Ertman, Progress Energy Harry Barrett, Duke Energy Jim Masterlark, NMC Elizabeth Kleinsorg, Kleinsorg Group Wade Larson, EPM Paul Boulden, Appendix R Solutions
5:30 p.m.	•	**Adjourn**

August 29, 2006 – Tuesday		
8:00 a.m. – 9:00 a.m.	•	**Continental Breakfast**
9:00 a.m. – 10:30 a.m.	•	**Plenary Eight: Inspections, Assessments, Recent Events, and SDP Issues Fielded by NRC Panel Q & A** Objective: To discuss regulatory issues, fire protection optimization, inspections, assessments, etc. Moderator: Chris Pragman, Exelon <u>Panel:</u> David Solorio – Office of Enforcement Doug Starkey – Office of Enforcement Peter Koltay – Inspection Program Branch Daniel Frumkin – NRR John Rogge – Region I Charlie Payne – Region II Julio Lara – Region III Gregory Pick – Region IV
10:30 a.m. – 10:45 a.m.	•	**Break**
10:45 a.m. – 12:00 p.m.	•	**Plenary Nine: Operator Manual Actions** Objective: To discuss RIS 2006-10, exemptions, and process issues Moderator: David Buell, OPPD Dan Frumkin, NRC Chris Pragman, Exelon
12:00 p.m. – 1:00 p.m.	•	**Lunch**
1:00 p.m. – 2:15 p.m.	•	**Plenary Ten: Fire Research Activities** Objective: To discuss current research in support of RI/PB fire protection and results to date from cable fire testing Moderator: Ken Ainger, Exelon Mark Salley, NRC Bijan Najafi, EPRI Clarence Worrell, PGE Mike Fletcher, Progress Energy
2:15 p.m. – 2:30 p.m.	•	**Break**
2:30 p.m. – 3:30 p.m.	•	**Plenary Eleven: Fire Protection and New Plants** Objective: Discuss how new plants will implement fire protection programs Moderator: Jeff Ertman, Progress Energy Robert Radlinski, NRC Wayne Sohlman, NEIL Joe Redmond, Areva

3:30 p.m. – 4:00 p.m.	•	**Plenary Twelve: Fire Brigade Credit** Objective: To discuss fire brigade recent issues of drill participation, pre-fire plans, brigade vs. dept. etc. Moderator: Frank Garrett, APS-STARS Frank Garrett, APS-STARS Cliff Sinopoli, Exelon
4:00 p.m.	•	**Adjourn**
August 30, 2006 – Wednesday		
7:30 a.m. – 8:30 a.m.	•	**Continental Breakfast**
8:30 a.m. – 9:30 a.m.	•	**Plenary Thirteen: Current Compliance** Objective: To discuss options and paths for current compliance Moderator: Rodney Wilferd, STARS <u>Panel:</u> Robert Radlinski, NRC Dan Frumkin, NRC Chris Pragman, Exelon Tom Gorman, PPL Mike Schoppman, NEI
9:30 a.m. – 10:30 a.m.	•	**Plenary Fourteen: The Future: Is There a Stable and Predictable Regulatory Process for Fire Protection?** Moderator: Frank Garrett, APS-STARS Sunil Weerakkody, NRC Ken Taplett, STP Nuclear Ken Ainger, Exelon Alex Marion, NEI
10:30- 11:00 a.m.	•	**Closing Remarks** Sunil Weerakkody, NRC Alex Marion, NEI
11:00 a.m.	•	**Adjourn**

August 30, 2006 – Wednesday		
ADDED SESSION: NFPA 805 Transition **1:00 p.m. – 5:00 p.m.**	•	**Objective:** To discuss and identify potential issues and FAQs **Scoping, Development and Documentation of Fire Scenarios** 1. Dennis Henneke, GE 2. Roger Sims, Kleinsorg Group 3. Mike Fletcher, Progress Energy 4. Tom Jutras, EPM **Fire PRA Component Selection Results** 1. Dennis Henneke, GE 2. Dave Miskiewicz, Progress Energy 3. Brandi Weaver, Duke Energy 4. John Pyo, PG&E 5. Bob Bertucio, Scientech **NUREG 6850 Pilot Results** 1. Gary Cooper/Walt Bush, Constellation Energy 2. Dennis Henneke, GE 3. Bijan Najafi, EPRI
August 31, 2006 – Thursday		
ADDED SESSION: NFPA 805 Transition **8:00 a.m. – 11:45 a.m.**	•	**Objective:** To discuss and identify potential issues and FAQs **Chapter 3/4 Transition Experience** 1. Mike Fletcher, Progress Energy 2. Tom Jutras, EPM 3. Harry Barrett, Duke Energy **Non-power Operation Transition** 1. Elizabeth Kleinsorg, Kleinsorg Group 2. Harry Barrett, Duke Energy 3. Paul Ouellette, EPM **Change Process** 1. John Lattner, Southern Nuclear 2. Jeff Ertman, Progress Energy 3. Mike Krupa, Entergy
11:45 a.m. – 12:00 p.m.	•	**Closing Remarks** Alex Marion, NEI

NEI - NRC Fire Protection Forum 2006
Plenary 5 – NFPA Transition Part 2

Automation of Process:

- Re-baselining Process
- Transition Process
- Pure Data Management
- In-progress Configuration Management
  - DCPs
  - ACPs

NEI - NRC Fire Protection Forum 2006
Plenary 5 – NFPA Transition Part 2
Transition Experience
Entergy – Rebecca Puckett

- Status of transition at Entergy (Waterford 3 and ANO)
  - Project plans complete with funding and implementing organizations in place
  - Addressing HEMYC with modifications/805 evaluations at Waterford. ANO has addressed HEMYC with a self-assessment on the risk and a planned schedule for potential modifications pending the outcome of transition results
  - Gap Analysis of Internal Events model for ANO, Unit 2 is complete and Waterford 3 Gap Analysis is about 50% complete.
  - Gaps will be filled during 2006
  - Fire PRA Bid Spec is ready for issuance to potential bidders
  - ANO is 95% complete with re-validation to Appendix R
  - Developing fleet procedures for transition during 2006
  - Start non-fire area Chapter 3 transition at ANO-2 and W3 this year

NEI - NRC Fire Protection Forum 2006
Plenary 5 – NFPA Transition Part 2
Transition Experience
Entergy – Rebecca Puckett

- Critical Nature of the Schedules
  - Pilots are vetting the process
  - Ideally non-pilots should follow the pilots
- Reality is that since everyone signed up together, schedules converge.
- What is the solution?
  - Extension of enforcement discretion for non-pilots to be tied to approval of the first amendment request
  - Utilization of task force to prioritize resolution of technical issues based on transition schedules
- NEI-04-02 is our process and RG 1.205 is our approval of that process. Lessons learned should be incorporated into those documents via the FAQ process to clarify ambiguities.

Fire Testing

Mike Fletcher, Progress Energy –
Harris Nuclear Plant

Topics

- MT ERFBS Testing
- Hemyc ERFBS Testing
- Meggitt Safety Systems Si 2400 Cable Testing

Progress Energy

MT ERFBS Testing

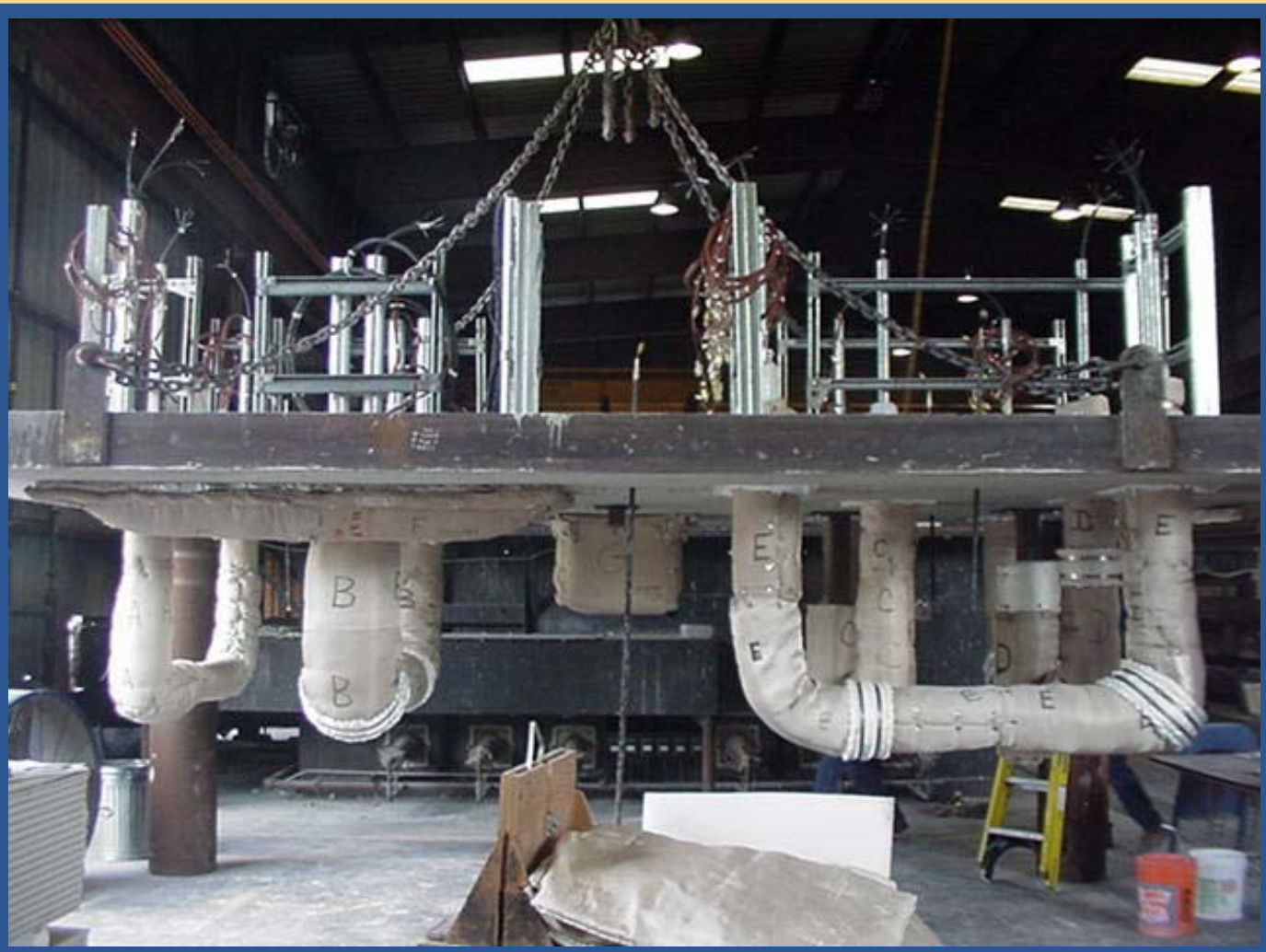
- NRC performed tests in spring of 05 which indicated that the 3 hr MT ERFBS would not pass GL 86-10 S1 criteria.
  - NRC used alternate materials due to obsolesce
- HNP Tested Plant Specific Applications
  - Purpose was to establish ERFBS worth for NFPA 805 change evaluation
  - Used Plant Materials (Siltemp, plant blankets)
  - Tested 7 plant installed configurations
    - Wall mounted conduits, J-boxes
    - Multiple conduit configurations
    - Conduits with bounding tube steel supports

MT ERFBS Testing

- 4 layer system
  - 1 inch ceramic fiber
  - SS foil vapor barrier
  - Aluminum Tri-hydrate powder
  - 1-1/2 inches ceramic fiber covered in Siltemp

Progress Energy

MT ERFBS Testing



Progress Energy

MT ERFBS Testing

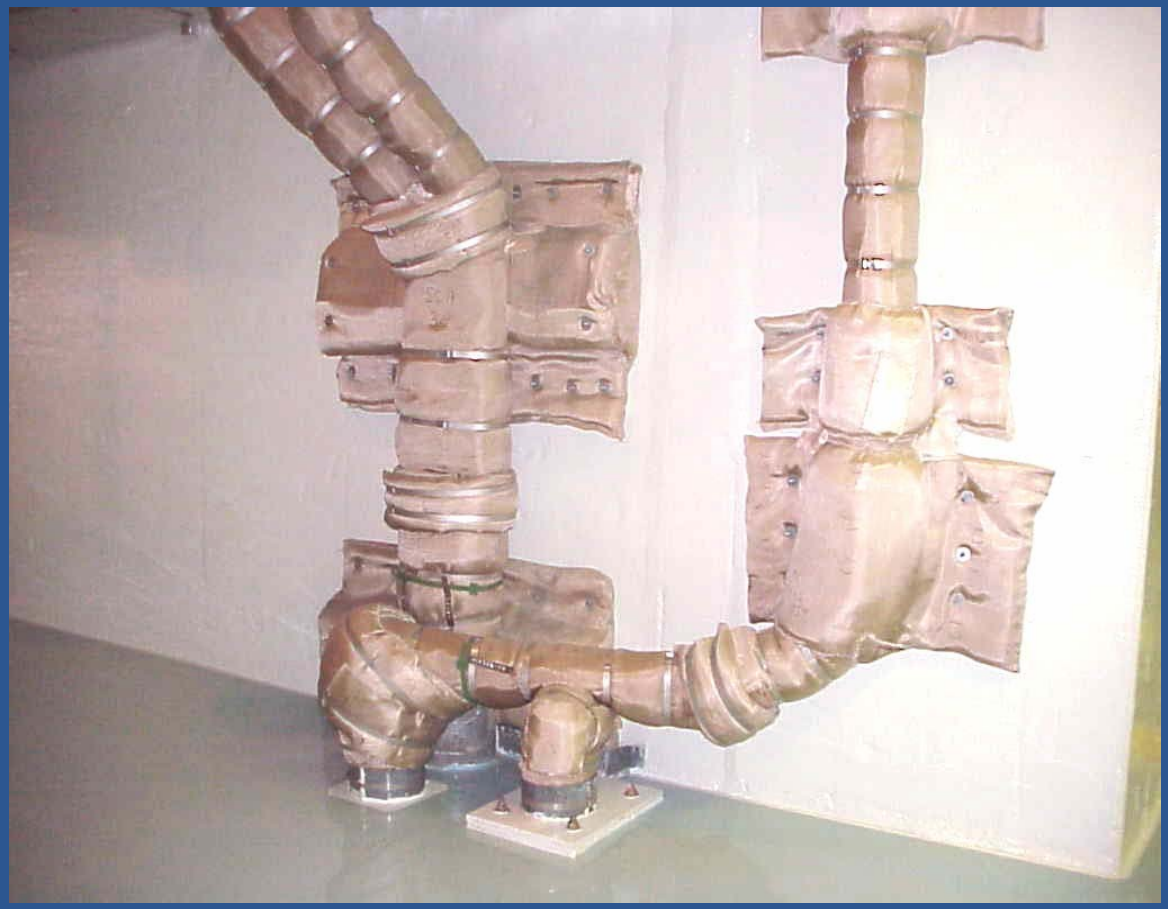
- P

MT ERFBS Testing

- Results
  - Wall mounted single conduit and two-3 inch conduits in free air passed for 3 hrs.
  - Strut with Hilti Kwik 3's passed
  - Remainder of items rated for 116 – 169 minutes
  - Results appear to be bounding for use in HNP NFPA 805 change evaluations.

Hemyc ERFBS Testing

- Single layer Ceramic Fiber enclosed in Siltemp
- Collars at butt joints, overlapped on longitudinal joints
- Installed with bands on conduit, and lacing hooks on tray.



Progress Energy

Hemyc ERFBS Testing

- NRC performed tests in spring of 05 which indicated that the 1 hour Hemyc ERFBS would not pass GL 86-10 S1 criteria.
  - NRC used alternate materials due to obsolesce
- NEI Tested Plant Specific Materials in Fall 05
  - Purpose was to determine impact of Siltemp material change
  - Tested Conduit Configuration Identical to NRC's
    - Used NRC Test deck
    - Used NRC's conduits, 1 inch , 2-1/2 inch, and 4 inch
    - Installed by HNP and Waterford Installers
    - Used plant Siltemp material

Hemyc ERFBS Testing

- NEI Test Results
  - Performance results not significantly different from the NRC's
  - Smallest conduits $\approx$ 30 minutes, largest conduits $\approx$ 50 minutes
  - Data more consistent with expected results (enclosed mass)

Hemyc ERFBS Testing

- Waterford Testing Conducted July 28th, 06
  - Purpose to bound most common size of plant conduit
    - Tested 3 inch conduits with 15% 26% fill and 4 inch conduits with 11 % and 28 % fill.
    - Tested using typical conduit supports with baseline and upgraded coverage using INTERAM ERFBS.
  - Results- All configurations rated for ≈ 30 - 35 minutes. Support coverage and joint collars influenced results.

Hemyc ERFBS Testing

- HNP will conduit 2 HEMYC fire tests in 4th qtr
- Purpose is to establish barrier worth of configurations not bounded by existing testing
  - Wall mounted single and multiple tray
  - Wall mounted conduits and J-boxes
  - Will use typical cable fill and bounding supports designs
  - Will include some upgrade designs for collars and supports based on previous test results

Meggitt Safety Systems Si 2400 Cable Testing

- SS Outer Sheath
- Silicon Dioxide Insulation
- Nickel Clad Copper Conductors

Progress Energy

Meggitt Safety Systems Si 2400 Cable Testing

- HNP looking for alternative to ERFBS to address circuit separation issues.
- Previously in use at Columbia and McGuire
- Cable provided environmentally qualified.
- Cable seismically qualified by HNP via SQURTS program.
- HNP conducted 3 hr fire testing to guidance of GL 86-10 S1

Meggitt Safety Systems Si 2400 Cable Testing

- Developed bounding configurations
  - Cables in horizontal and vertical runs and maximum unsupported spans.
  - Tested minimum bend radius and factory splice in each cable size.
  - Tested a verity of unprotected supports using tube steel, strut, clamps, embed bolts.

Progress Energy

Meggitt Safety Systems Si 2400 Cable Testing

- Cable Functionality Monitoring
  - Performed per 86-10 S1
    - Megger Tested Cables
- Additional Cable Functionality Monitoring
  - Testing Specified by HNP
    - Current Leakage Monitoring

Progress Energy

Meggitt Safety Systems Si 2400 Cable Testing

- Used guidance from UL 2196 “Test for Fire Resistive Cable” to establish
  - Smallest Conductor
  - Minimum Number of conductors
  - Minimum thickness of conductor insulation
  - Minimum thickness between conductors
  - Minimum thickness between conductors and sheath
- Tested 4/C #8, 8/C #12, 7/C #14, and 7/C#10

Meggitt Safety Systems Si 2400 Cable Testing

- First Fire Test Conducted July 04
  - All Supports Passed.
  - Cable Passed Hose Stream Test.
  - Megger and Leakage Test Data was Collected before and during fire exposure.
- Cable Failed Post Hose Steam Megger Testing
  - Cable Jacket Failed –Due to Galvanized Strut Supports (NRC IN 2006-02)

Meggitt Safety Systems Si 2400 Cable Testing – Liquid Metal Embrittlement

Progress Energy

Meggitt Safety Systems Si 2400 Cable Testing

- Final Fire Test Conducted Feb 05
- Used combination SS strut, clamps, and SS shield for galvanized supports.
- All Supports Passed.
- Cable Passed Hose Stream Test.
- Megger and Leakage Test Data was Collected before, during, and the after the 3 hr fire exposure.

Progress Energy

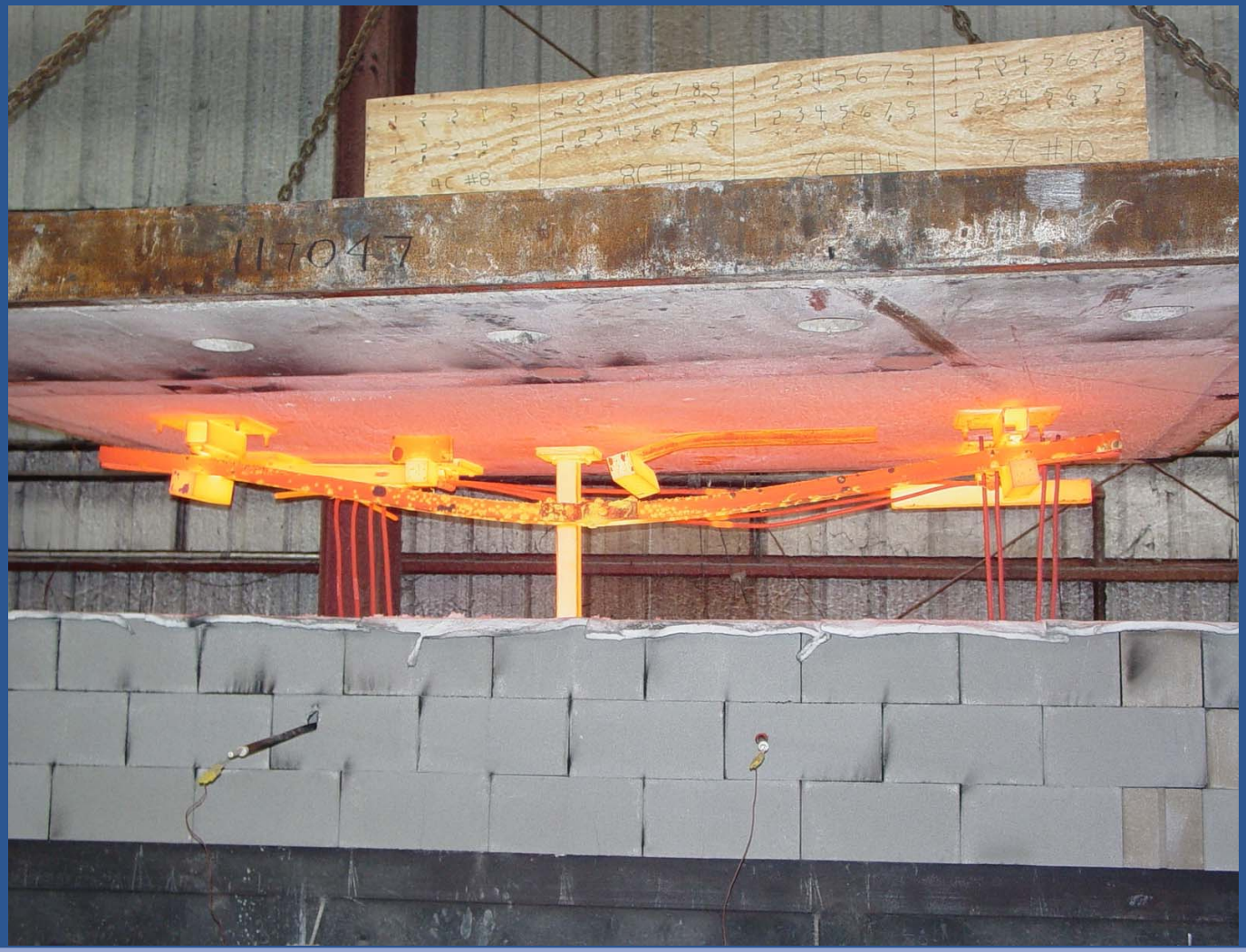
A Meggitt Safety Systems Si 2400 Cable Testing

Progress Energy

A Meggitt Safety Systems Si 2400 Cable Testing

Progress Energy

A Meggitt Safety Systems Si 2400 Cable Testing



Progress Energy

A Meggitt Safety Systems Si 2400 Cable Testing

- Regulatory Approvals:
  - Initial NRC approval for cable functionality testing methods and its use for the specific plant application.
  - HNP withdrew generic approval request after discussions with NRR.
  - July 31,06 NRR issued letter stating HNP standard license condition supersedes GL 86-10 question 8.10. This allows use of cable without prior NRC approval.

Fire Testing

- SO WHAT ?
  - Hemyc ERFBS and Meggitt Safety Systems Si 2400 Cable add tools for fire protection engineers resolution of plant cable separation issues.

ELECTRIC POWER RESEARCH INSTITUTE

EPRI Fire Research Program

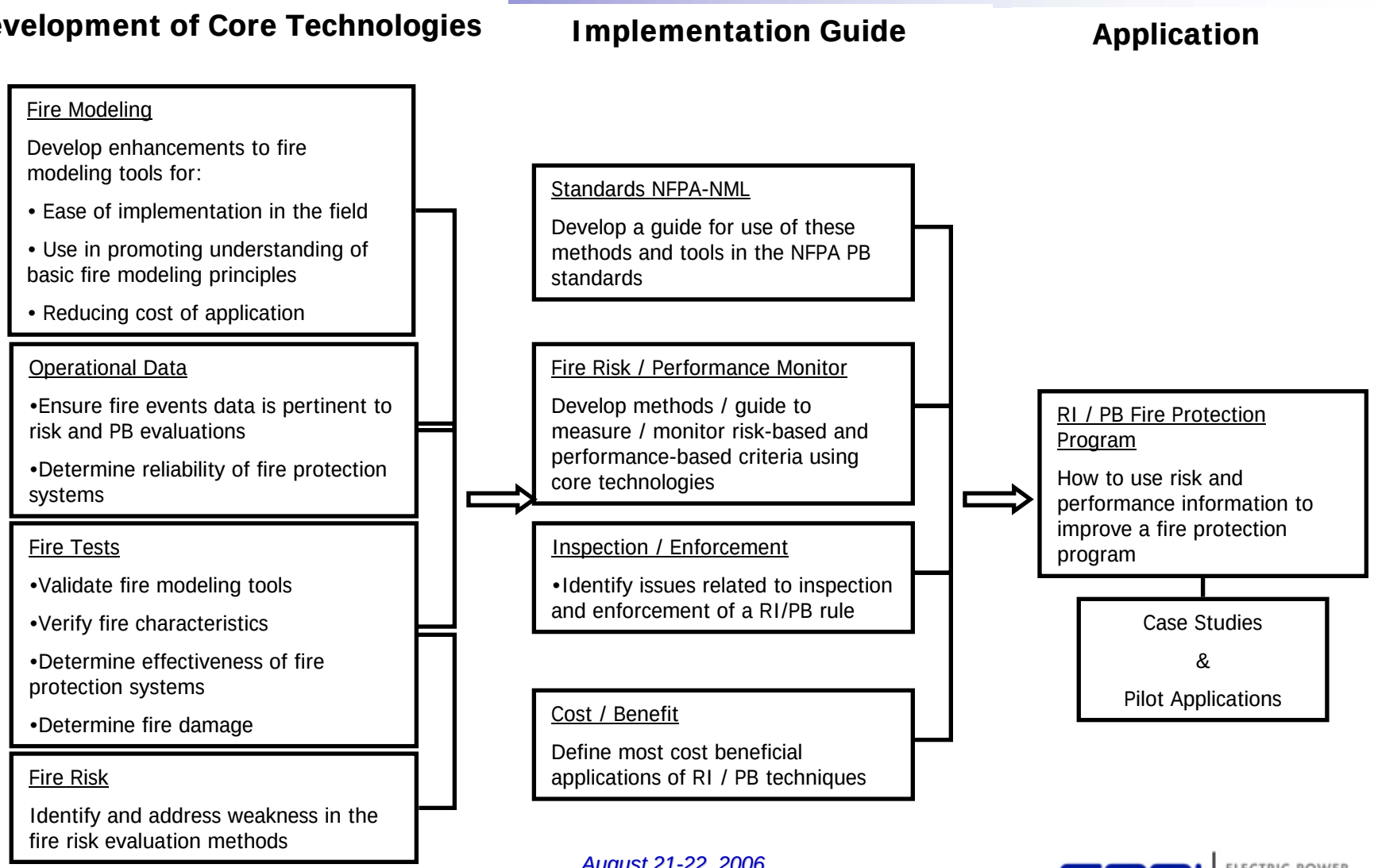
NEI Fire Protection Information Forum

Bijan Najafi

San Francisco, CA

August 28 - September 2, 2006

Overview of EPRI's Program for RI/PB Fire Protection [EPRI TR108799, Dec 97]



EPRI ELECTRIC POWER RESEARCH INSTITUTE

EPRI Fire Research Program & It's Role in RI/PB Fire Protection and NFPA 805

Focus on Methods and Training with most impact on 805 transition

- Core technology; Methods, databases, and technical bases
  - Support the users of existing EPRI products
  - Continue to develop/improve the necessary methods, data and technical bases
- Applications methods
  - Develop the technical bases for the use of the EPRI/RES Fire PRA methodology in RI applications, including 805 change evaluation
- Training
  - Increase training for the users of the technology developed by EPRI

EPRI Fire Research Program

Project			Status	2006		2007		2008	
Core Technology (CT)	EPRI/RES Fire PRA Methodology (at power): Pilot Applications	J	In-Progress		NMP				
	EPRI/RES Fire PRA Methodology: User Support and Revision	J	In planning						
	EPRI/NRC-RES LP/SD Fire Risk Study	J	In-Progress						
	Post-Fire HRA Method	J	In planning						
	EPRI/NRC-RES Fire Model V&V	J	In-Progress						
	Fire Modeling Users Guide	J	In planning						
	Fire Events Database	J	In planning						
Application Methods (AM)	RI/PB Methods for Optimization of Fire Protection Impairments & Comp Measures		Phase I Completed Phase II in planning						
	Guidance for use of EPRI/NRC-RES Fire PRA Methodology for NFPA 805 Change Evaluation		Phase I In-progress Phase II in planning						
Training (TR)	Fire Modeling Course	S	In-Progress						
	Fire PRA Course	S	In planning						
Automation (AU)	Fire PRA Software; functional specification		TBD						

J = Joint EPRI and NRC-RES project
S = EPRI project with NRC-RES support

In-Planning = These projects are at various stages of defining the scope, approach, work-breakdown (for EPRI/NRC projects), schedule and other relevant data. This includes the decision on the nature of the cooperation, i.e., “J” or “S”.

Fire PRA

Core Technology

- EPRI 1011989 / NUREG/CR-6850 Pilots, User Support & Revision
  - Objectives
    a) Ensure proper use of EPRI1011989 & NUREG/CR-6850 ,
    b) Collect and disseminate important information learned from the use of this document in a timely manner, and
    c) Collect lessons learned to help possible future revisions
  - Will be formed this year and continue in the future as necessary
- LPSD Fire Risk Studies
  - A joint EPRI/NRC-RES started this year
  - Developing both quantitative and qualitative methods

Fire PRA (Cont.)

Core Technology (Cont.)

- Post- Fire HRA Method
  - Use of Fire PRAs under 10CFR50.48(c) or current fire protection rule where post-fire manual actions are involved requires a methodology for the development of best-estimate HEPs for the scenarios and operator actions that are important to the fire risk. This need may not be fully met with the current version of the EPRI 1011989 & NUREG/CR-6850.
  - Objective
    - Develop the HRA methodology for developing estimates for HEPs for human error events under fire generated conditions by building upon existing HRA methods
    - In a timely manner to support transition to 805
  - Status
    - In planning as a joint EPRI and NRC-RES project

Fire PRA (Cont.)

Training

- Completed two workshops in 2005 and 2006
- Fire PRA Course starting in 2007

Fire Modeling

Core Technology

- Fire Model V&V, EPRI 1011999, NUREG-1824
  - Another critical piece in RI fire protection and transition to 805
  - Defines the ranges/conditions that the selected fire models (FIVE, FDT, CFAST, MAGIC and FDS) can be used in fire modeling
  - Status
    - Completed review by an independent team, public and NRR
    - Review by ACRS in Sept/Oct 06
    - Publication in early 07
- Fire Modeling User's Guide (in planning for CY 07)
  - A joint EPRI/NRC-RES revision of the EPRI Fire Modeling Guide that reflects the results of the V&V
  - Intended as a Guide to be used by utility engineers and NRC staff and inspectors when doing or reviewing fire modeling
  - Once completed, may form the basis for the future Fire Modeling Course, as the EPRI Fire Modeling Guide does now

Training

- Fire Modeling Course Since 2002
- Will continue on annual basis

Application Methods

Using the methods developed under the Core Technology track of the EPRI research program, e.g., 1011989 & NUREG/CR-6850

- EPRI 1013211, "*Optimization of Fire Protection Impairments at Nuclear Power Plants: Phase 1 - Development of a Framework*" August 2006.
- Guidance for Application of Fire PRA Methods to NFPA 805 Change Evaluations

Guidance for the use of the EPRI/NRC-RES Fire PRA Methodology in NFPA 805 Change Evaluation

Need

A. *NEI 04-02 & Regulatory Guide* 1.205 define the need for estimating ΔRISK resulting from a "plant change"

B. *EPRI 101989 & NUREG/CR-6850* describes a method for assessment of fire risk

C. *ANS Fire PRA standard, Regulatory Guide 1.200 and Fire PRA Peer Review documents* define means for determination of technical adequacy when fire PRA methods are use.

This Project

Develop the guidance to support A using the methods described in B with the technical adequacy requirements in C. The same process may be used under the current 10CFR50.48 Appendix R regulation to support ROP (SDP) and emerging issues.

Specific Objectives

- Assess the pedigree of FRA state-of-the-art in dealing with a given technical issue. If necessary, identify needed further development work such as post-fire HRA for plant changes prompted by the manual actions issue
- Provide the guidance to define and assess the Δrisk measures in response to a specific issue.
- Technical adequacy for specific applications based on the ANS Fire PRA Standard (ANS 50.23) and RG 1.200.

Guidance for the use of the EPRI/NRC-RES Fire PRA Methodology in NFPA 805 Change Evaluation (Cont.)

- Phase I (CY06)
  - Review and classify types of "plant changes" requiring risk evaluation in order to develop generic guidance for each category, including
    - Assessment of the adequacy of the state-of-the-art in fire PRA to support the change evaluation,
    - Tie-in with the CT part of the EPRI Fire Research Program where improvement in the state-of-the-art is warranted and is cost beneficial

    Knowledge of fire risk methods and their technical bases is the key to understanding their strength and weakness in application
  - Review each "plant change classification" against the technical requirements described in ANS Fire PRA Standard (ANS 50.23), and other documents such as RG1.200.

    Knowledge of the state-of-the-art and requirements of the ANS capability category is key. Appendices A and B of the Fire PRA Standard are good starting points.

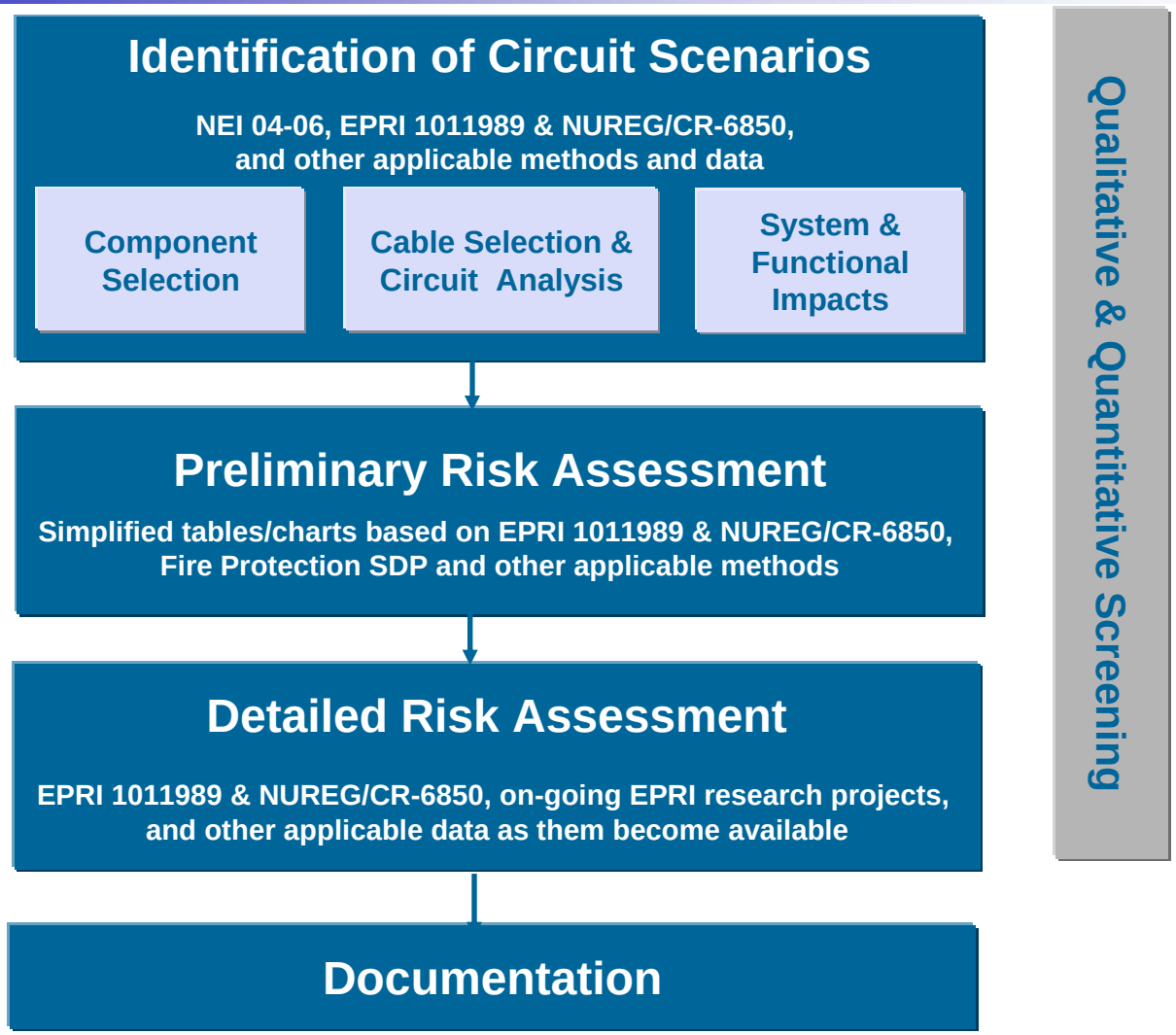
Guidance for the use of the EPRI/NRC-RES Fire PRA Methodology in NFPA 805 Change Evaluation (Cont.)

- Develop an approach for estimating the Δrisk of potential plant changes and information for decision-making including qualitative and/or quantitative criteria
  - This phase will focus on “changes” that result from the plant’s post-fire safe shutdown analyses and/or licensing bases.

  The process should recognize the before and after conditions in a number of ways in addition to CDF and LERF

- Phase II (CY07)
  - Same as Phase I for additional “plant changes”, such as those prompted by manual actions and potential inadequacy of the electrical raceway fire barrier systems (ERFBS) such as Hemyc MT.

Guidance for use of the EPRI/NRC-RES Fire PRA Methodology in NFPA 805 Change Evaluation: Overview of Phase I *Approach*



Summary

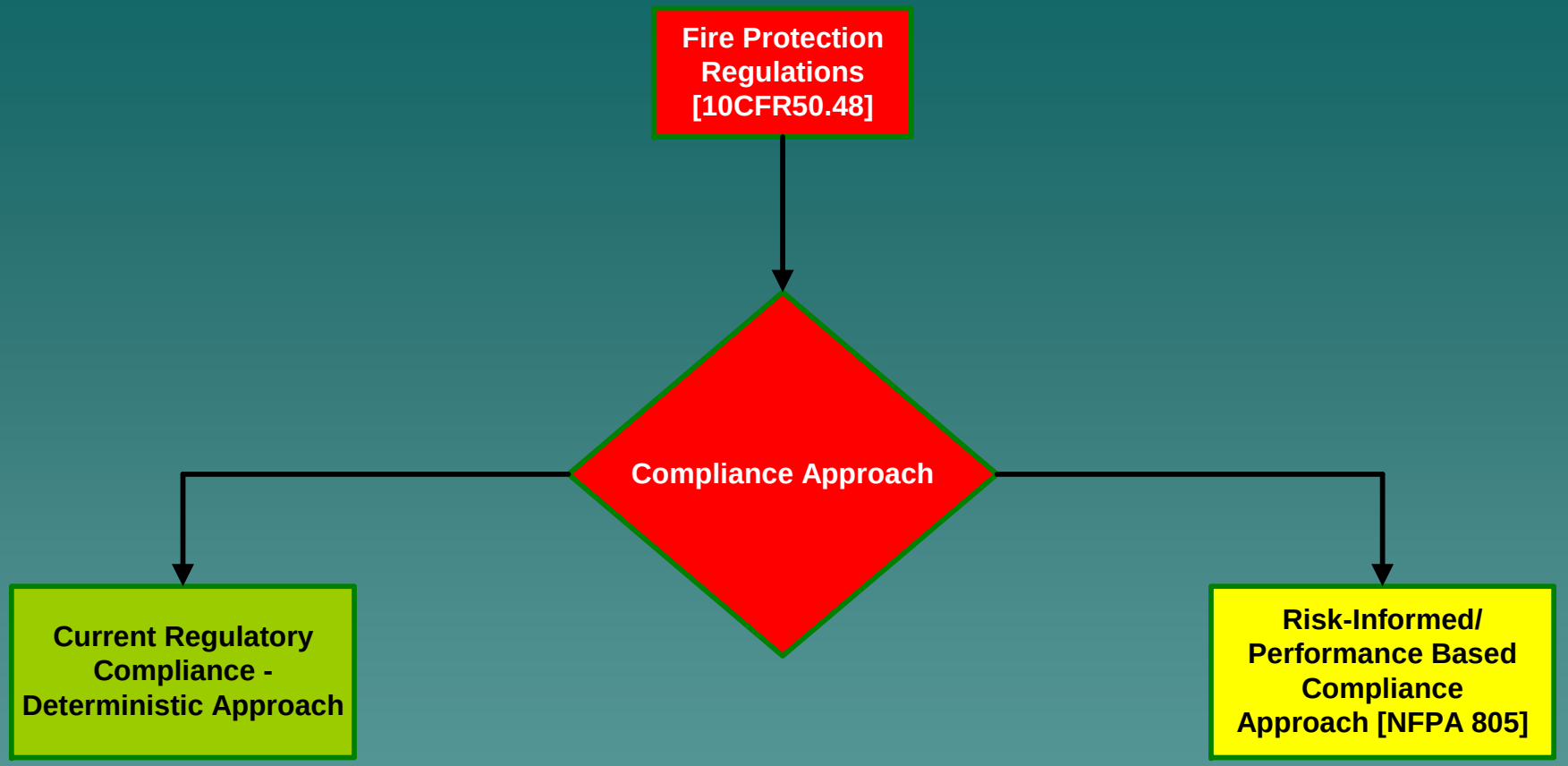
- EPRI Fire Research Program has a long history of developing methods and tools to support the industry
- Focus of the program for the last 8 years has been on RI/PB fire protection (EPRI TR108799, Dec 97)
- Increased focus on supporting 805 transition
  - Timely development of additional methods/technical bases
  - Expand training on the methods develop by EPRI

NEI Fire Protection Information Forum – August 2006 Plenary Thirteen **Current Compliance Options**

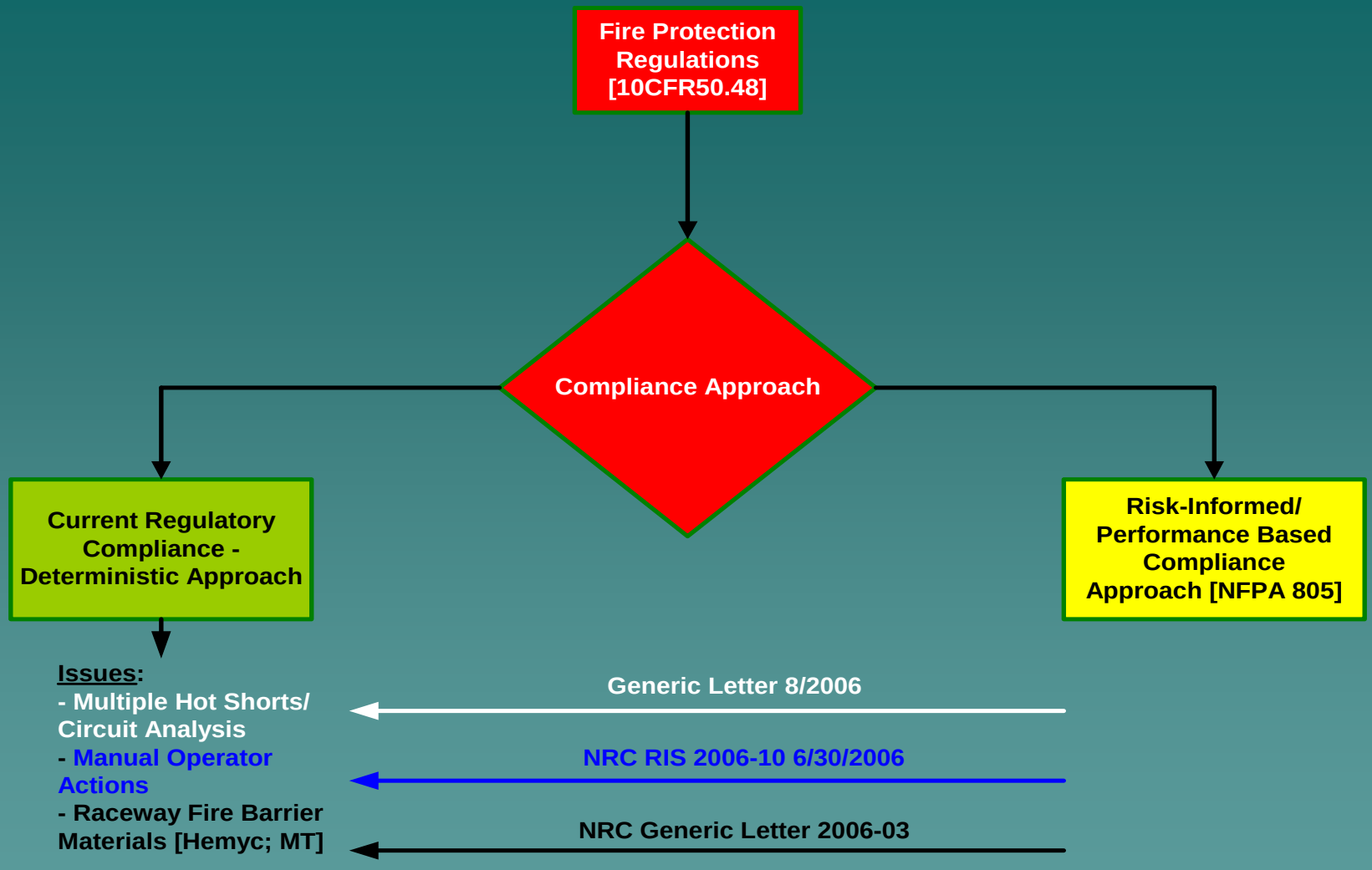
Thomas A. Gorman, PE
PPL Susquehanna LLC

Agenda

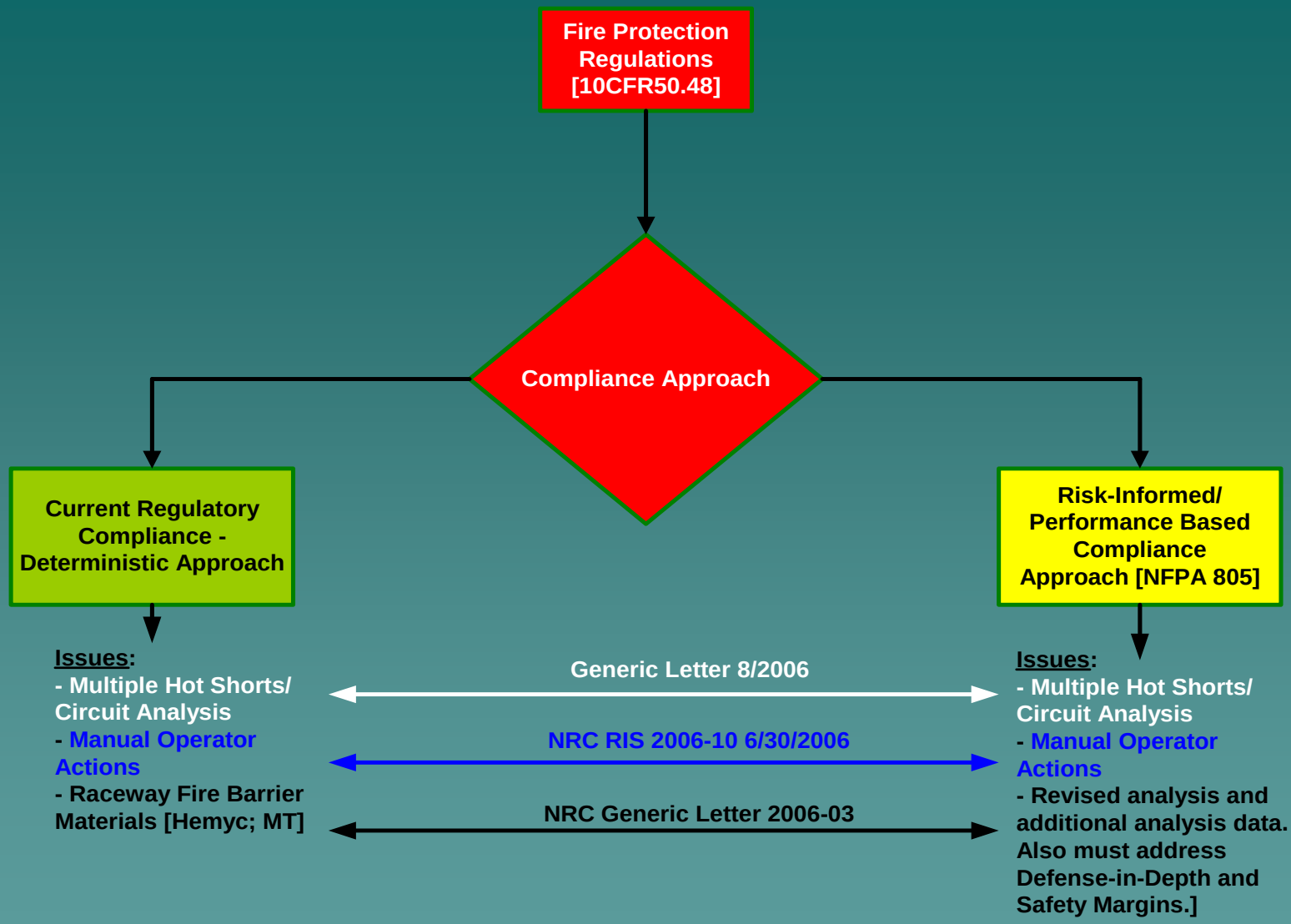
- Compliance Options
- Issues Associated with Deterministic Compliance
- Commonality of Issues
- Need for Fire PRAs to Support Compliance
- Demand on Fire PRA Resources
- Success for Each Compliance Option



Current Compliance Options



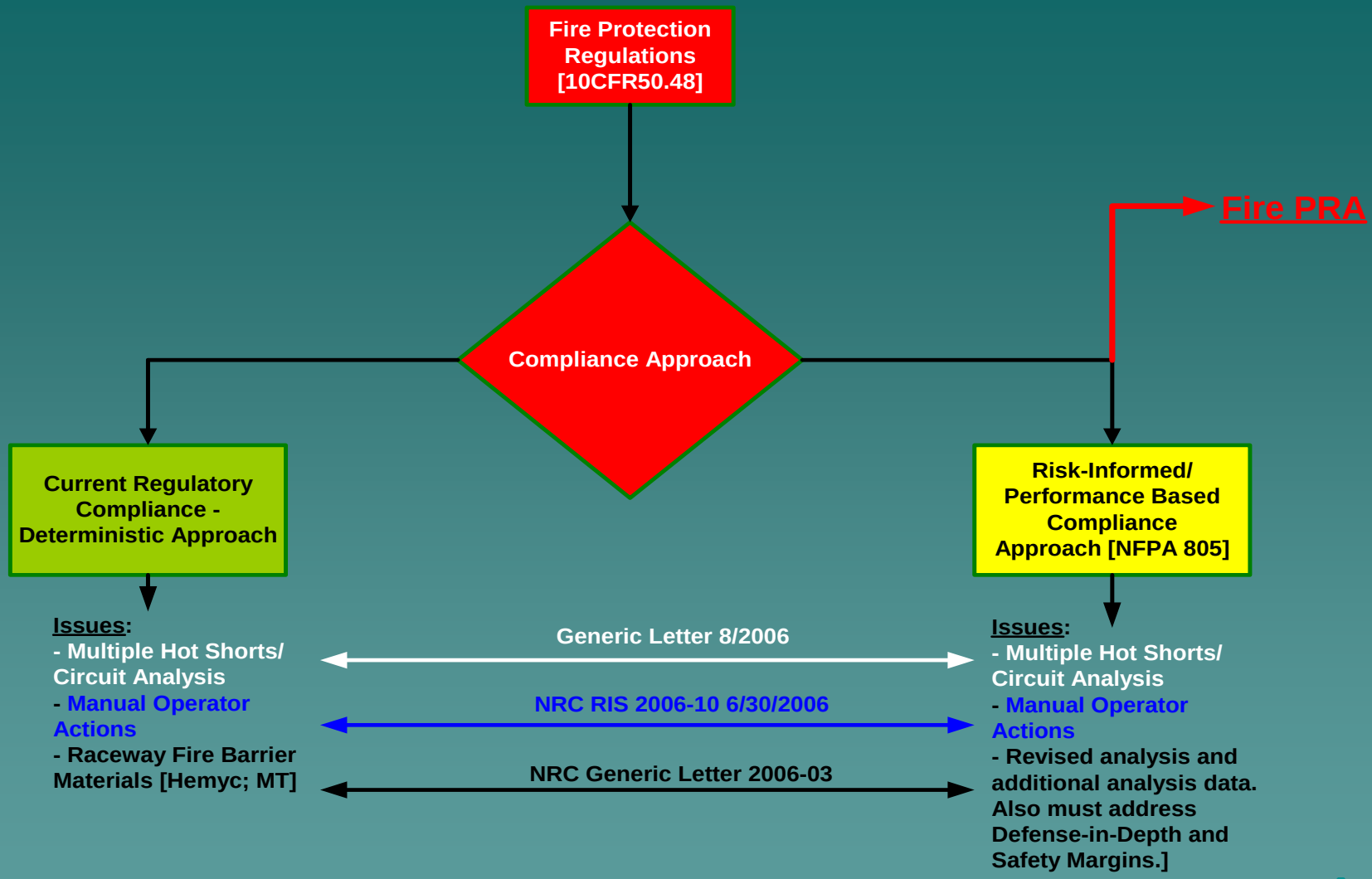
Issues Associated with Determinisitc Compliance



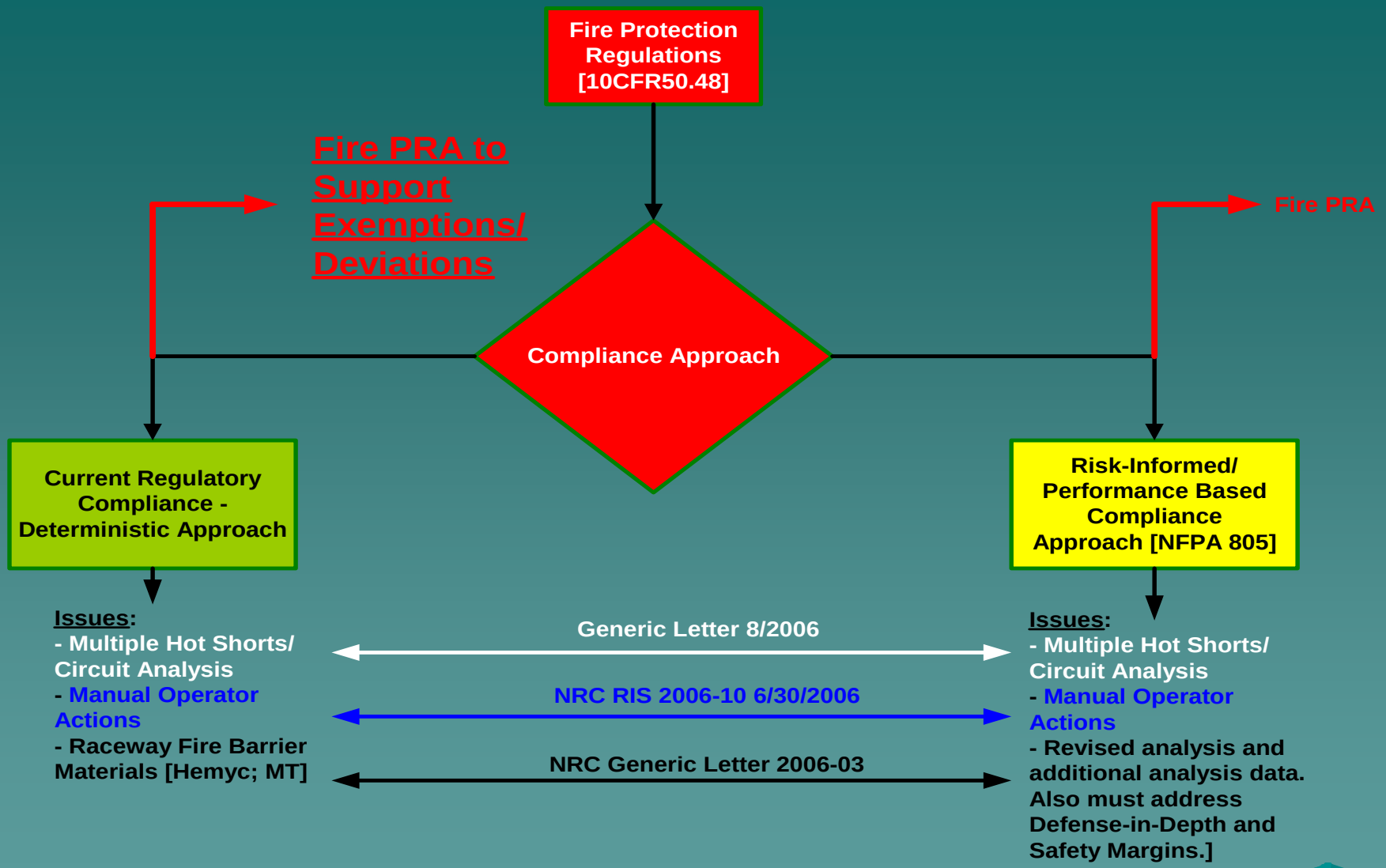
Issues Common to Either Compliance Strategy

Fire PRAs to Support Compliance

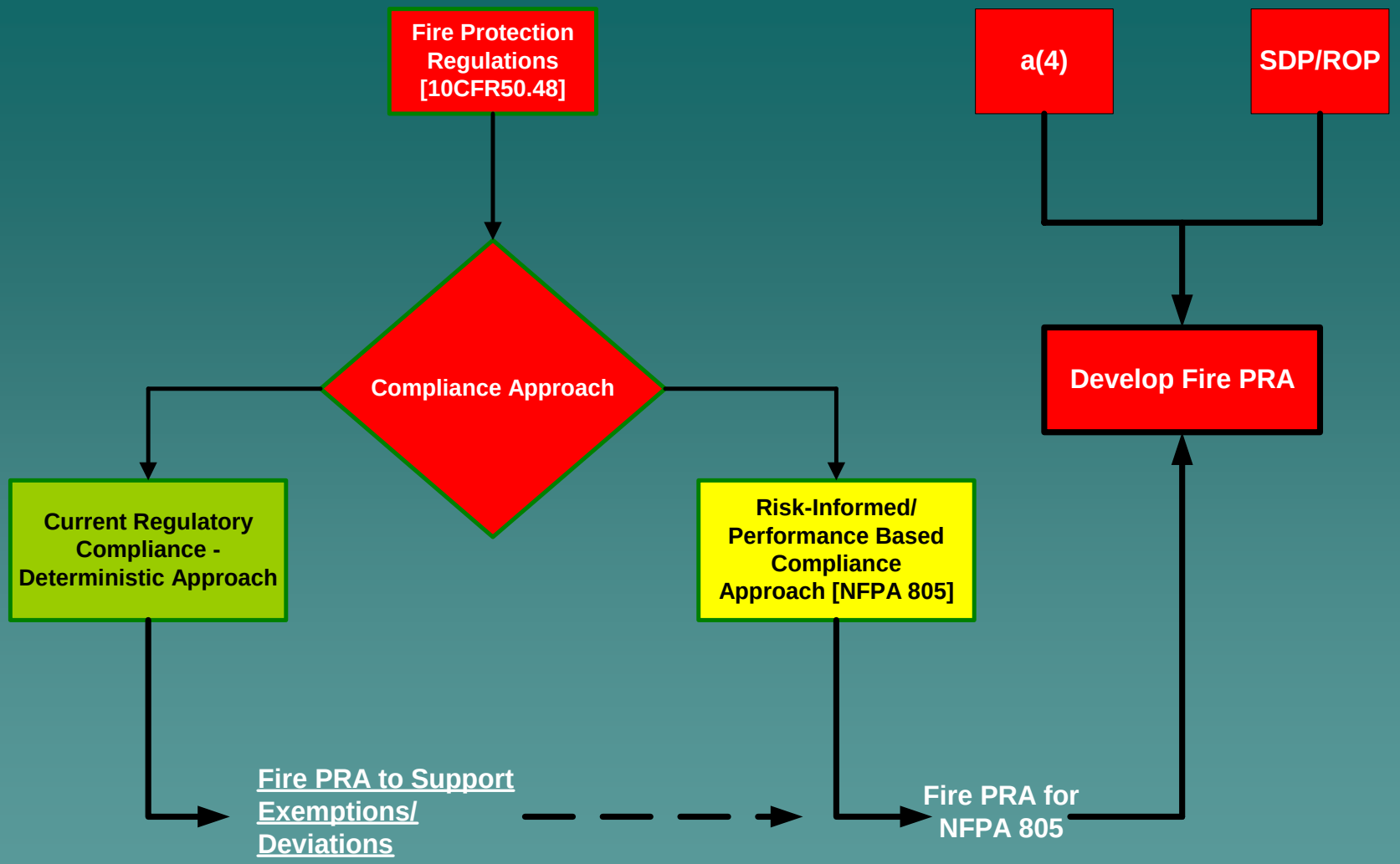
- Deterministic Compliance
- NFPA 805
- Maintenance Rule a(4)
- Significance Deterministic Process under the Reactor Oversight Process



Use of Fire PRA for NFPA 805



Use of Fire PRA with Deterministic Compliance



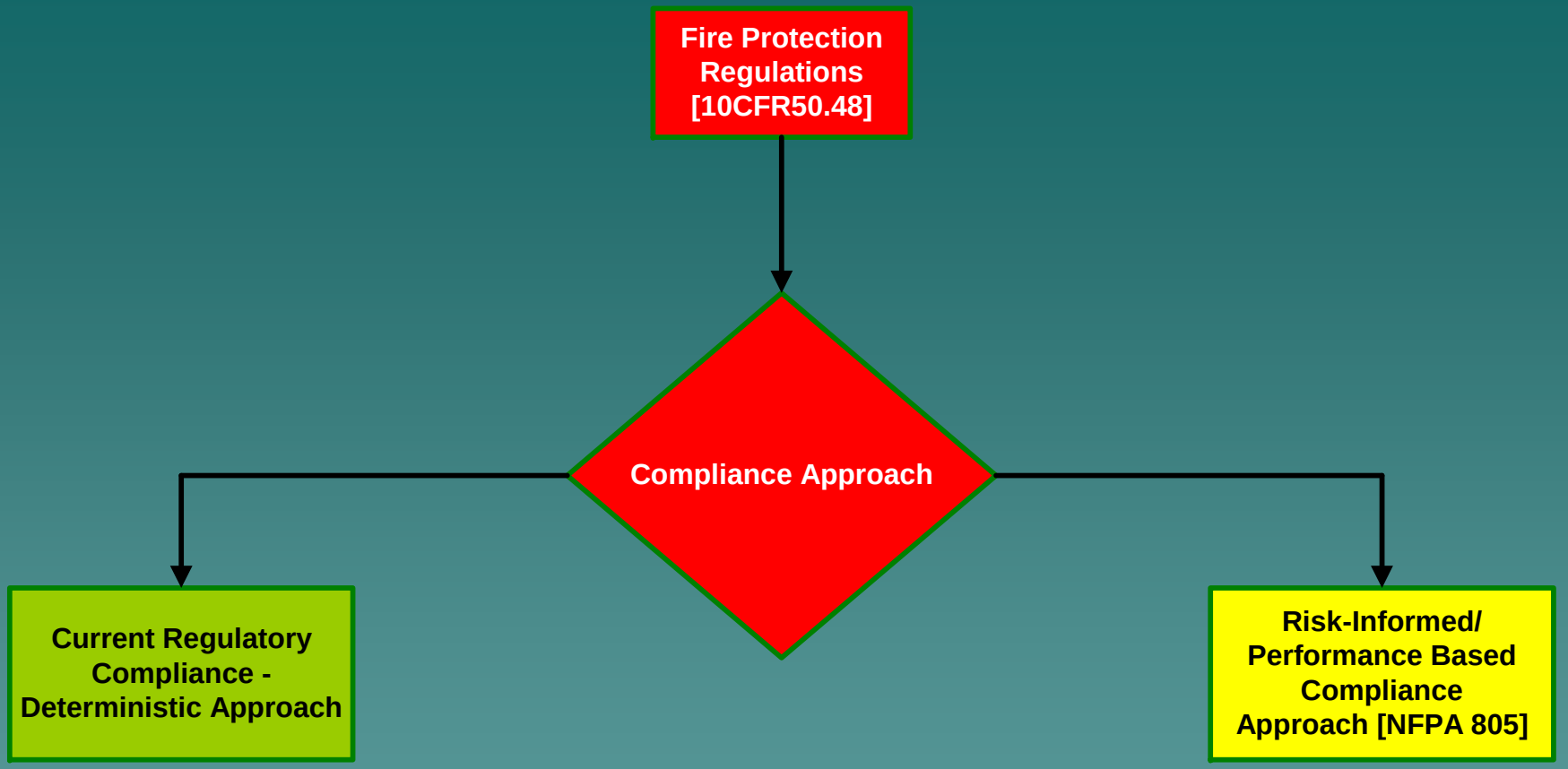
Additional Demands for Fire PRAs

Demand on Fire PRA Resources

- Development of Standards
- Training on Standards
- Support 50 man-years of Fire PRA development in each of the next 4 years
- Current Resources are very limited
- Continued “pressure” to adopt NFPA 805 will make conditions worse
- Mass migration to NFPA 805 could threaten the ultimate success of this compliance strategy
- Judicious use of available resources

Success for Each Compliance Option

- **NFPA 805 Based Compliance:**
  - A clear definition of the requirements for satisfying NFPA 805, with a supporting Fire PRA, developed through an orderly transition using the current pilot plants.
- **Deterministic Compliance:**
  - A clear and balanced criteria for addressing multiple spurious operations and the use of manual operator actions based on the concept of reasonable assurance of plant safety.



Current Compliance Options - True Choice