

**RISK-INFORMED,
PERFORMANCE-BASED FIRE
PROTECTION FOR EXISTING
LIGHT-WATER NUCLEAR
POWER PLANTS**

Public Comment Resolution: Draft Guide 1218

*Category 3 Public Meeting
September 10, 2009*

Presentation Topics

- Meeting Purpose
- Motivation for Revision 1 of RG 1.205
- Resolution of Selected Public Comments
- Other Public Comments (Stakeholder Questions)
- General Discussion

Meeting Purpose

- This meeting is to inform stakeholders of NRC's resolution of the public comments on Draft Guide DG-1218.
- The NRC staff seeks to foster understanding of:
 - Changes made because of the public comments
 - Underlying basis for how the comments were resolved
- Public participation is actively sought
 - Questions may be asked throughout the meeting

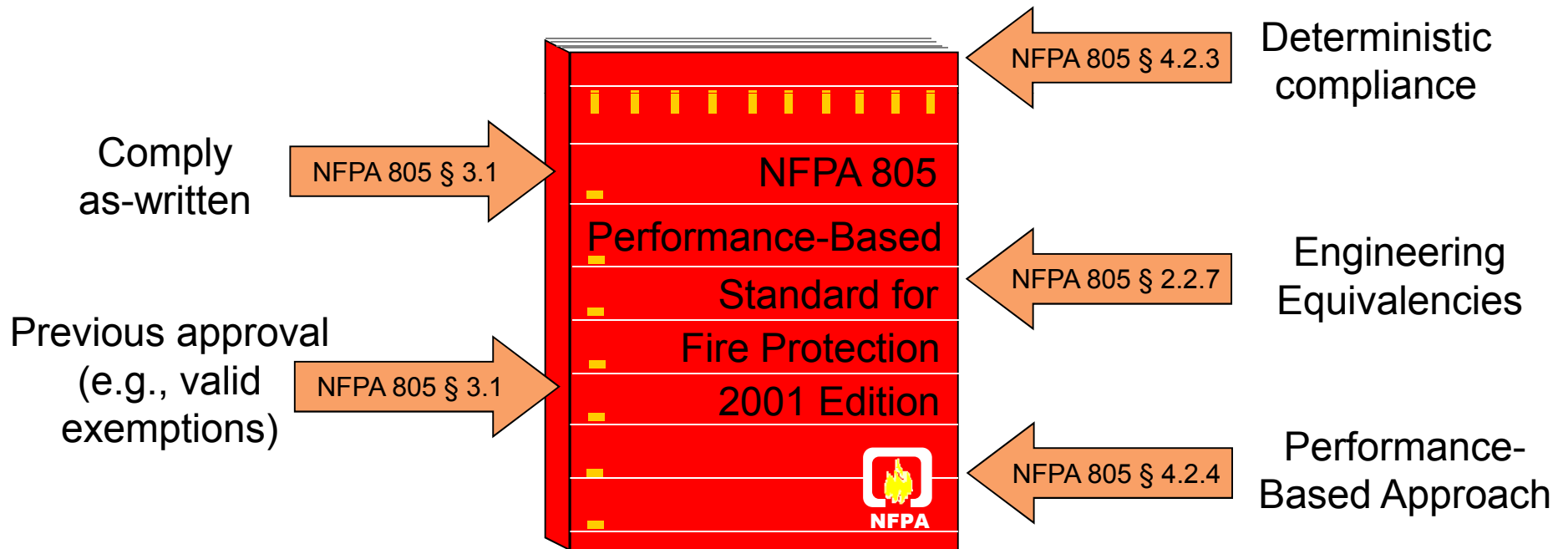
Motivation for Revision 1

- Drivers for the revision to RG 1.205
 - NEI 04-02, Revision 2
 - Closed FAQs after NEI 04-02 revision
 - Ongoing pilot plant meetings
 - Pilot plant license amendment request review, including regulatory audits at both Oconee and Harris
- Most of the changes were needed to:
 - Clarify guidance; e.g., plant change versus fire risk evaluations
 - Add missing guidance; e.g., additional risk of certain recovery actions
- The goal is to foster full and scrutable compliance with the new regulation

NFPA 805 Compliance

Chapter 3: Fundamental Fire Protection Program and Design Elements

Chapter 4: Determination of Fire Protection Systems and Features



Public Comment Process

- DG-1218 was developed to incorporate lessons learned from the NFPA 805 pilot plant process into Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants."
- Timeline:
 - RG 1.205 initial issuance – May, 2006
 - Pilot Plant NFPA 805 license amendment requests - May, 2008
 - DG-1218 published for public comment – March, 2009
 - Public meeting to explain change from RG 1.205 – April, 2009
 - Public comments received – May, 2009
 - ACRS Subcommittee presentations – June and August, 2009
 - CRGR presentation – July, 2009
- Comments were received from NFPA, NEI, TVA, GE-Hitachi, and Southern Nuclear

Resolution of Selected Public Comments

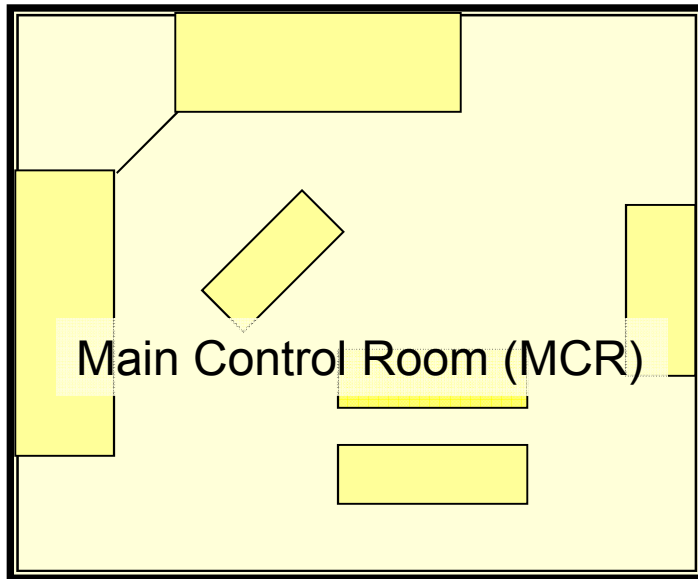
- Definition of Primary Control Station
 - Dedicated shutdown
 - Alternative shutdown
- Additional Risk of Recovery Actions involving Credited Train
 - Previously Approved
 - Not Previously Approved
- Fire Probabilistic Risk Assessment (PRA)
 - Quality
 - Submittal Guidance
 - Methods
 - Fire Risk Evaluation versus Plant Change Evaluation
- Sample License Condition
- Resolution of other Public Comments – Stakeholder Questions



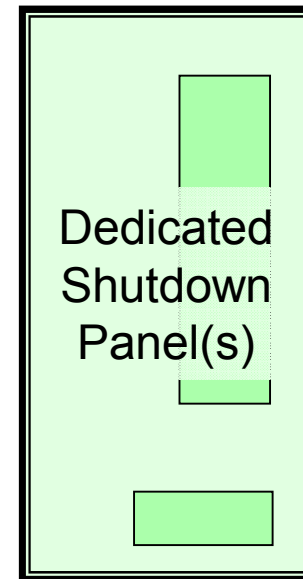
DEFINITION OF PRIMARY CONTROL STATION

Recovery Actions & the Definition of Primary Control Station

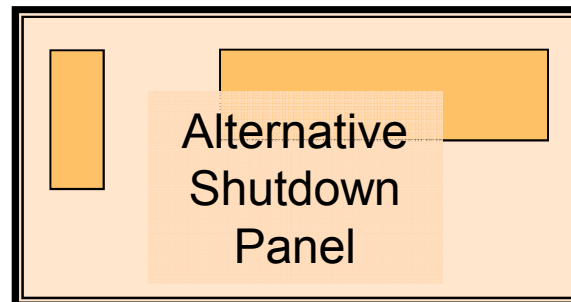
- Recovery action:
 - “Activities to achieve the nuclear safety performance criteria that take place outside of the main control room or outside of the primary control station(s) for the equipment being operated, including the replacement or modification of components.” (NFPA 805 §1.6.52)
 - Primary Control Station (RG 1.205, Rev. 1)
 - Dedicated* shutdown panel or panels
 - Alternative* shutdown panels
 - location becomes primary command and control center
 - location has controls, indications, communications
 - multiple components operated from that location
- * (Appendix R, Section III.G.3)



Control Room actions are not recovery actions



Dedicated Shutdown Panel actions are not recovery actions



Alternative Shutdown actions are not recovery actions provided:

- Primary command & control
- Requisite controls, indications, & communications
- Multiple components controlled from location



ADDITIONAL RISK OF RECOVERY ACTIONS

Recovery Actions

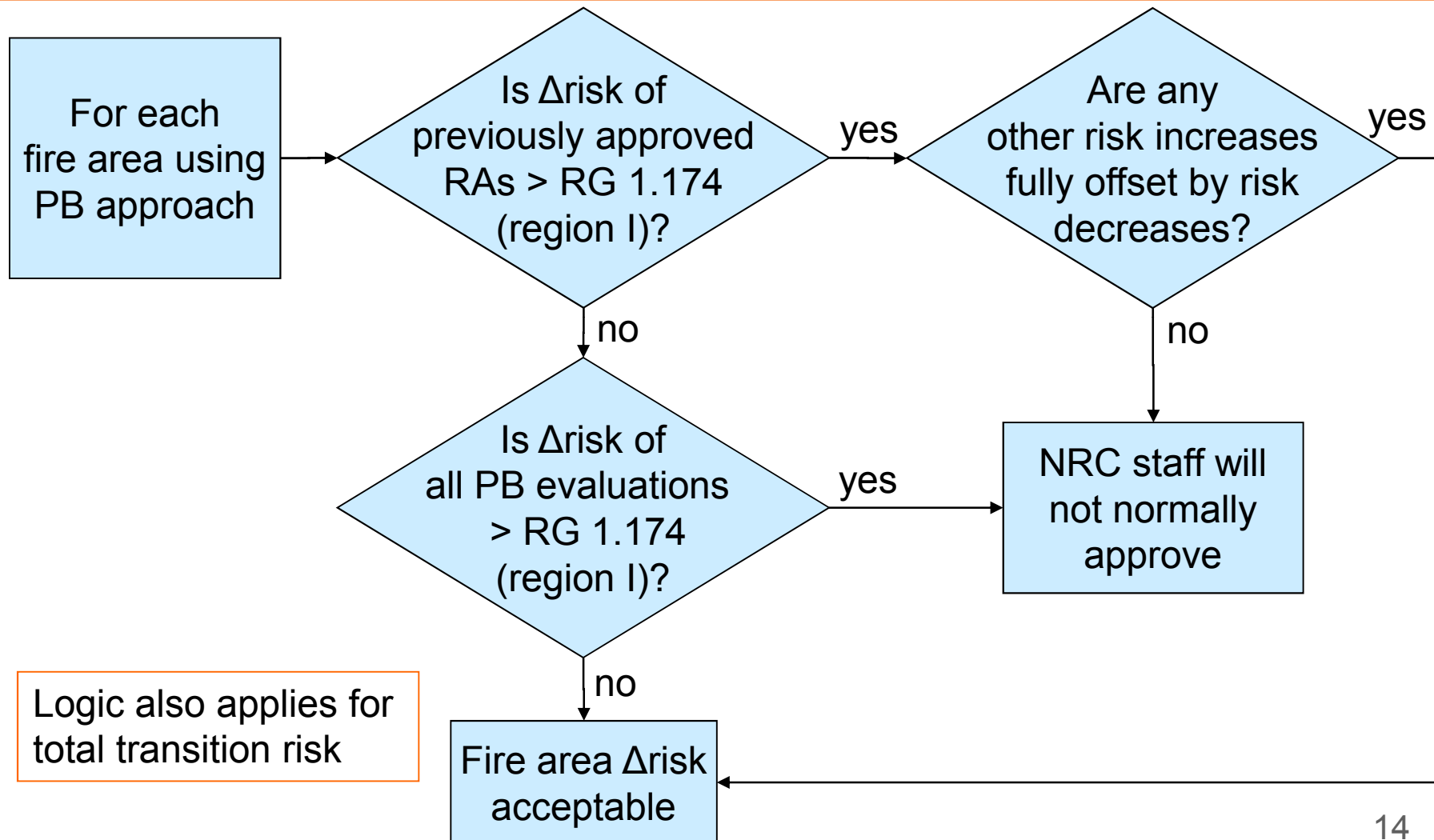
- NRC staff clarified when plant change evaluations are required for recovery actions
- The additional risk of recovery actions was changed to match NFPA 805, Section 4.2.3.1
- The definition of primary control station was clarified (already discussed)
- The NRC staff does not agree that previous approval of recovery actions implies deterministic compliance (contrary to the rule)

Previously Approved RAs

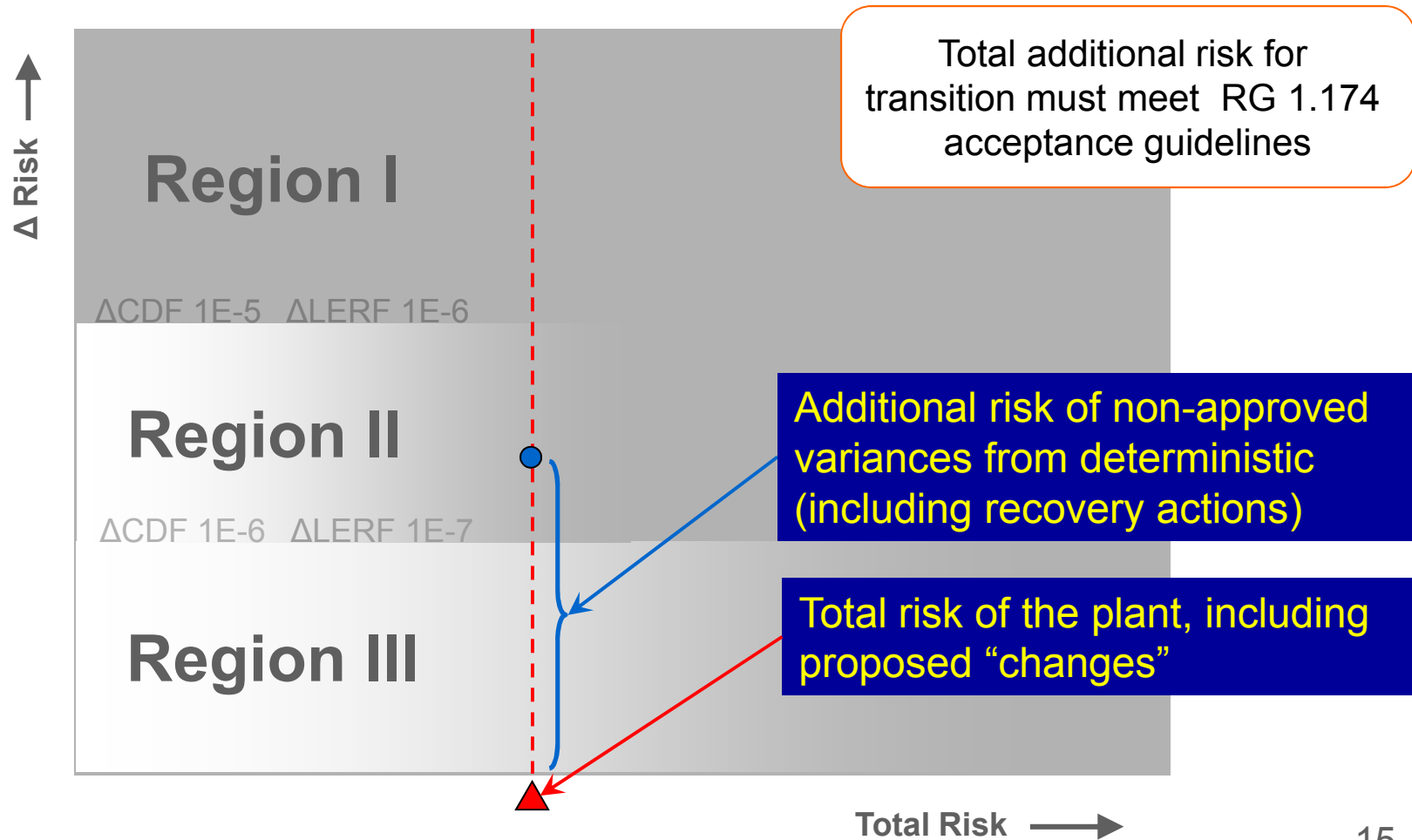
- Additional risk (Δ CDF; Δ LERF) of recovery actions must be evaluated (requirement of the rule)
- The risk is acceptable based on previous approval*
- This additional risk is considered when evaluating the acceptability of other, proposed risk contributions when using the performance-based approach (see next slide)

*Unless circumstances indicate that a backfit under 10 CFR 50.109 is warranted on an adequate protection or cost-beneficial safety improvement basis.

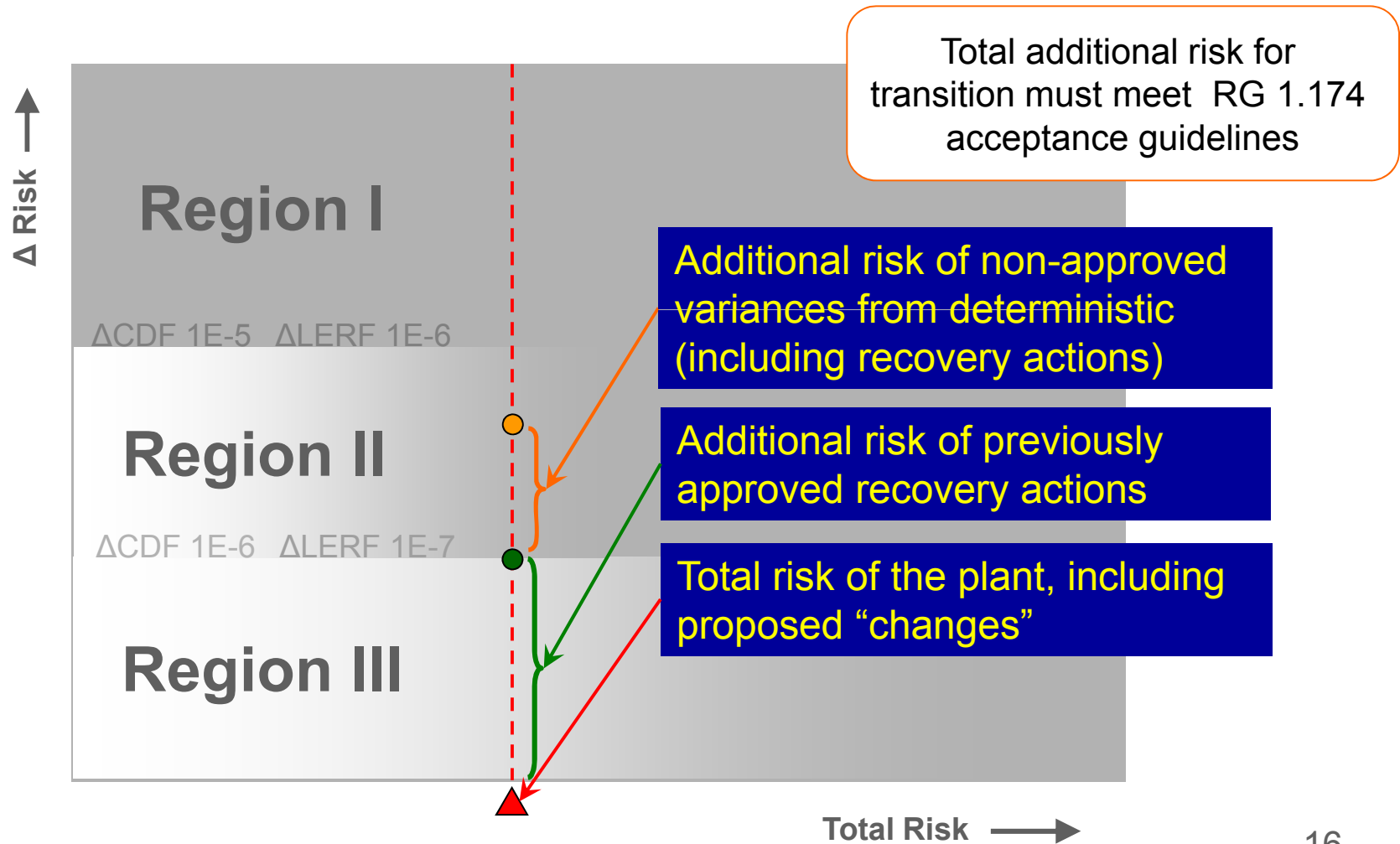
Application of RG 1.174 to NRC Staff Review During Transition (by Fire Area)



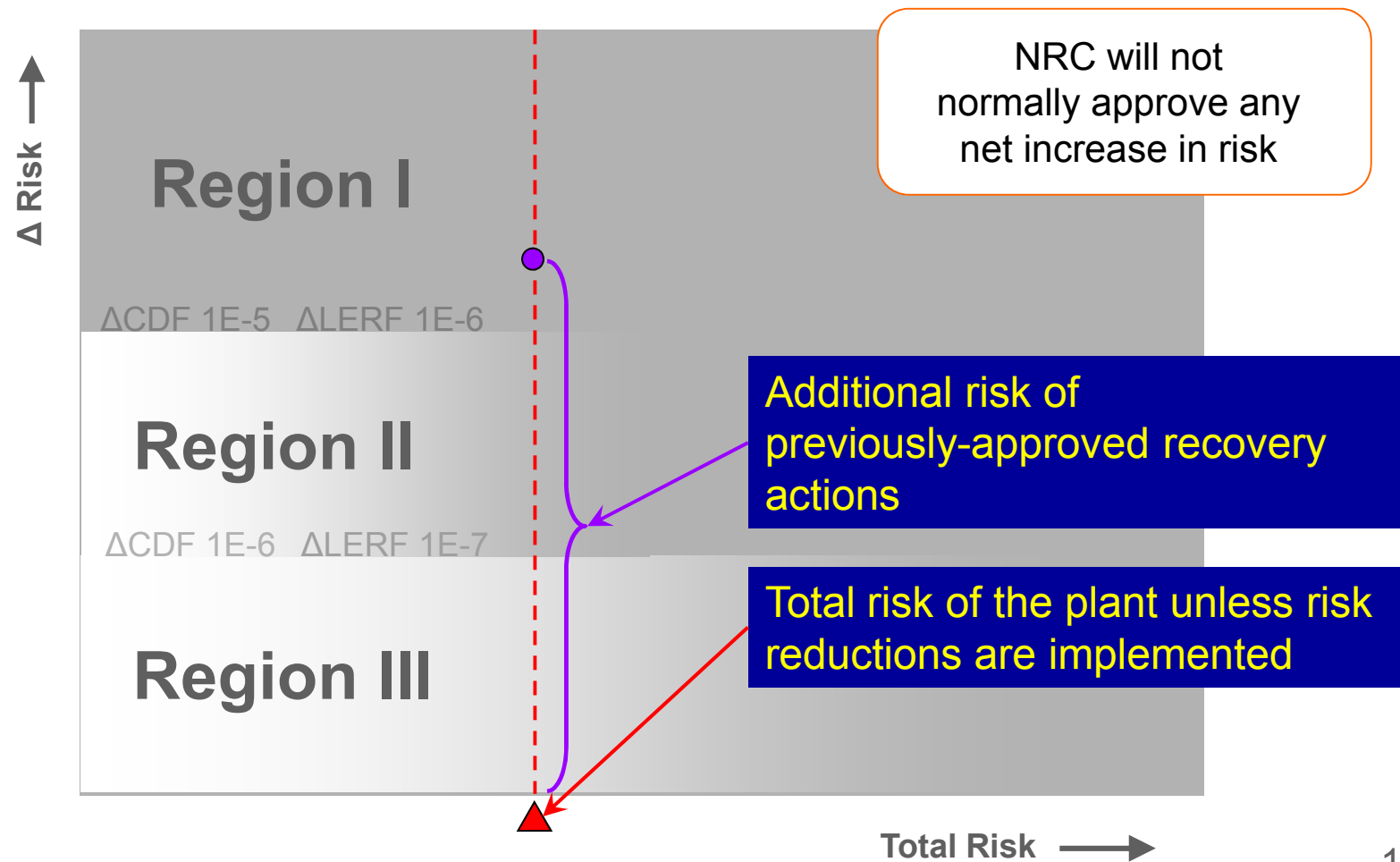
Case 1: There are No Previously Approved Recovery Actions



Case 2: Additional Risk of Previously-Approved Recovery Actions Is Within RG 1.174



Case 3: Additional Risk of Previously-Approved Recovery Actions Exceeds RG 1.174





FIRE PROBABILISTIC RISK ASSESSMENT

Fire PRA – Quality & Submittal Guidance

- Fire PRA technical adequacy – 2 aspects
 - Underlying PRA (i.e., the baseline model)
 - Analyses, assumptions, and approximations to map the cause-effect relationship associated with the application
- Method for addressing
 - Baseline PRA - conform to the peer review and self assessment processes in RG 1.200
 - Risk assessments - describe the specific modeling of each cause-effect relationship associated with the application
- Submittal guidance
 - Submit the documentation described in Section 4.2 of RG 1.200
 - Capability Category (CC) II of PRA standard is generally acceptable
 - Justify use of CC I for specific supporting requirements
 - Evaluate whether parts of the PRA need to meet CC III

Fire PRA – Methods

- Licensee may model cause/effect relationship with methods
 - That have been used in the peer-reviewed baseline PRA;
 - That have been endorsed by NRC through a license amendment or NRC approval of generic methods specifically for use in NFPA 805 risk assessments; or,
 - That have been demonstrated to bound the risk impact.
- The Standard License Condition reflects this change

Risk Evaluations

- Two similar (but different) risk evaluations in NFPA 805
 - Fire Risk Evaluations
 - Performed during transition
 - Demonstrates adequacy of an alternate to the deterministic criteria
 - Performed for each fire area and total for plant
 - Plant Change Evaluations
 - Changes to the “previously approved FPP”
 - Cumulative risk must be considered
 - Cumulative starts at implementation of NFPA 805 (including all necessary modifications)



SAMPLE LICENSE CONDITION

Standard License Condition

- Transition License Conditions:
 - (1) Before achieving full compliance with 10 CFR 50.48(c), as specified by (2) below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change clearly does not increase risk
- Risk-informed self approval of changes
 - Limited to those changes for which the risk assessment methods are adequate
 - Risk evaluation based on approaches for modeling the cause and effect relationship as discussed earlier
 - Document per RG 1.200, Section 4

Plant Changes without Prior NRC Approval (cont'd)

- Performance-based changes to NFPA 805 Chapter 3 fundamental FPP elements and design requirements
 - Changes where engineering evaluation demonstrates that the alternative is
 - functionally equivalent; or,
 - adequate for the hazard.
 - Latter category applies only to parts of Chapter 3 invoked by NFPA 805 Chapter 4
 - Fire Alarm and Detection Systems
 - Automatic and Manual Water-Based Fire Suppression Systems
 - Gaseous Fire Suppression Systems
 - Passive Fire Protection Features



OTHER PUBLIC COMMENTS?

Summary

- Several drivers for a revision to RG 1.205
- Goal was to foster full and scrutable compliance
- NRC staff seeks to publish guidance that clearly shows how compliance could be achieved without creating unnecessary burden to licensees
- RG 1.205 Rev. 1 clarifies the guidance where necessary and adds guidance that was missing from the initial Regulatory Guide



Questions?

Existing Licensing Basis

TRANSITION

NFPA 805 Licensing Basis

App R III.G.2
Separation, barriers,
detection, suppression

- Meets NFPA 805 § 4.2.3
- Equivalency per NFPA 805 § 2.2.7

Meets §4.2.3
deterministic criteria

- The NFPA 805 deterministic criteria are very similar to Existing Licensing Basis criteria.
- An “equivalent level of fire protection” also meets the NFPA 805 deterministic criteria.

App R III.G.2 Exemption
Operator Manual Action
in lieu of Equipment

- Provide Δ CDF and Δ LERF
- Δ Risk OK – previously approved

Meets §4.2.4
performance-based

- The additional risk of previously-approved recovery actions on the protected train must be submitted, but the recovery action “carries over” into NFPA 805.
- This additional risk of these actions is considered when the fire risk evaluation is used for variances from the deterministic requirements or non-previously-approved recovery actions.

Existing Licensing Basis

App R III.G.3 Actions
“Dedicated” shutdown
“Alternative” shutdown

TRANSITION

- Verify previous approval
- Verify “alternative” meets RG 1.205

NFPA 805 Licensing Basis

Meets §4.2.3
deterministic criteria
(not recovery actions)

- Actions at the dedicated shutdown panel or panels are not recovery actions because they are considered taking place at the primary control station.
- Actions at an alternative shutdown panel that meets certain criteria are not recovery actions for the same reason.

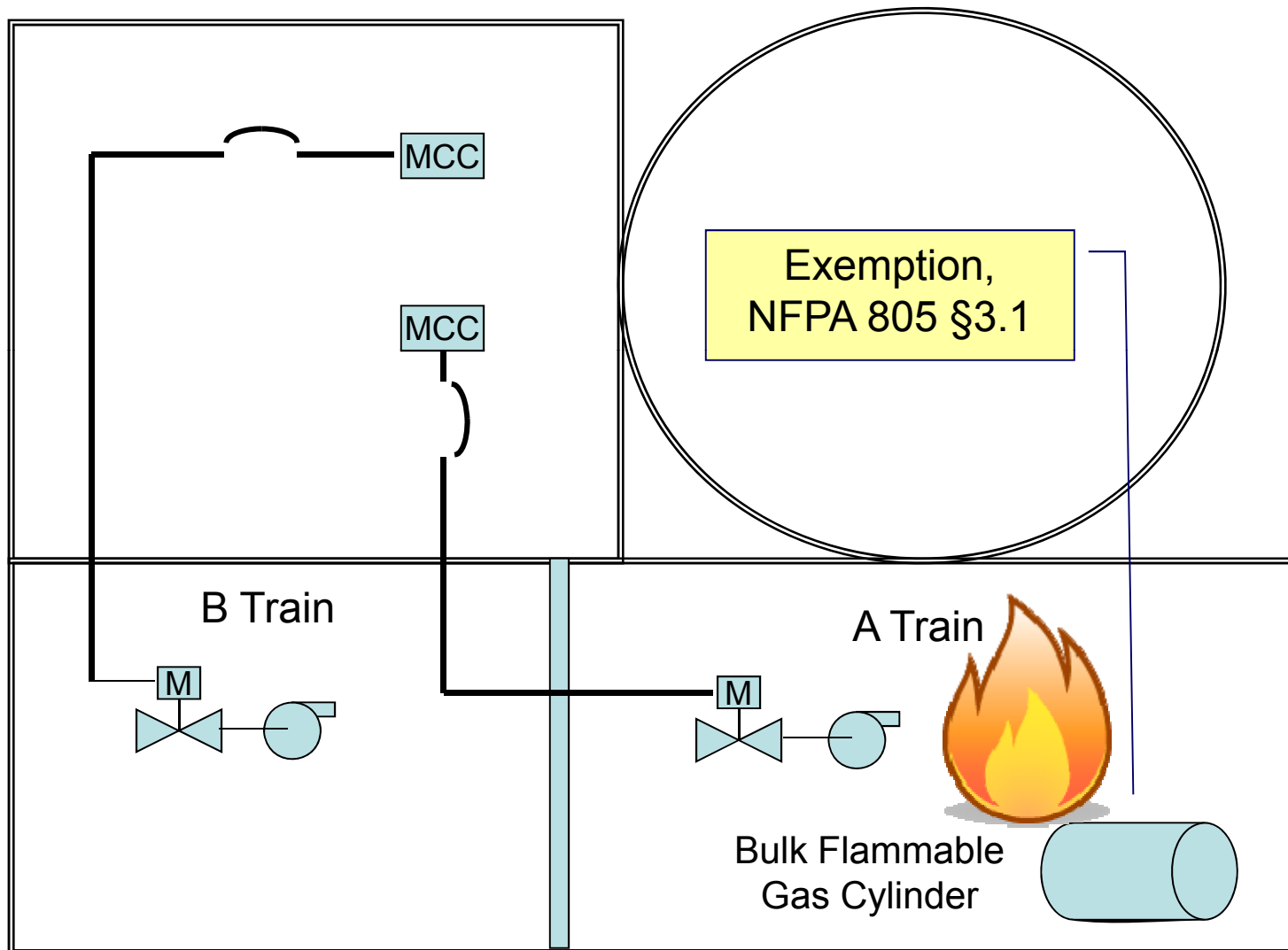
Variances – Non-approved
Equipment
Operator Manual Actions
(except those above)

- Fire modeling or Fire Risk
- Additional risk of recovery actions
- Consider Δ Risk of previously approved recovery actions

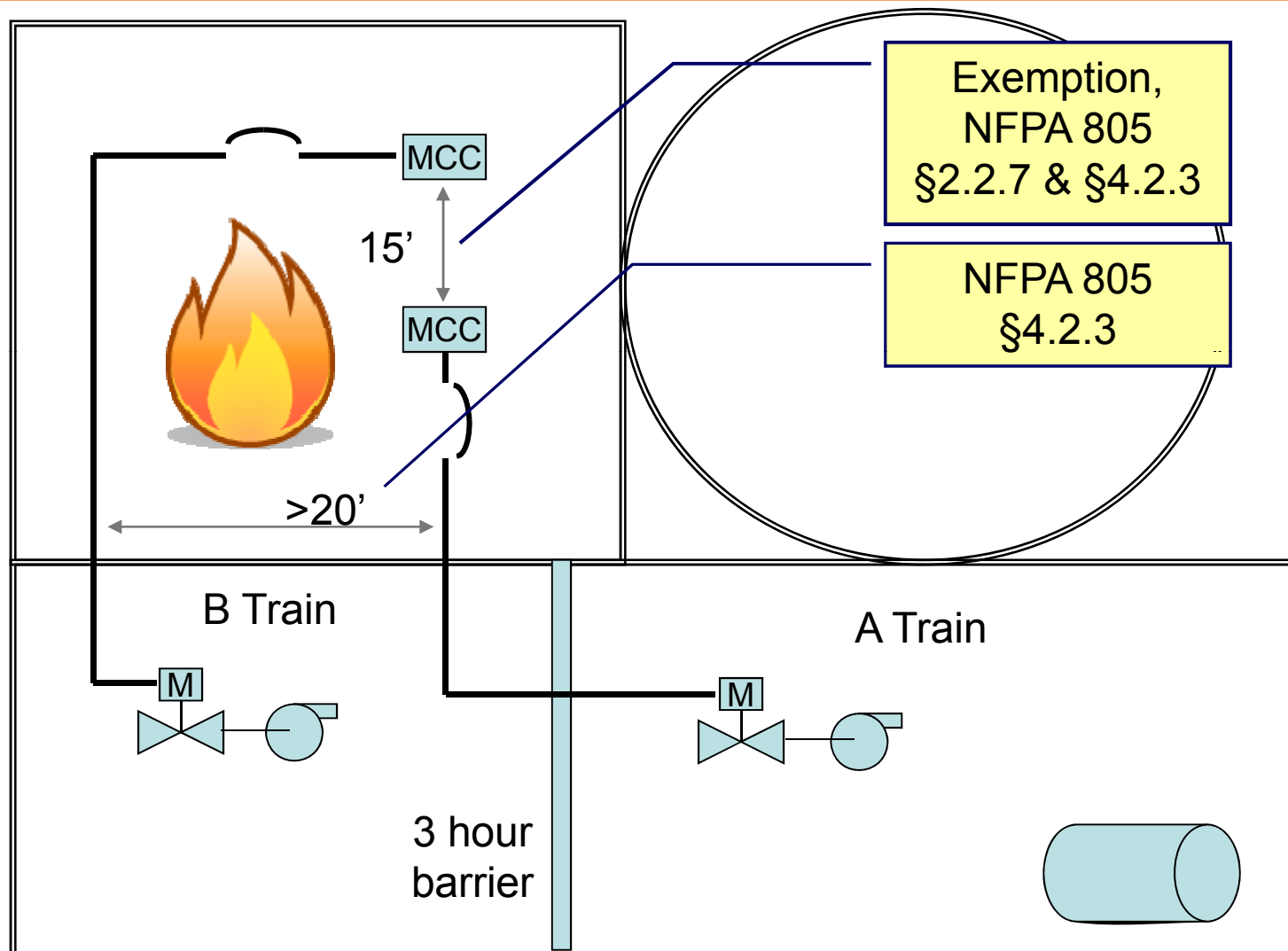
Meet NFPA 805 §4.2.4.1
Meet NFPA 805 §4.2.4.2
Meet 10 CFR 50.48(c)

- The additional risk of previously-approved recovery actions on the protected train must be submitted, but the recovery action “carries over” into NFPA 805.
- This additional risk of these actions is considered when the fire risk evaluation is used for variances from the deterministic requirements or non-previously-approved recovery actions.

Chapter 3 Compliance Example



Chapter 4 Deterministic Compliance Example



Chapter 4 Performance-Based Compliance Example

