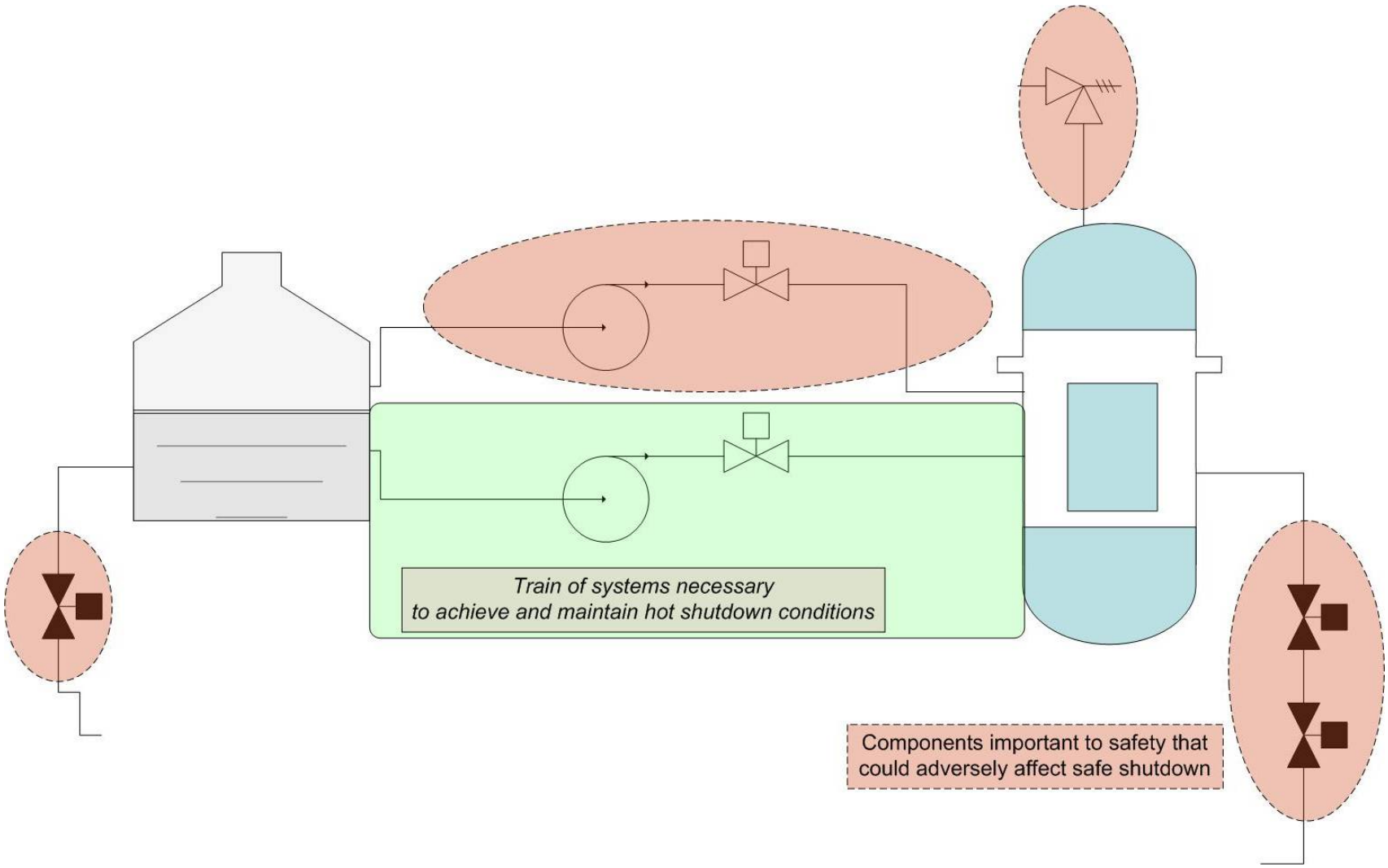
NRC Fire Protection Steering Committee Meeting

June 3, 2008

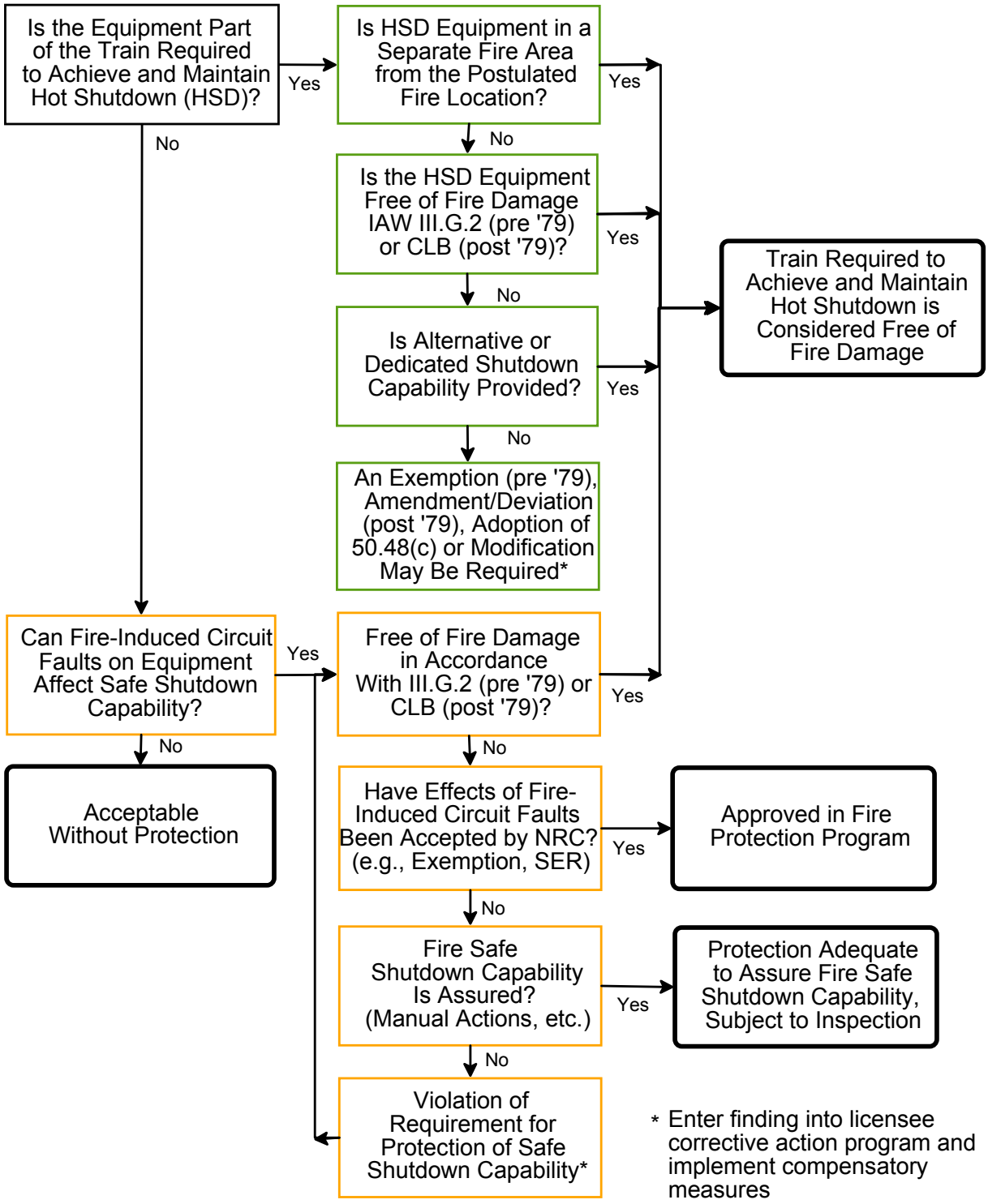
Topics

- Fire-Induced Circuit Failures
  - Overview of NRC Approach
  - Industry Observations Regarding NRC Approach
- Other Topics
  - NFPA 805
  - Post-Fire Operator Manual Actions
  - Fire Barriers

Table 1		
10 CFR 50. Appendix R, III.G. ***Fire protection of safe shutdown capability***. 1. Fire protection features shall be provided for structures, systems, and components important to safe shutdown.		
Rule Application	Requirement to protect one train of systems necessary to achieve and maintain hot shutdown conditions	Requirement to protect *components important to safe shutdown* that could adversely affect safe shutdown capability
Compliance Options	III.G.1.a One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage III.G.2 . . . ensuring that one of the redundant trains is free of fire damage. . a. . . . fire barrier having a 3-hour rating. . . b. . . . 20 feet with no intervening combustible or fire hazards. . . fire detectors and an automatic fire suppression system . . .; or c. . . . a fire barrier having a 1-hour rating, . . . fire detectors and an automatic fire suppression system. . . III.G.3 Alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, zone under consideration . . .	Currently Developed Options: • III.G.2 protection, and • manual actions Options Under Development: • Fire modeling, • NEI method in NEI 00-01, Revision 2, and • the use of a full fire risk analysis
Discussion	Circuits for trains of plant equipment that are required to operate for fire safe shutdown and equipment that assures availability of the train's required flow path must be protected so as to be free from fire damage, in accordance with III.G.1, 2 or 3. A train free of fire damage is demonstrated by rigorous design review and physical protection such as III.G.2. This includes consideration of single and multiple spurious actuations that could affect the train of safe shutdown equipment. Manual actions, fire modeling, and risk-informed approaches such as the NEI method, cannot be used to demonstrate compliance.	For equipment that is not part of the train necessary to achieve and maintain hot shutdown conditions or is not necessary to assure availability of the hot shutdown train's flow path, but could otherwise challenge safe shutdown, safe shutdown must be assured. This includes spurious actuation of such equipment.
Equipment Examples	Source, motive power, and flow path required to assure reactivity control, make-up, cooling and necessary instrumentation, such as pumps and flow path valves	RHR/RCS isolation valves, ADS valves, steam generator atmospheric dump vales, and steam bypass valves, when this equipment is not part of train of systems required for safe shutdown


Train of systems necessary
to achieve and maintain hot shutdown conditions
Components important to safety that
could adversely affect safe shutdown

Fire-Induced Circuit Failure Compliance Flow Chart



Industry Observations

From May 7, 2008 – Slide Presentation

[Industry's Restatement of] NRC Proposal of 3-27-2008

- **Green Box Components**
  - Part of Train required to achieve and maintain post-fire hot shutdown
  - Must meet Appendix R Sections III.G.1, 2, 3 or CLB
- **Orange Box Components**
  - Not part of Train required to achieve and maintain post-fire hot shutdown, but can impact the ability of green box components to perform their safe shutdown function (could mal-operate).
  - Additional mitigation tools, such as operator manual actions allowed.
  - Possible use of Fire Modeling and Focused Scope Fire PRA's.

Industry Assessment Regulatory Analysis

- Industry Interpretation:
  - NRC Regulations and Guidance currently define the split between **Green Box Components** and **Orange Box Components.**
    - **Green Box Components** – components required to perform hot shutdown safe shutdown functions (credited flowpath)
    - **Orange Box Components** – components whose maloperation can affect the ability of the **Green Box Components** to perform their hot shutdown function (can maloperate and impact hot shutdown)

Industry Observations

From May 7, 2008 – Slide Presentation

Conclusions

- The NRC proposed concept for **Green Box/Orange Box**
  - Appears consistent with the current deterministic regulations and guidance
  - Appears to be workable, when implemented as explained herein