# Defense Nuclear Facilities Safety Board

## FIRE PROTECTION TOPICS OF INTEREST

# Overview of the Board

- Established by statute in 1989 to oversee the Department of Energy's operation of defense nuclear facilities.
- Jurisdiction covers current weapons-related facilities and facilities devoted to defense waste storage, processing and disposal.
- Agency's powers are quasi-regulatory. The Board can recommend changes, review and suggest standards, hold hearings, conduct investigations, and impose reporting requirements, but not issue penalties.

# Fire Protection Activities

- Since its inception, the Defense Nuclear Facilities Safety Board (Board) has closely monitored the Department of Energy's (DOE) fire protection program.
- Two fire protection engineers supported by other technical staff and engineers manage this effort.
- What we look at:
  - Safety basis documentation content & assumptions
  - Quality of FHAs (content, completeness & assumptions)
  - Quality of engineering evaluations
  - Fire Protection Program

# Fire Risk

- "It is now established that at many nuclear facilities, fires are the dominant source of risk to workers and the public."(DNFSB/TECH-27, June 14, 2000)
- Risk categories:
  - New construction – New and challenging requirements
  - Aging legacy facilities – great challenge
    - May not have met codes in effect at time of construction
    - Fire risk not always understood and recognized
    - May not have been upgraded over time to keep pace with risk changes
  - Facilities undergoing decommissioning
    - Overall fire risk associated with D&D
    - Impairment of fire protection systems

# Fire Risk

- In past decades, several major fires have occurred at defense nuclear facilities.
  - Rocky Flats
  - Paducah Gaseous Diffusion Plant
  - N-Reactor
- Other lesser fires have also impacted environmental clean-up operations, in some cases halting operations for months.
- While no large fires have occurred in more recent times, this experience should not lead to complacency.
- A single major fire could result in serious damage to the DOE nuclear program and in the worst case, cause harm to workers or the public.

# Safety Related Fire Suppression

- Projects are now implementing interim guidance (soon to be 1066 Appendix A).
  - UPF at Y-12
  - PF-4 at LANL
  - CMRR at LANL
- Bounding Fire .(Safety Basis)
- Design Basis Fire.
  - NFPA guidance
  - Possibility of multiple common cause fires (seismic)
  - Consider conservative design margins

# Safety Related Fire Suppression

- Questions on the design basis fire:
  - How many fires?
  - How large?
- How to approach these questions?
  - Deterministic – Criteria?
  - Probabilistic – PRA?
  - Something else?
- No current accepted methodology.
  - Must address uncertainty and conservative margins.
  - For some facilities combinations may be appropriate
- Future discussions needed.
  - Safety Basis and Fire Protection with other SMEs.

# Fire Protection System Reclassification

- More older fire protection systems being reclassified from general service to safety class or safety significant.
- Key is the functional requirements from the DSA.
- Functional requirements drive design requirements.
- Just meeting minimum NFPA requirements may not be enough.
- Avoid “wand” waving.

# Reclassification Continued:

- Typical considerations for water based systems:
  - Condition of pumps & tanks.
  - Pump meets demand & NFPA 25 compliant.
  - Tank meets supply and duration & NFPA 25 compliant– recent tank inspection.
  - Hydraulic analysis of water supply piping.
  - Hydraulic analysis of sprinkler system.
    - Must meet largest demand.
    - Multiple fires (where identified in safety basis).

# Reclassification Issues Identified

- Typical considerations for water based systems:
  - Gap Analysis to current code requirements.
    - Resolution of deficiencies that may affect performance.
  - Interconnection of safety systems with system components classified as general service.
  - Design & installation did not meet code of record.
  - Changing conditions which negate code of record.
  - Failure to address issues identified during inspections or performance of Gap Analysis.
  - IT&M does not meet expectations for SS & SC.

# Other Areas of Interest to Board

- Fire Hazard Analysis & Engineering Evaluations:
  - Quality, completeness.
  - Technically defensible.
  - Assumptions are appropriate and validated or protected.
- Inspection, Testing & Maintenance:
  - NFPA compliant.
  - Tracking & trending IT&M.
  - Special emphasis for safety class & safety significant systems.
  - Impairments and timely resolution.
- SQA of Safety related design software.
  - hydraulic calculations and others for safety related systems.
- TSRs, LCOs and Compensatory Measurers.

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## QUESTIONS?