



# FNP LAR AUDIT PRESENTATION

March 19, 2013

**Session 6 – N P O and Rad Release**  
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# NPO Overview

- NPO Nuclear Safety Assessment developed as specified in NFPA-805, Sections 2.4.1.4, utilizing guidance provided in Appendix B, Sections B.2 and B.6 and NEI 04-02 (Rev. 2), Section 4.3.3 and Appendix F
- ARC was utilized for both NSCA and NPO
- “High Risk Evolutions” identified utilizing guidance provided NUMARC 91-06 and FAQ 07-40
- Circuit Analysis performed IAW NEI 00-01 (Rev 1)
  - NEI 00-01 Rev 1 – Rev 2 gap analysis included NPO
  - NEI 00-01 Rev 2/3 MSO’s considered

# NPO Methodology

1. Determine Plant Operating States that should be reviewed
2. Established performance goals and objectives for Non-Power Operations
3. Review plant systems to determine Key Safety Functions (KSFs)
4. Identify success paths based on DID sheets and necessary components to achieve a KSF using
  - Perform additional circuit analysis as necessary
5. ARC Analysis to identify pinch-points

# NPO Plant Operating States

- As defined in FAQ 07-0040
- CAFTA Fault trees developed for each POS 1A, 1B, 2, and 3
- KSF Logics account for MSO combinations
- For most key safety function success paths, POS 2 is limiting state
  - Lowest possible reactor inventory with large decay heat load applicable to NPO

# NPO KSF'S

- Reactivity Control
- Decay Heat Removal Capability
- Electrical Power Availability
- Inventory Control
- RCS Integrity
- Spent Fuel Pool Cooling
- Support Systems

# NPO Results and Insights

- 163 Total Fire Areas
  - Unit 1
    - 79 areas where each KSF has a success path;
    - 37 areas where one KSF can be lost (pinch point)
    - 47 All KSF's lost (pinch point)
  - Unit 2
    - 58 areas where each KSF has a success path;
    - 71 areas where one KSF can be lost (pinch point)
    - 34 All KSFs lost (pinch point)
- Key insight from this analysis – Fire in certain areas of the *operating* unit could adversely affect KSFs in the *shutdown* unit

# NPO Commitments

- Revise fire risk and outage management procedures and other administrative controls to consider the recommendations from FAQ 07-0040 specified in the evaluation:
  - Restriction of hot work in analysis areas during periods of increased vulnerability.
  - Verification of functional detection and / or suppression in the vulnerable analysis areas.
  - Limitation of transient combustible materials in analysis areas during periods of increased vulnerability.
  - Plant equipment configuration changes (e.g., removing power from equipment once it is placed in its desired position).
  - Provision of additional fire patrols at periodic intervals or other appropriate compensatory measures (such as surveillance cameras) during periods of increased vulnerability.
  - Rescheduling work to a period with lower risk or higher defense in depth

# Rad Release Overview

- Purpose
  - The purpose of the Radioactive Release evaluation is to review and document compliance with the radioactive release goals, performance objectives, and performance criteria of NFPA 805.



# Rad Release Methodology

- The evaluation utilized the guidance contained in NEI 04-02 Section 4.3.4 and Appendix G, FAQ 09-0056 and the associated closure memo, and lessons learned from the pilot plants and non-pilot plant reviews/RAIs available at the time of the evaluation.

# Rad Release Methodology

- Compartments
  - All fire areas were reviewed for the potential to affect radioactive release and either screened in or screened out. This was performed for all modes of operation.
  - Where possible fire areas were combined into a common compartment to avoid repetitive information.
  - In some cases fire areas were subdivided into multiple compartments since features of the overall fire area varied and could not be considered as a single compartment.
- A basis was provided why a compartment screened in or screened out.

# Rad Release Methodology

- Compartments (continued)
  - Those compartments which contained fire areas which screened in (potential to affect radioactive release) were then reviewed to determine if engineering controls are available to control and/or monitor airborne or liquid effluents.
- Administrative Controls
  - Administrative controls were reviewed to ensure steps are in place for containment and monitoring of potentially contaminated smoke and fire suppression water.

# Rad Release Methodology

- Fire Brigade Training
  - Training materials were reviewed to ensure they are consistent with the pre-fire plans in terms of containment and monitoring of potentially contaminated smoke and fire suppression water.

# Rad Release Commitments

- Create Pre-Fire Plans for each of the fire zones using the following recommended structure:
  - Apply to all areas that have the potential for a radioactive release regardless of the safety significance.
  - Include identification, on the drawing or within the text portion of the pre-fire plan, of location with a greater risk of radioactive release. These areas are RCA interface locations with doors and hatches.

# Rad Release Commitments

- Create Pre-Fire Plans (continued)
  - Penetration area fire plans
    - Note vulnerability with potential seal leakage at gap between the containment and the auxiliary building
  - Yard (General areas with RCA locations)
  - Old Steam Generator Storage Structure
  - Low Level Radwaste Building
  - Solidification/Dewatering Facility

# Rad Release Commitments

- Modify Fire Brigade Training
  - Follow the site and corporate training process to add a task to the “task list” contained in the Southern Nuclear Fire Training System Master Plan. This action will drive the creation of objectives and supporting training material be placed in the appropriate locations for the training program.

# Rad Release Commitments

- Procedure Modifications / Standard Operating Procedure Creation
  - Modified in FNP-0-EIP-13.0,
    - Clarify Health Physics support to the Fire Brigade
  - Develop standalone standard operating procedures for potential radioactive release
    - transient fire in the yard
    - outside fires that involve radioactive material
    - smoke scrubbing considerations



# Rad Release Commitments

- Procedure Modifications / Standard Operating Procedure Creation (continued)
- Develop new guidance for radioactive/contaminated material located outside of a hardened structure to:
  - Be contained in a closed metal, no-combustible, container  
OR
  - Have radiation protection determine that should a fire consume the material, the release of radioactive material would not exceed 10 CFR 20 limits.

# QUESTIONS

