U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Combined License Application Review STP Units 3 and 4

Safety Panel 2

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Panelists

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Recommendation 4.2 - Framework

- **SECY-12-0025 contains proposed orders and requests for information in response to lessons learned from Fukushima Dai-ichi**
- **Order EA-12-049 has requirements for mitigation of beyond-design-basis external events**
- **JLD-ISG-2012-01 provides guidance for meeting Order EA-12-049**

STP Units 3 and 4 Approach

- **In Phase 1 (initial phase), installed plant equipment maintains key safety functions for 36 hours**
- **No Phase 2 (transition phase) is needed since time is available to bring in offsite resources**
- **In Phase 3 (final phase), offsite portable equipment supports key safety functions beyond 36 hours**

Three Key Safety Functions

- **Core cooling is maintained by reactor core isolation cooling (RCIC) in Phase 1 and ac-independent water addition (ACIWA) system in Phase 3**
- **Containment overpressure protection system maintains containment integrity**
- **During Phase 1, spent fuel cooling uses existing water inventory; after Phase 1 ACIWA maintains spent fuel pool water level**

Water and Fuel Supplies

- **Phase 1 - RCIC uses water from the suppression pool and condensate storage tank**
- **Phase 3 - ACIWA uses water from fire water storage tanks and ultimate heat sink basins**
- **Operators transfer fuel from Seismic Category I fuel oil storage tanks in Phase 3**

Electrical Power

- **Phase 1 - Class 1E 125 VDC station batteries provide power for 36 hours via load shedding**
- **Staff reviewed the battery sizing calculation and confirmed the adequacy of the power supply**
- **Phase 3 – Two offsite portable FLEX 480V, 1500 kW diesel generators to power the loads**
- **Electrical isolation is maintained between the safety-related system and the FLEX diesel generators**

Conclusions

- **STP 3&4 mitigation strategies provide core cooling, containment, and spent fuel pool cooling capabilities per Order EA-12-049**
- **License condition requires completion of the overall integrated plan, and full implementation of the guidance and strategies prior to fuel load**

Open Phase Condition (Bulletin 2012-01)

- **An open phase condition occurred at the Byron plant in 2012. An open phase condition occurs when one or more of the three phases in an offsite power feed is lost**
- **Regulatory basis: 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 17 and 10 CFR 50.55a(h)(3).**

Open Phase Condition

- **This event is significant because it has the potential to result in a common cause failure, in which both offsite and onsite electrical power systems might not be able to perform their intended safety function**
- **The event highlighted a problem that could occur at other reactors**

Open Phase Condition

- **To address the vulnerability identified in Bulletin 2012-01, active reactor designs, such as STP, should have the following:**
  - **Automatic detection of loss of phase events**
  - **Alarm in the control room**
  - **Automatic mitigation/response**

Open Phase Condition

- **STP is the first 10 CFR Part 52 active reactor design COL applicant to resolve the open phase issue**
- **STP design includes a scheme to detect, alarm, and automatically respond to an open phase event**

Open Phase Condition

- **Staff determined that the design was sufficient because it provides features for detection, alarm, and automatic protection of safety-related equipment.**
- **Furthermore, the design meets the requirements in GDC 17 and 10 CFR 50.55a(h)(3).**

Questions?