# Follow-Up Public Meeting regarding Pre-Submittal Meeting for Vogtle 3 and 4 Squib Valves Alternatives

**July 8, 2026**

U.S.NRC
United States Nuclear Regulatory Commission
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# Agenda

- Introduction
- Opening Remarks
- Probabilistic Risk Assessment (PRA) Feedback
- General Design Criterion (GDC)-34
- Technical Specifications
- Discussion
- Public Comment to NRC
- Closing Remarks

# Introduction

- A pre-submittal public meeting was held on June 22, 2026, to discuss Southern Nuclear Operating Company's (SNC's) plan to submit two alternative requests regarding the pyrotechnically-actuated (squib) valves.
- The SNC slides from the pre-submittal meeting are available in ADAMS Accession No. ML26166A218.

# Opening Remarks

- This follow-up public meeting was posted on the NRC public website on June 27, 2026 (ML26178A005).
- The original NRC slides for this follow-up are available in ADAMS Accession No. ML26187A155. The revised slides ADAMS Accession No. is to be determined.

# PRA Feedback

- As described in Vogtle Units 3 and 4 Updated Final Safety Analysis Report (UFSAR), Revision 8, Section 19.59.3.5, common-cause failures (CCFs) of the safety-related squib valves in the AP1000 design are extremely important.
- High reliability of the squib valves are significant in maintaining the low core damage frequency (CDF).

# PRA Feedback (continued)

- There is large uncertainty as to the failure rates that squib valves are assigned and they are among the most safety-significant mechanical components in the AP1000 design.
- The 12 squib valves (4 automatic depressurization system (ADS), 4 gravity injection, and 4 recirculation) comprise the safety-related loss-of-coolant accident (LOCA) mitigation capability for the AP1000 design.
- CCF of the squib valves must be prevented.

# PRA Feedback (continued)

- In addition to a careful deterministic review, the NRC staff needs a convincing, quantitative risk assessment addressing the effect of extending the interval between inspections.
- The NRC staff needs a human factors evaluation that shows how the probability of CCF due to maintenance error can be adequately mitigated.

# PRA Feedback (continued)

- Pyrotechnic charges have a reported design life of 8 years.
- The NRC staff assumes that the valves have a design life of 60 years. Is this the case?
- The failure modes of each subcomponent of the squib valves should be evaluated separately to determine the acceptability of a 10-year inspection cycle.

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# PRA Feedback (continued)

- It is an acknowledged principle of high-hazard industries (e.g., commercial aviation) that performing "special maintenance" simultaneously on redundant risk-significant components should be avoided. (The term is usually applied to infrequent or complicated maintenance, especially on important systems and components.)
- The probability of CCF increases dramatically if the maintenance is performed on multiple similar components by the same person or team consecutively.

# PRA Feedback (continued)

- For example, all three engines of a three-engine airplane failed in 1983, because one person replaced the same component on each engine in one overnight check—committing the same error each time.*  (A device that required an O-ring seal was replaced, but new O-rings were not included with the new device.)

*National Transportation Safety Board, "Eastern Air Lines Flight 855—Multiple Engine Failure:  Lockheed L-1011 TriStar 1 (N334EA)," Miami International Airport, Miami, Florida, May 5, 1983.

# PRA Feedback (continued)

- If performed in the same outage, it is likely that the same team would be doing the job. Even if different teams were used, they would certainly be using the same procedure, and all would receive similar pre-evolution briefings.

# General Design Criterion (GDC)-34 (Residual Heat Removal)

- Vogtle 3 and 4 meet GDC-34 by using the passive core cooling system (PXS).
- Instead of relying on active pumps and alternating current (AC) power to remove decay heat, it uses natural forces like gravity, natural circulation, and evaporation to keep the reactor safe and stable during transients and accidents.

# GDC-34 (continued)

- The PXS meets this requirement through three main safety-related mechanisms:
  - Passive Residual Heat Removal (PRHR) Heat Exchanger,
  - ADS and Gravity Injection, and
  - Passive Containment Cooling System (PCS).

# GDC-34 (continued)

- PRHR Heat Exchanger: If normal cooling is lost, the PRHR Heat Exchanger automatically actuates to transfer core heat from the Reactor Coolant System (RCS) into the large In-Containment Refueling Water Storage Tank (IRWST).
- It drives the water through natural circulation, requiring no pumps.

# GDC-34 (continued)

- ADS and Gravity Injection: If the primary loop leaks or the PRHR cannot meet long-term cooling, the ADS safely depressurizes the reactor.
- This allows gravity to flood the reactor core with cooling water from safety tanks.

# GDC-34 (continued)

- PCS: Once the steam vents into the steel containment vessel, the PCS pours water over the outside of the dome.
- Airflow naturally circulates to condense the steam and cool the reactor environment, effectively removing residual heat indefinitely without operator action.

# Technical Specifications (TSs)

- Current TSs will present an operational challenge the licensee needs to be aware of.
- Current TSs have the following restrictions:
  - Only one Stage 4 ADS valve can be removed from service in Modes 5 and Mode 6 with the upper vessel internals in place.
  - IRWST injection and containment recirculation must maintain one injection flow path and one recirculation flow path at all times in Modes 5 and 6.

# TSs (continued)

- While this does not preclude the testing strategy SNC proposed, it does add restrictions for when the proposed valve maintenance activities can be performed.
- Only one Stage 4 ADS valve can be removed from service in Modes 5 and Mode 6 with the upper vessel internals in place. Three valves must remain in service until the vessel internals are removed.
- Two IRWST Injection Valve and Two Containment Recirculation valve must remain in-service until the reactor is defueled.

# TSs (continued)

- The Passive IRWST injection and containment recirculation function is required for all shutdown event sequences and is particularly risk significant in mid loop sequences Delta CDF is greater than 1 E-5 with less than 6 days exposure time.
- However, if one path is still available that would be allowed by TSs, SNC would have to clarify exactly how it plans to sequence the maintenance activities.

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# TSs (continued)

- TS 3.4.12 Automatic Depressurization System (ADS) - Shutdown, RCS Intact
- TS 3.4.13 - Automatic Depressurization System (ADS) - Shutdown, RCS Open
- TS 3.5.7 - In-containment Refueling Water Storage Tank (IRWST) - Shutdown, MODE 5
- TS 3.5.8 - In-containment Refueling Water Storage Tank (IRWST) - Shutdown, MODE 6

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# Discussion

# Questions to NRC?

# Closing Remarks

- The NRC staff did not make any regulatory decision during this public meeting.
- The NRC staff will thoroughly review the two proposed alternative requests once received and make any regulatory decisions in writing in a timely manner.