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February 26, 2021

Subject: Pre-Submittal of Presentation for Meeting to Discuss Design Certification Extension for **AP1000®**

Please find enclosed the non-proprietary presentation for the March 3rd public meeting related to the AP1000 Design Certification Extension.

Very truly yours,

Zachary S. Harper
Manager, Licensing Engineering

/Enclosures

1. APP-GW-GLY-187 Revision 1, "Pre-Submittal Meeting **AP1000®** Design Certification Extension"

cc:
Anna Bradford	- U.S. NRC
Bob Caldwell	- U.S. NRC
Michael Dudek	- U.S. NRC
Bruce Bavol	- U.S. NRC
Michael Corletti	- Westinghouse
Doug Weaver	- Westinghouse

ENCLOSURE 1

Pre-Submittal Meeting **AP1000**® Design Certification Extension

Pre-Submittal Meeting
AP1000® Design Certification Extension

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Meeting Purpose & Agenda

Purpose

- Provide an overview of a planned Westinghouse submittal related to the AP1000 design certification extension
- Receive and address NRC staff feedback

Agenda

- Background Information
- Summary of the technical issues & resolution
- Content & Scope of the submittal

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Background Information

- By letter dated June 26, 2020 (ML20178A640), Westinghouse requested the NRC extend the duration of the AP1000 design certification (DC).
- SECY-20-0082 (ML20252A153) recommended to extend the AP1000 DC an additional 5 years beyond the current expiration date of February 27, 2021 using the direct final rule process.
- Staff Requirements Memorandum - SECY-20-0082 (ML20322A047) approved the recommendation.

Background Information

- In order to enable the NRC staff to make the necessary safety findings under 10 CFR 52.54, Westinghouse will be submitting information that resolves five previously identified technical issues within the AP1000 design certification.
- These technical issues were resolved as part of the Levy, Lee, and Turkey Point AP1000 combined license (COL) applications, as well as the Vogtle 3&4 COL.
- The purpose of the submittal is to update the certified design with the same design information that NRC previously approved as part of the COL process.

Summary of the Technical Issues & Resolution

- Details of the five previously identified & resolved technical issues can be found in the following Vogtle 3&4 documentation

	LAR Number	Amendment Request	Amendment Approval	NRC SER
Passive Core Cooling System (PXS) Condensate Return	SNC LAR-16-026 (WEC LAR-053)	ML16319A120 ML16321A416 (Supplement 1)	ML17024A317	ML17024A307
Main Control Room Emergency Habitability System (VES) Changes to Satisfy Post-Actuation Performance Requirements	SNC LAR-17-001 (WEC LAR-082)	ML17129A608 ML17258B211 (Supplement 1)	ML18011A885	ML18011A894
Improvements to Main Control Room (MCR) Post-Accident Radiological Consequences	SNC LAR-17-023 (WEC LAR-099)	ML17243A352, ML18040A489 (Supplement 1) ML18067A648 (Supplement 2)	ML18085A620	ML18085A628
Hydrogen Venting from Passive Core Cooling System (PXS) Compartments	SNC LAR-17-003 (WEC LAR-093)	ML17053A425 ML17153A362 (Supplement 1)	ML17213A217	ML17213A224
PMS Logic Changes for Source Range Flux Doubling	SNC LAR-16-006 (WEC LAR-0103)	ML16168A399	ML16320A097	ML16320A174

Summary of the Technical Issues & Resolution

Condensate Return

- SECY-94-084 recommended that passive reactor safety systems include a residual heat removal system capable of bringing the reactor to a safe shutdown condition of 420°F for non-loss of coolant accident events.
- Per the AP1000 DCD, the Passive Core Cooling System (PXS) is capable of removing heat to the safe shutdown condition of 420°F in 36 hours.
- Subsequent to design certification, changes were required to the containment gutter arrangement to support prolonged non-LOCA events to meet the DCD 420°F requirement.
- In addition, the Shutdown Temperature Evaluation in Appendix 19E was updated to analyze the PRHR HX performance with the design modifications to confirm it meets its licensing basis performance criterion of cooling the RCS to 420°F within 36 hours and maintaining a safe shutdown condition.

Summary of the Technical Issues & Resolution

MCR Heat Up

- The emergency habitability system (VES) provides a 72-hour supply of breathable air for the occupants of the main control room (MCR).
- The heat loads within the MCR are designed to limit the heat-up when VES is operating.
- Subsequent to design certification, calculations found the MCR temperature response exceeded the current licensing basis maximum and equipment qualification conditions.
- Therefore, an automatic and manual, Class 1E, electrical load shed of nonessential non-safety related equipment within the main control room was added that brought the design back into alignment with the licensing basis.

Summary of the Technical Issues & Resolution

MCR Dose

- The AP1000 MCR operator dose requirements are met by the safety related MCR emergency habitability system VES.
- Subsequent to design certification, calculations identified several issues associated with the VES that challenged the ability to satisfy GDC 19 control room dose limits.
- Therefore, design changes were made to ensure personnel dose does not exceed 5 rem total dose equivalent (TEDE) for the duration of a design basis accident (DBA).

Summary of the Technical Issues & Resolution

Hydrogen Venting

- The containment hydrogen control system (VLS) is designed promote hydrogen burning in the event of a severe accident. This occurs soon after the lower flammability limit is reached in the containment to provide confidence containment integrity is maintained.
- During a beyond design basis event, hydrogen may be vented from the PXS compartments through openings in the floor where each Core Make-up Tank is located.
- ITAAC provide a minimum distance between the primary hydrogen vent openings and the containment shell to ensure containment integrity.
- Subsequent to design certification, a revised building and equipment layout was identified which led to revised ITAAC minimum distances.
- An evaluation was performed to confirm that a diffusion flame hydrogen burn at the venting locations do not challenge containment integrity.

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Summary of the Technical Issues & Resolution

PMS Logic Changes for Flux Doubling

- IEEE 603-1991, imposes requirements on the operating bypasses (i.e., “blocks” and “resets”) used for the AP1000 PMS.
- Subsequent to design certification, it was identified that the PMS functional logic for blocking the source range (SR) neutron flux doubling signal required revision to fully comply with the IEEE 603 Subclause 6.6 criteria. An operator could block flux doubling logic without an appropriate permissive.
- Therefore, a new permissive was added to block the flux doubling signal during reactor startup, P-8.
  - Above P-8, operators can control both control rods & boron concentration for reactivity adjustment.
  - Below P-8, the safety system overrides isolation valves from the demineralized water system closed, preventing a boron dilution event.
  - In addition, a reset of SR neutron flux doubling signal when RCS temperature decreases below the permissive was added.

Content & Scope of the Submittal

- The technical resolution of the five issues will align with the Vogtle 3&4 License Amendments
- DCD markups and clean DCD pages will be provided for each issue
- The submittal will reference the technical discussion provided in the Vogtle LARs
- In nearly all cases, the DCD change pages will match the Vogtle LAR change pages verbatim
- In limited instances, the DCD change pages will vary slightly from the Vogtle licensing basis change pages due to other Vogtle 3&4 departures impacting the same licensing basis content
  - The technical design changes and the NRC bases for approval is not impacted because of these administrative differences
  - Examples are provided on the following two slides

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Content & Scope of the Submittal

Example 1 - Vogtle 3&4 Tech Spec Upgrade

- Prior to the submittal of the five Vogtle LARs, a Tech Spec Upgrade LAR was approved and implemented
- The Tech Spec Upgrade implemented administrative changes and rearranged many Tech Specs, including the ESFAS Tech Spec
- These upgrades do not constitute a significant error in the DCD; therefore, it is not being implemented at this time
- Since the Tech Spec Upgrade is not implemented, the DCD Tech Spec change pages associated with some of these five issues will look similar to the Levy, Lee, and Turkey Point Tech Spec change pages

Content & Scope of the Submittal

Example 2 - Vogtle 3&4 departures

- Prior to the submittal of the five Vogtle LARs, departures were implemented into the Vogtle licensing basis
- In order to stay as consistent as possible with the Vogtle LAR change pages, some minor changes from other Vogtle departures will be included in the DCD change pages
- These changes will be identified and discussed in the submittal

Content & Scope of the Submittal

Topical Reports

- The MCR Heat-up change has a small impact on DCD Chapter 7 incorporated by reference Topical Reports
- The submittal will contain change pages for DCD Chapter 7A, similar to the Vogtle LAR
- An affidavit will be submitted for these Chapter 7A changes

Questions