Enclosure 2

Transmittal of the Westinghouse AP300™ SMR Pre-Application Regulatory Engagement Plan Periodic Update – February 2024

(Non-Proprietary)

February 2024

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REVISION SUMMARY

Revision	Revision Description
A	Initial Issue
B	Accounts for changes in design from Rev. A. Includes further information on proposed regulatory engagement. Describes additional white papers.

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Acronyms and Trademarks

Acronym	Definition
CFR	Code of Federal Regulations
CMT	Core Makeup Tank
DC	Direct Current
DCA	Design Certification Application
DCD	Design Control Document
FOAK	First-Of-A-Kind
I&C	Instrumentation & Controls
IRWST	In-Containment Refueling Water Storage Tank
MSHIM	Mechanical Shim
NI	Nuclear Island
NRC	United States Nuclear Regulatory Commission
PRHR HX	Passive Residual Heat Removal Heat Exchanger
REP	Regulatory Engagement Plan
SMR	Small Module Reactor
WEC	Westinghouse Electric Company

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1.0 Introduction

1.1 Purpose

This Regulatory Engagement Plan (REP) describes the anticipated pre-application interactions Westinghouse Electric Company LLC (Westinghouse, or WEC) intends to have with the United States Nuclear Regulatory Commission (NRC) to support future licensure of the AP300™ Small Modular Reactor (SMR) based on proven AP1000™ pressurized water reactor (PWR) design and novel design features. The purpose of this REP is to document the basic design philosophy of the SMR, provide an overview of the proposed licensing approach, and provide a timeline for the planned pre-application interactions between the NRC and WEC, with the goal of soliciting NRC staff feedback on noteworthy topics which carry potential licensing risk. All these actions will minimize regulatory complexity and create a timely and efficient path to the ultimate licensure of the AP300 SMR design.

1.2 Scope

The initial issuance of the REP introduced the NRC staff to the technology and conceptual approach to the Westinghouse AP300 SMR, included an overview of the phased design approach and licensing strategy, and described the anticipated pre-application engagement activities between Westinghouse and the NRC.

The current version of the REP (Revision B) includes the information presented in the initial issue and expands on the status of the AP300 SMR project (Q1 2024) from the licensing perspective. The current version describes important departures from the initial issue, completed milestones and new developments that happened during Q4 2023 or are expected developments during Q1 2024. This includes immediate actions taken by Westinghouse in the development of the technology and required future NRC support. Initial discussions with the NRC staff will inform preliminary design and licensing decisions. It is important for Westinghouse to notify the NRC on a timeline for these pre-application activities such that NRC staff can allocate the appropriate resources to support the Westinghouse objectives in the licensing process for the AP300 SMR.

1.3 Regulatory Engagement Plan Updates

This REP will be updated periodically to address major changes to the project. Future pre-application and post-application regulatory engagement activities will be included in future revisions of this REP as the project progresses. Changes to the REP will be communicated to the NRC staff via formal correspondence.

2.0 Technology Overview

The AP1000 design documentation and licensing basis will be leveraged extensively and used as the baseline for the creation of the AP300 SMR to the extent practicable. The AP300 SMR overall approach to safety is depicted in Figure 2-1.

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The AP300 SMR conceptual design phase was successfully completed at the end of 2023. Important milestones achieved during this phase were the validation of design choices, the initiation of regulatory engagement, and the rapid advance in design documentation based on proven AP1000 plant technology. Key areas of design advancement included:

- Confirmatory analyses to validate technical feasibility of design choices
- Development of preliminary sizing and performance data
- Confirmation of plant performance requirements
- Establishment of applicable design criteria
- Development of design description and analysis reports
- Development of conceptual plant design including identification of and establishing functional requirements for the 2nd Level design elements, preliminary system process and instrumentation diagrams and general arrangement through three-dimensional (3D) model development

A fundamental design objective of the AP300 SMR is to optimize the safety-related footprint in order to drive reductions in quantities and construction labor costs, while demonstrating the same level of safety as the AP1000 design.

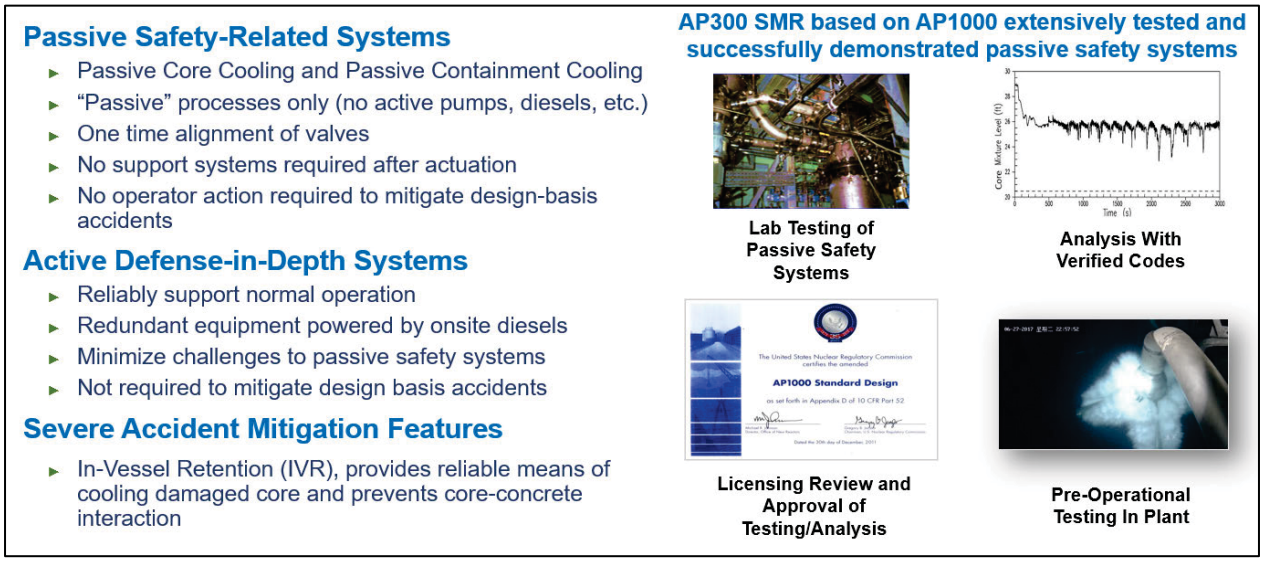

Figure 2-1: Demonstrated Approach to Safety

2.1 Brief Plant Overview

AP300 SMR is a 1-loop PWR reactor with 990 megawatt (MW) thermal power output. It will leverage the same passive containment and core cooling systems and overall approach from the AP1000 plant, with some modifications as highlighted in Section 2.2. The overall plot layout will be similar to AP1000 design. [

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Figure 2-1 and Figure 2-2 depict an overview of the conceptual design and plot plan, respectively. Table 2.1-1 provides a comparison of some AP300 SMR properties with AP1000. Figure 2-3 depicts the primary RCS loop equipment.

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Figure 2-1: AP300 SMR Conceptual Design

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Figure 2-2: AP300 SMR Plot Plan

Table 2.1-1: Comparison of Some AP300 SMR Properties with AP1000

	AP300 SMR	AP1000 Plant

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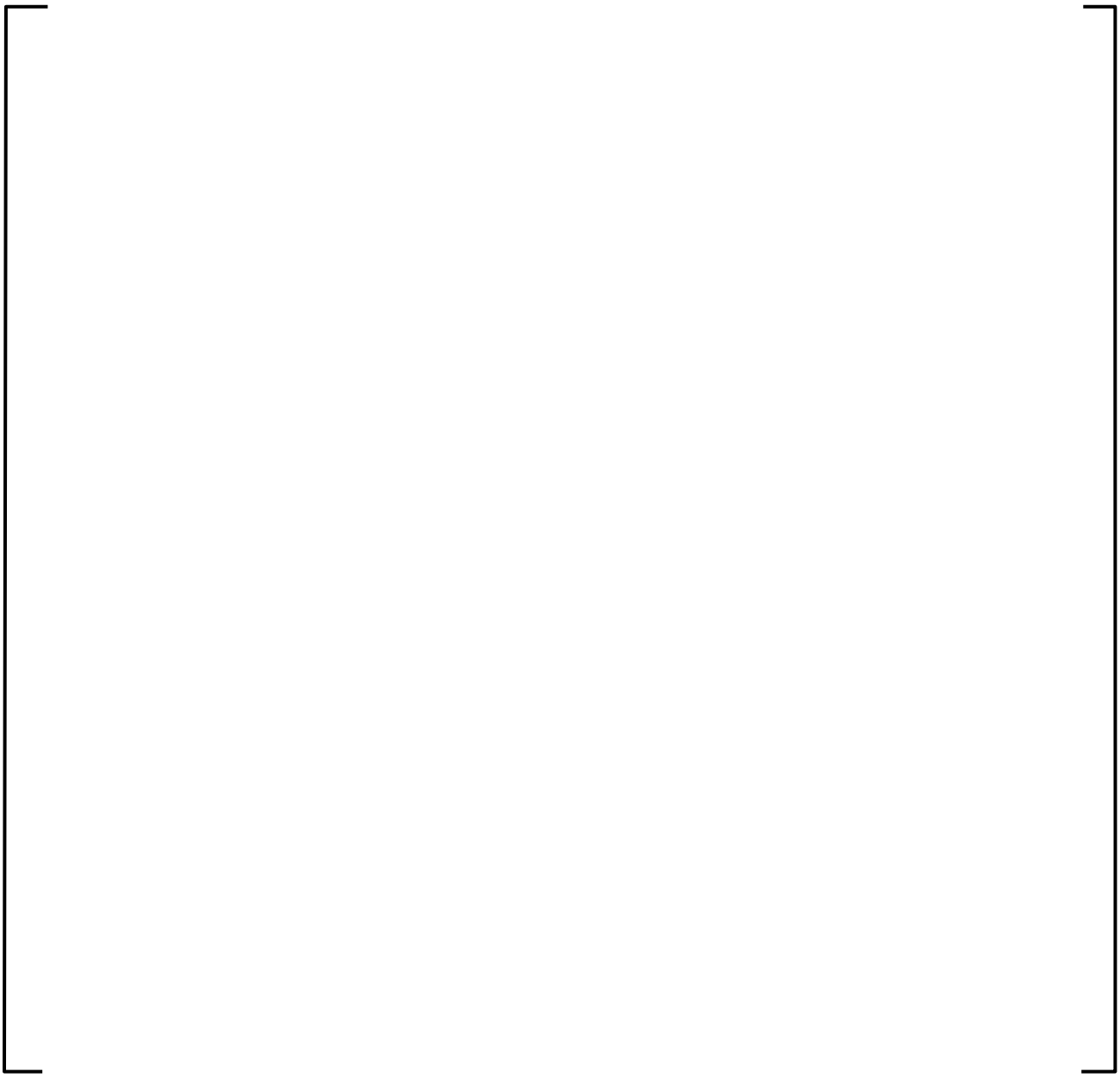

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Figure 2-3: Overview of AP300 SMR 1-Loop Design

2.2 AP300 SMR Design Features

There are some significant differences to the AP300 SMR conceptual design from the AP1000 plant design as a result of the optimization of the plant footprint to create an economically feasible design. Since one of the goals of the AP300 SMR project is to achieve an optimization of the reactor system without adding significant first-of-a-kind (FOAK) risks and challenges, these significant differences envisioned were subjected to additional evaluation to ensure the perceived benefits outweighed potential risks and that the same level of safety from the AP1000 design could be demonstrated. Additional evaluation of these design

choices [

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AP300 SMR design features which differ from the AP1000 plant are highlighted in Table 2.2-1 with a discussion on how the AP1000 plant technology will be leveraged where appropriate. These design features will be the focus of the white paper strategy discussed in Section 3.4.

Table 2.2-1: AP300 SMR Design Features which Differ from AP1000

AP300 SMR Features	Leveraging AP1000 Plant Technology
[ ]a,c,e	– Passive safety systems support 72 hour coping time: • Onsite systems and equipment to extend the operation to 7 days • Hardened connections for connecting offsite equipment – Active non-safety-systems provide defense-in-depth functions – In-vessel retention of molten core debris – Passive Systems Structures and Components (SSCs) are protected within the steel containment vessel which is protected by a robust shield building
[ ]a,c,e	– Robustness to Station Black-Out events and use of fail-safe features for LOOP mitigation
[ ]a,c,e	– I&C is based on proven AP1000 plant platforms: • NRC approved Common Q™ for safety system
[ ]a,c,e	– No safety-related operator actions during initial 72 hour coping time
[ ]a,c,e	– Same Fuel Handling Functional Requirements

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Table 2.2-1: AP300 SMR Design Features which Differ from AP1000	
AP300 SMR Features	**Leveraging AP1000 Plant Technology**
[ ]a,c,e	– Using proven 17x17 RFA Fuel Assembly Technology – Using proven mechanical shim (MSHIM™) reactivity control

3.0 Regulatory Strategy

3.1 Application Type

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3.2 Design and Licensing Strategy

Westinghouse plans to leverage a phased design development approach for the AP300 SMR. The phased approach ensures the design has reached the necessary level of design maturity prior to progressing through each design phase. From the licensing perspective, important aspects of each phase are as follows:

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3.2.1 Conceptual Design Phase

The Conceptual Design Phase, successfully completed at the end of 2023, validated design choices, started regulatory engagement, and rapidly advanced design documentation based on proven AP1000 plant technology.

NRC Pre-Application Engagement was initiated and the first issue of the REP was submitted. Additionally, development of the first wave of White Papers was started. White Paper submittals have the objective of de-risking future license applications through NRC review, feedback, and buy-in on key topics early through pre-application engagement. See section 3.4 for additional information.

3.2.2 Basic Design and Licensing Phase

The Basic Design and Licensing Phase, **[ ]**[a,c,e] will progress the conceptual design developed in 2023 with sufficient detail to support the submittal of the licensing application.

White paper submittals will continue (see section 3.4 for additional information). Some of these papers will facilitate the development of topical reports that will be submitted as part of the licensing application.

Westinghouse plans to engage with the NRC staff during this phase to update the staff on programmatic topics, including plans for design, white papers for review, testing, and future pre-application licensing and formal licensing activities. **[ ]**[a,c,e]

Refer to Figure 3-1 for a summary and roadmap on the licensing strategy Westinghouse will follow for NRC licensing of the AP300 SMR.

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Figure 3-1: AP300 SMR US Licensing Roadmap

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Figure 3-2 depicts the design phases and licensing activities completed and planned for [ ]a,c,e The elements of this strategy include:

a,c,e

Figure 3-2: Planned Design Phases and Licensing Activities for [ ]a,c,e

3.3 Interaction Plan

The type and frequency of NRC staff interaction will vary as the development of the AP300 SMR program evolves and new questions and issues arise. Westinghouse plans to hold routine project management discussions and technical meetings with the NRC staff.

- Technical discussions and pre/post-submittal meetings - The technical discussions will provide the opportunity for direct engagement with NRC staff reviewers in specific subject areas and will include reviewers and management. Meetings will be focused on the reports discussed in Section 3.4. During the routine project management meetings, the NRC project managers and Westinghouse will determine the necessity and value-add of holding pre-submittal and post-submittal meetings for each submittal.

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3.4 White Papers

Pre-application engagement will mainly consist of identifying and addressing key topics. An initial set of key topics will be addressed through submitting various white papers.

Table 3.4-1 lists the white papers Westinghouse plans to submit. This table also provides a brief purpose statement and the planned submittal timeframe for each report. **[**

][a,c,e]

The following represents the various types of engagement activities that may be expected for a white paper submittal. Given the array of anticipated submittal topics listed, not all engagement activities detailed below may be necessary for each report. Discretion on the appropriate engagement vehicle will be discussed between the NRC program manager and Westinghouse during the routine project meetings.

1. Pre-submittal Meetings: Westinghouse provides an overview of the submittal. Westinghouse and the NRC agree on the expected outcome of the review. Westinghouse provides requested review timeframe.
2. Package Submittal: Westinghouse formally submits the content to the NRC for review. Anticipated Westinghouse submittal timeframe is captured in Table 3.4-1.
3. Post-submittal Meetings/Clarification Calls: The NRC staff provides verbal feedback on the submittal. Westinghouse receives feedback, asks clarifying questions, and provides any necessary clarification to the NRC.

Westinghouse kindly requests feedback from NRC within 30-60 days for each white paper submittal.

Table 3.4-1: List of White Papers for Pre-Application Engagement

ID	Report Topic	Planned Purpose	Pre-submittal Meeting Date	Submittal Date
First Wave				
1	Design Description Overview	Describes the AP300 SMR goals, communicates basic plant design, including updates to design features and methodologies that are cost reduction improvements to AP1000 plant technology.	11-09-2023	12-07-2023 Accession No. ML23347A167

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Table 3.4-1: List of White Papers for Pre-Application Engagement				
ID	**Report Topic**	**Planned Purpose**	**Pre-submittal Meeting Date**	**Submittal Date**
2	Localized 1E Power System & Safety	Describes the localized 1E DC power concept to reduce the IDS footprint and the differences from the AP1000 plant 1E DC power supply system (IDS). It will also describe the alternative approach to safety-related MOVs to reduce IDS battery loads.	12-12-2023	01-29-2024 Accession No. ML24029A160
3	I&C Concept of Operations	[ ] a,c,e	[ ] a,c,e	[ ] a,c,e
4	Fuel Handling and Storage	Describes the AP300 SMR plant fuel handling and storage strategy of storing the spent fuel inside Containment instead of in the Auxiliary Building, including a description of the method and strategy for fuel handling for refueling activities.	02-23-2024	March 2024
5	Core Design and Fuel Cycle	Describes the core design and extended fuel cycle design as well as the implications on the operation and maintenance of the AP300 SMR design.	02-02-2024	March 2024
6	NSSS Configuration and Layout	Describes the NSSS configuration and layout for the one-loop design, including passive safety systems. Describes how preliminary PIRTs informed conceptual design decisions and the strategy for scaling evaluations to leverage historical AP600 and AP1000 testing.	02-14-2024	March 2024

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Table 3.4-1: List of White Papers for Pre-Application Engagement				
ID	**Report Topic**	**Planned Purpose**	**Pre-submittal Meeting Date**	**Submittal Date**
Second Wave				

a,c,e

4.0 References

1. **U. S. Nuclear Regulatory Commission.** *FINAL SAFETY EVALUATION FOR WCAP-18482-P/WCAP-18482-NP, REVISION 0, "WESTINGHOUSE ADVANCED DOPED PELLET TECHNOLOGY (ADPOPT™) FUEL".* 2022.

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