Enclosure 3

### Westinghouse AP300 Small Modular Reactor Pre-Application Regulatory Engagement Plan

(Non-Proprietary)

# May 2023

(13 pages including this cover page)

Westinghouse Electric Company 1000 Westinghouse Drive Cranberry Township, PA 16066

© 2023 Westinghouse Electric Company LLC All Rights Reserved

### **Table of Contents**

<u>Section</u>	n <u>Description</u>	<u>Page</u>
ACRON	NYMS AND TRADEMARKS	3
REFER	RENCES	3
1.0	INTRODUCTION	4
1.1	Purpose	4
1.2	Scope	4
1.3	Regulatory Engagement Plan Updates	4
2.0	TECHNOLOGY OVERVIEW	4
2.1	Brief Plant Overview	5
2.2	AP300 SMR Design Features	9
3.0	REGULATORY STRATEGY	
3.1	Application Type	
3.2	Design and Licensing Strategy	
3.3	Interaction Plan	
3.4	White Papers	

### List of Tables

Section	Description	Page
Table 2.1-1: Comparison of some AF	300 SMR properties with AP1000	7
Table 2.2-1: AP300 SMR Design Fea	tures which Differ from AP1000	9
Table 3.4-1: List of White Papers for I	Pre-Application Engagement	13

# List of Figures

Section	Description	Pag	le
Figure 2.1-1: AP300 SMR Conceptual Design		6	
Figure 2.1-2: AP300 SMR Plot Plan		7	
Figure 2.1-3: Overview on AP300 SMR 1-Loop E	Design	8	
Figure 3.2-1: Planned Design Phases and Licens	sing Activities for [	] <sup>a,c,e</sup> 11	

## Acronyms and Trademarks

**AP300, AP600,** and **AP1000**, are a trademarks or registered trademarks of Westinghouse Electric Company LLC, its affiliates and/or its subsidiaries in the United States of America and may be registered in other countries throughout the world. All rights reserved. Unauthorized use is strictly prohibited. Other names may be trademarks of their respective owners.

Acronym	Definition
CFR	Code of Federal Regulations
DC	Design Certification
I&C	Instrumentation & Controls
IRWST	In-Containment Refueling Water Storage Tank
MSHIM	Mechanical Shim
NRC	United States Nuclear Regulatory Commission
REP	Regulatory Engagement Plan
SMR	Small Module Reactor

# References

1. 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," U.S. Nuclear Regulatory Commission.

### 1.0 Introduction

### 1.1 Purpose

This Regulatory Engagement Plan (REP) describes the anticipated pre-application interactions Westinghouse intends to have with the United States Nuclear Regulatory Commission (NRC) to support the future licensing of the AP300 Small Modular Reactor (SMR) based on proven AP1000 design and novel design features. The purpose of this REP will be 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 Westinghouse, with the goal of soliciting NRC feedback on noteworthy topics. 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

This initial issuance of the REP introduces the staff to the technology and conceptual approach to the Westinghouse AP300 SMR, includes an overview of the phased design approach and licensing strategy, and describes the anticipated pre-application engagement activities between Westinghouse and the NRC.

[

J<sup>a,c,e</sup> This includes immediate actions taken by Westinghouse in the development of the technology and required future NRC support. Initial discussions with the NRC will inform preliminary design and licensing decisions. It is important for Westinghouse to notify NRC on a timeline for these pre-application activities such that NRC 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 a formal letter.

### 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 1.3-1.

[

The AP300 SMR conceptual design phase will validate design choices, initiate regulatory engagement, and rapidly advance design documentation based on proven AP1000 plant technology. The key areas of design advancement include:

- 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 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 1.3-1: Demonstrated Approach to Safety

### 2.1 Brief Plant Overview

AP300 SMR will be a 1-loop PWR reactor with 900 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 the section 2.2. The overall plot layout will be similar to AP1000 design.

Figure 2.1-1 and Figure 2.1-2 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 2.1-3 depicts the primary RCS loop equipment.

Figure 2.1-1: AP300 SMR Conceptual Design

### Figure 2.1-2: AP300 SMR Plot Plan

Westinghouse AP300 SMR	Westinghouse AP1000
<b>_</b>	

Figure 2.1-3: Overview on AP300 SMR 1-Loop Design

### 2.2 AP300 SMR Design Features

There are some 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. While one of the goals of the AP300 SMR project is to achieve an optimization of the reactor system without adding first-of-a-kind (FOAK) challenges, these differences envisioned require additional evaluation to ensure the benefits outweigh potential risks and that the same level of safety from the AP1000 design is demonstrated. Additional evaluation of these design choices will be made [ ]<sup>a,c,e</sup> as the conceptual design is finalized.

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		
[ ] <sup>a,c,e</sup>	<ul> <li>Passive safety systems support 72 hour coping time:</li> <li>Onsite systems and equipment to extend the operation to 7 days</li> <li>Hardened connections for connecting offsite equipment</li> <li>Active non-safety-systems provide defense-in-depth functions</li> <li>In-vessel retention of molten core debris</li> <li>Passive Systems Structures and Components (SSCs) are protected within the steel containment vessel which is protected by a robust shield building</li> </ul>		
[	<ul> <li>Robustness to Station Black-Out (SBO) events and use of fail-safe features for loss of offsite power (LOOP) mitigation</li> </ul>		
]a,c,e			
[ ]a,c,e	<ul> <li>I&amp;C is based on proven AP1000 plant platforms:</li> <li>NRC approved Common Q<sup>™</sup> for safety system</li> </ul>		
I	<ul> <li>No safety-related operator actions during initial 72 hour coping time</li> </ul>		

Table 2.2-1: AP300 SMR Design Features which Differ from AP1000			
AP300 SMR Features	Leveraging AP1000 Plant Technology		
[ ] <sup>a,c,e</sup>	<ul> <li>The safety-related cooling and shielding is performed by the water in the pool</li> <li>Same Fuel Handling Functional Requirements</li> </ul>		
1	– Using proven 17x17 RFA Fuel Assembly Technology		
]a,c,e			

# 3.0 Regulatory Strategy

3.1 Application Type

[

]<sup>a,c,e</sup>

### 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. Figure 3.2-1 depicts the design phases and licensing activities planned for [ ]<sup>a,c,e</sup> The elements of this strategy include:

- **Conceptual Design Phase** Validate design choices, initiate regulatory engagement, and rapidly advance design documentation based on proven AP1000 plant technology.
- NRC Pre-Application Engagement Design familiarization through white papers and approval of key topics through topical reports.
- Regulatory White Paper Submittal Submittals to the NRC with the purpose of de-risking future license applications through NRC review, feedback, and buy-in on key topics early through preapplication engagement.
- **Basic Design and Licensing Phase** The basic design and licensing phase is divided into two key phases, the preliminary and intermediate design.
  - **Preliminary Engineering Design** Progression of the design in each area to provide the necessary inputs to the production of the initial revision of the Design Control Document.
  - Intermediate Engineering Design Regulatory engagement to achieve NRC approval of topical reports and ultimately achieve NRC Design Certification.
- Topical Report Preparation Development of Topical Reports to facilitate NRC approval of key regulatory issues.

Figure 3.2-1: Planned Design Phases and Licensing Activities for [

]<sup>a,c,e</sup>

#### 3.3 Interaction Plan

The type and frequency of 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.

<u>Technical discussions and pre-submittal/post-submittal meetings</u> - 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 postsubmittal meetings for each submittal.

### 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.

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. <u>Pre-submittal Meetings</u>: 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. <u>Package Submittal:</u> Westinghouse formally submits the content to the NRC for review. Anticipated Westinghouse submittal timeframe is captured in Table 3.4-1.
- <u>Post-submittal Meetings/Clarification Calls:</u> The NRC provides verbal feedback on the submittal to Westinghouse. Westinghouse receives feedback, asks clarifying questions, and provides any necessary clarification to the NRC.

Table 3.4-1: List of White Papers for Pre-Application Engagement			
Report Topic	Planned Purpose	Planned Initial Submittal Date	
Design Description Overview	Describes the purpose and need for the project / plant and communicates basic plant design, including novel/ FOAK design features and methodologies.	[ ] <sup>a,c,e</sup>	