Virtual NRC Pre-submittal Meeting: eVinci™ Micro-Reactor Wave 2 White Papers

March 29, 2022

Westinghouse

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Purpose & Agenda

Purpose: Provide an overview of the Wave 2 **eVinci** micro-reactor white papers

Agenda

- White Paper Development Plan Review
- Summary of Wave 2 White Papers
- Schedule

White Paper Development Plan Review

#	Topic	Submittal Wave
1	Facility Level Design Description	1 (Submitted)
2	Principal Design Criteria	1 (Submitted)
3	Safety and Accident Analysis Methodologies	1 (Submitted)
4	LMP Implementation	1 (Submitted)
5	Regulatory Analysis	2
6	Deployment Model	2
7	Safeguards Information Plan	2
8	Test and Analysis Process	2
9	Functional Containment and Mechanistic Source Term	2
10	Composite Material Qualification and Testing	2
11	Fuel Qualification and Testing	3
12	Code Qualification	3

#	Topic	Submittal Wave
13	Advanced Logic System®(ALS)-II	3
14	Component Qualification	3
15	Emergency Planning and EPZ Sizing Methodology	3
16	Physical Security	3
17	Heat Pipe Design, Qualification, and Testing	3
18	Nuclear Design Report	3
19	Transportation and Packaging	3
20	Operations and Remote Monitoring	4
21	Phenomena Identification and Ranking Table (PIRT)	4
22	Integral Effects and Transient Testing Report	4
23	Refueling and Decommissioning	4
24	Seismic Methodology	4

Summary of Wave 2 White Papers

Topic 1: Regulatory Analysis

- Purpose:
  - Defines the regulatory framework to be used for the **eVinci** micro-reactor
  - Provides proposed approach to the applicable and not applicable parts of Title 10 of the CFR
  - Provides preliminary list of expected regulatory exemptions
- Request for NRC feedback:
  - Are there any 10 CFR parts or sections that NRC thinks should be identified as applicable to the project that are currently identified as not applicable? If so, which parts or sections?
  - Is the proposed plan to close out some Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) at a manufacturing facility as opposed to at the facility site acceptable? Can NRC identify any issues or concerns that Westinghouse has not addressed in our plan?
  - To support the **eVinci** micro-reactor deployment model, shorter durations for ITAAC closure will be necessary. Does NRC have any concerns with being able to support ITAAC closeouts to meet a proposed 30-day installation period?
  - Does NRC agree with the list of the potential exemptions described in Table 4.0-1? Does NRC anticipate any significant challenges with any of these proposed potential exemptions?

Summary of Wave 2 White Papers

Topic 2: Deployment Model

- Purpose:
  - Describes the overall lifecycle of the **eVinci** micro-reactor, from manufacturing through operations to decommissioning
  - Describes the proposed planned licensing path for each phase of the lifecycle
- Request for NRC feedback:
  - Does NRC identify any concerns with the proposed **eVinci** micro-reactor licensing path?
  - Are there any potentially applicable regulations or licenses that could be required for the proposed deployment model that are not discussed in the white paper?
  - Are there any specific steps in the deployment model that NRC would like to have more detailed discussions about, or information provided on during the pre-application phase?
  - Can NRC provide any insights on approximate timeframes that would be needed to support approvals of the various licenses discussed for the proposed deployment model?
  - An alternative to the proposed deployment model step for assembly in a manufacturing facility is provided in Section 3.0. Can NRC provide feedback on this potential alternative described in Section 3.0?

Summary of Wave 2 White Papers

Topic 3: Safeguards Information Program Strategy

- Purpose:
  - Describes the strategy for protection of SGI specifically required to support the design and licensing of the **eVinci** micro-reactor within the existing, NRC approved, Westinghouse SGI Program
- Request for NRC feedback:
  - Does NRC have any concerns with Westinghouse's approach for the **eVinci** micro-reactor SGI program?
  - NRC asked to provide all relevant SGI related to a typical new reactor program.

Summary of Wave 2 White Papers

Topic 4: Test and Analysis Process for Design and Development

- Purpose:
  - Describes the process being used to develop and validate the design and safety basis
- Request for NRC feedback
  - Has the NRC staff identified any potential gaps between the methodology discussed within the white paper and the test and analyses requirements for a plant licensed through 10 CFR Part 52 and 10 CFR 50.43(e)?

Summary of Wave 2 White Papers

Topic 5: Functional Containment and Mechanistic Source Term

- Purpose:
  - Describes the functional containment and the mechanistic source term methodology
  - Outlines the acceptance criteria for evaluating functional containment performance
- Request for NRC feedback:
  - Is there any information missing from the discussion provided in the white paper?
  - Are any design features not adequately addressed? If so, what?
  - Are the acceptance criteria adequate for evaluating the Functional Containment Performance (Section 5.0) and for applying the Safety Categorization Process as part of the Licensing Modernization Program?

Summary of Wave 2 White Papers

Topic 6: Composite Material Qualification and Testing

- Purpose:
  - Describes the specific Ceramic Matrix Composite (CMC) materials being considered for candidate core components
  - Outlines the qualification and testing strategy for these materials considering the principles of ASME BPVC.III.5.2019 Subpart B
- Request for NRC feedback:
  - Does NRC have any concerns with Westinghouse's qualification plan for CMC materials and components and proposed testing for core support application and the associated environmental conditions?
  - Can NRC comment on material testing, component testing, and analytical methods described in the white paper?
  - Can NRC provide specific comment on the application specific testing temperature intervals proposed given the characteristics of CMC materials and the anticipated design temperature range of the **eVinci** micro-reactor?
  - Can the NRC comment on the combined design by test and analysis approach described in the white paper for large core support components subject to irradiation where a design by test approach is not considered practical since CMC material properties are dependent on component form for which a robust database does not exist?

Schedule

- Submittal to NRC: March 31st
- Request for NRC Feedback: June 30th

Questions