

U.S. NUCLEAR REGULATORY COMMISSION SUMMARY OF THE NOVEMBER 30, 2022,
OBSERVATION PREAPPLICATION PUBLIC MEETING
WITH SMR, LLC (A HOLTEC INTERNATIONAL COMPANY)
TO DISCUSS THE SMR-160 CLOSED SYSTEM ISOLATION VALVES DESIGN

Meeting Summary

The U.S. Nuclear Regulatory Commission (NRC) held a virtual observation public meeting on November 30, 2022, with SMR, LLC (SMR), a Holtec International Company, to have a preapplication discussion on its closed system isolation valves.¹ Specifically, SMR (applicant) requested the meeting to discuss its White Paper on SMR-160 Primary Decay Heat Removal (PDHR) and Secondary Decay Heat Removal (SDHR) containment isolation schemes.^{2,3} The applicant provided presentation slides for the public meeting.⁴

This virtual preapplication meeting had attendees from SMR, LLC, Holtec International, LLC, and a member of the public. There was no closed session to discuss proprietary information.

During the meeting, the applicant and the NRC discussed the following items:

- The applicant provided an overview of the PDHR and SDHR, as described in the meeting materials, with a desired outcome of receiving NRC staff feedback on whether the containment isolation regulations apply to the SMR-160 design.
- In response to the NRC staff's question, the applicant responded that the SMR-160 design does not have containment isolation valves; rather, the SMR-160 design has PDHR isolation valves and SDHR isolation valves.
- The NRC requested additional information on how leakage would be detected regarding leakage from bonnet seals and valve shafts (Slide 11). The applicant responded that the system design has not been finalized but system leakage testing might be done.
- In reference to the figure on Slide 9 of the presentation slides, the applicant clarified that the primary and secondary systems each consist of only one closed loop to provide safety-related decay heat removal from the reactor coolant system, and the opening of the PDHR and SDHR isolation valves actuates these systems.

¹ Letter from J. Hawkins, "SMR, LLC Preapplication Meeting Materials for November 30, 2022 (Project No. 99902049), dated November 1, 2022, Agencywide Documents and Access Management System (ADAMS) Accession No. ML22305A509, part of ML22305A508.

² SMR, LLC, "Enclosure 2: SMR-160 PDHR and SDHR Containment Isolation White Paper Report No. HI-2220845, Rev. O (Redacted)," dated November 1, 2022, ML22305A511, part of ML22305A508.

³ SMR, LLC, "Enclosure 3: SMR-160 PDHR and SDHR Containment Isolation White Paper Report No. HI-2220845, Rev. O," (Proprietary) dated November 1, 2022, ML22305A512, part of ML22305A508.

⁴ SMR, LLC, "Enclosure 1: SMR, LLC, Preapplication Meeting Presentation on Overview of SMR-160 PDHR," dated November 1, 2022, ML22305A511, part of ML22305A508.

- The NRC staff requested whether the applicant has considered leak-before-break (LBB) or break exclusion analysis for the closed loop system and noted that NuScale had applied break exclusion methods in its design. In response to the applicant's request of whether meeting the LBB criteria or break exclusion methods are required, the NRC staff noted that it is not strictly required but is one example for a specific design that has been approved by the staff. The NRC staff noted that an LBB or break exclusion evaluation provides additional assurance of the system's integrity, which is a consideration in determining whether the system should have isolation valves. The NRC staff encouraged additional future interactions on the applicant's approach for justifying that isolation valves are not needed.⁵
- The NRC staff requested additional information on whether the applicant postulated a pipe break outside containment or justified it is not of significant consequences. This concern was prompted by Slide 11, where a General Design Criterion (GDC) 57 containment isolation valve is eliminated based on two justifications: (1) a closed system forming the second containment barrier, and (2) the piping integrity analysis using Standard Review Plan Section 3.6.2 or a leak-tight housing for the section of piping associated with the eliminated containment isolation valve. In the proposed GDC 57 containment isolation valve elimination shown in Slide 9, a postulated pipe break with no significant consequences (e.g., dose consequence, dynamic effects, and PDHR heat removal function, pressurization of annulus) to be provided could be used as an alternative to the second justification above. One way or another, in addition to the closed system, the piping integrity or no significant consequences resulting from the postulated pipe break should be addressed to justify the proposed containment isolation valve elimination.
- The applicant concluded its presentation with a question to the NRC staff on whether its design, as discussed during the meeting, would need an exemption to GDC 57 (Slide 15). The NRC staff responded that based on its understanding of the design, it appears that an exemption to GDC 57 would be needed with sufficient details to justify the insignificant consequences of the configuration presented, i.e., outside containment in the annular reservoir region.
- A member of the public had the following questions of the NRC staff:
 - Is LBB based purely on analysis or is it supported by testing? The NRC staff responded that the LBB analysis is not based only computer models and theoretical data but includes other piping considerations based on years of operating experience. The NRC staff stated it would need to review the basis and get back to the member of the public with a more complete answer.
 - What fuel will be used in this design? The NRC staff responded details on fuel used for this design will be provided with the submission of the construction permit application.

⁵ US NRC, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Chapter 3, "Design of Structures, Components, Equipment, and Systems," Branch Technical Position 3-4, "Postulated Rupture Locations in Fluid System Piping Inside and Outside Containment," Revision 3, ML16085A315.

- The applicant and NRC staff confirmed that a closed session to discuss proprietary information was not needed.

The meeting was adjourned at 2:15 pm.