

**U.S. NUCLEAR REGULATORY COMMISSION SUMMARY OF THE NOVEMBER 8, 2023,**  
**PREAPPLICATION PUBLIC MEETING**  
**WITH SMR, LLC (A HOLTEC INTERNATIONAL COMPANY)**  
**TO DISCUSS THE SMR-160 UPDATE OF ITS SOIL-STRUCTURE INTERACTION**  
**METHODOLOGY**

**Meeting Summary**

The U.S. Nuclear Regulatory Commission (NRC) held an observation public meeting on November 8, 2023, with SMR, LLC (SMR), a Holtec International Company (Holtec), to discuss preapplication information related to the update of its Soil-Structure Interaction Methodology.<sup>1</sup> SMR (Holtec) first discussed its seismic analysis methodology to support the construction permit application of the SMR-160 design at a preapplication public meeting held on September 27, 2022.<sup>2</sup> SMR (Holtec) requested this meeting to discuss and receive NRC staff feedback on its questions related to this topic in its presentation materials and white paper.<sup>3, 4, 5, 6</sup> In preparation for this meeting, the NRC staff provided SMR (Holtec) clarification questions (Enclosure 4), some of which were discussed during the meeting. This meeting summary satisfies the SMR (Holtec) request for review and feedback on its presentation materials.

This hybrid observation preapplication meeting had attendees from SMR (Holtec) and its contractor SC Solutions, NRC staff, and members of the public. The NRC staff, SMR (Holtec), and SC Solutions discussed proprietary information during the closed session.

Preapplication engagements, including this meeting, provide an opportunity for the NRC staff to engage in early discussions with a prospective applicant to offer licensing guidance and to identify potential licensing issues early in the licensing process. No decisions or commitments were made during the preapplication meeting.

The following summarizes the discussion during the open session of the meeting:

- After opening remarks and introductions, SMR (Holtec) described the purpose of the meeting to provide a high-level overview of the soil-structure interaction methodology and discuss preliminary results and future plans. SMR (Holtec) stated its desired

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<sup>1</sup> Letter from A. Brenner, "SMR, LLC Preapplication Meeting Materials for November 8, 2023 (Project No. 99902049)," dated October 28, 2023. (Agencywide Documents and Access Management System (ADAMS) Accession No. ML23301A003, part of ML23301A002).

<sup>2</sup> U.S. NRC, Meeting Summary "Enclosure 3 – 9-27-22 Meeting Summary of the Public Meeting with SMR, LLC, a Holtec International Company, to Discuss Seismic Analysis Methodology," dated October 3, 2022, (ML22263A065, part of ML22259A128).

<sup>3</sup> SMR, LLC, Enclosure 1: "SMR, LLC Meeting Presentation Materials for November 8, 2023 (P)," dated November 8, 2023, (ML23301A004 - Proprietary, part of ML23301A002).

<sup>4</sup> SMR, LLC, Enclosure 2: "SMR, LLC Meeting Presentation Materials for November 8, 2023 (NP)," dated November 8, 2023, (ML23301A005, part of ML23301A002).

<sup>5</sup> SMR, LLC, Enclosure 3: "SSI Analysis Methodology White Paper (P)," dated November 8, 2023, (ML23301A006 - Proprietary, part of ML23301A002).

<sup>6</sup> SMR, LLC, Enclosure 4: "SSI Analysis Methodology White Paper (NP)," dated November 8, 2023, (ML23301A007, part of ML23301A002).

outcomes were to obtain feedback from the NRC staff on the presentation materials and identify any potential risk areas or gaps in the SSI methodology.

- For Slide #10, the NRC staff requested additional information regarding the level of effort being considered for validation and verification of the SMR (Holtec) methodology. SMR (Holtec) responded by referencing Sub-bullet #3 and stating that it intends to show the difference between the results obtained from the LS-DYNA method and the System for Analysis of Soil-Structure Interaction (SASSI) method. The NRC staff responded saying that it expects a comprehensive method of testing for verification purposes. Since SMR (Holtec) is proposing a new methodology, the NRC staff would need to see further testing to have confidence that the method can be more widely applied. SMR (Holtec) concluded by saying that it intends to come up with a representative structure with deep embedment within the soil.
- For Slide # 12, Sub-bullet #2, the NRC staff requested clarification on how the water would be modeled, specifically as it relates to sloshing. SMR (Holtec) stated that the model it plans to use is not capable of simulating sloshing and that sloshing is not important for this analysis. The NRC staff asked for the basis for this assumption in any future submittal on this topic.
- For Slide #12, Sub-bullet #3, the NRC staff wanted to know the composition of the walls. SMR (Holtec) stated that the composition of the walls would be concrete and steel and stated that the term “thick shell elements” implies solid elements used to model walls and slabs. The NRC staff then requested further clarification between what constitutes a thick versus a thin wall. Following the meeting, SMR (Holtec) provided further context to the NRC staff in response to this question.<sup>7</sup>
- On Slide #19, the NRC staff requested clarification regarding the various depictions of basemats, specifically to what extent each basemat spans the building footprint. SMR (Holtec) responded stating that Figure 5 of the white paper would be updated to show the basemat spans appropriately.
- There were no questions or comments from members of the public observing the meeting.

The open session ended at 2:47 pm.

The following summarizes the proprietary discussion of the closed session of the meeting:

- SMR (Holtec) explained its approach to benchmark the hysteretic soil models \*MAT\_079 and \*MAT\_232. The NRC staff asked about site-specific soil properties used in the analysis.

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<sup>7</sup> U.S. NRC Email to SMR, LLC, “1-29-24 - Email to A. Brenner – NRC Staff Question and SMR (Holtec) Response re November 8, 2023, Public Meeting Materials – SMR-160 Update SSI Methodology (99902049),” dated January 29, 2024, (ML24030A471).

- The NRC staff asked if the applicant had any plans to do a 3D site response analysis that will include both the elastic and non-linear materials to verify that site response is being captured appropriately.
- In response to a question from NRC staff, SMR (Holtec) confirmed that the control motion would be located at the very bottom of the soil column which occurs at a depth of –170 feet, not at the bottom of the structural building.
- The NRC staff asked how long it took to run this model. SMR (Holtec) responded that the model would take a single day to compute and that the model contains roughly 100,000 elements using a high-performance computer.
- Based on the discussion, SMR (Holtec) stated its plans to revise and resubmit its white paper with written responses to the initial questions provided by the NRC staff. Additionally, SMR (Holtec) stated that a topical report on its SSI methodology could be expected sometime in 2025.

The meeting was adjourned at 3:33 pm.