U.S. NUCLEAR REGULATORY COMMISSION SUMMARY OF THE OCTOBER 4, 2023, OBSERVATION PREAPPLICATION PUBLIC MEETING WITH SMR, LLC (A HOLTEC INTERNATIONAL COMPANY) TO DISCUSS APPLICABILITY OF THREE MILE ISLAND REQUIREMENTS TO THE SMR-160 DESIGN

Meeting Summary

The U.S. Nuclear Regulatory Commission (NRC) held an observation preapplication public meeting on October 4, 2023, with SMR, LLC (SMR), a Holtec International Company (Holtec), to discuss the applicability of Three Mile Island (TMI) requirements in 10 CFR 50.34(f) to the SMR-160 design.[1,2] SMR (Holtec) requested the meeting to discuss and receive NRC staff feedback on its questions found in its meeting materials.[3] This meeting summary satisfies the SMR (Holtec) request for review and feedback on its preapplication meeting materials.

This virtual observation preapplication meeting had attendees from SMR, LLC, Holtec, NRC staff, and members of the public. Prior to the meeting, SMR (Holtec) confirmed that the discussion will not include any proprietary information; therefore, the NRC staff did not plan on conducting a closed session.

It should be noted that SMR (Holtec) recently informed the NRC staff of its plan to uprate its design to 300 MWe and stated that much of the anticipated discussion on this applicability of TMI requirements should still be applicable; however, the NRC staff recognizes that SMR (Holtec) should confirm the applicability of the feedback and discussion from this meeting after it completes the uprated design changes.

The following summarizes the discussion during the meeting:

- After welcoming remarks and introductions, SMR (Holtec) described the purpose of the meeting to seek NRC staff feedback on the information it proposes to include in a TMI requirements table in Chapter 1 of the preliminary safety analysis report (PSAR) included in its construction permit application. SMR (Holtec) noted that it did not plan to provide details in the table; rather, the table would include a brief discussion of whether the SMR (Holtec) design conforms to the TMI requirements and refer to other parts of the PSAR containing details on how the design conforms to the TMI requirements, if applicable. In response to the SMR (Holtec) question, the NRC staff noted that providing a reference for each TMI requirement would support a more efficient NRC staff review.

- With respect to the TMI requirement in 10 CFR 50.34(f)(1)(i) described on Slide 6, the NRC staff noted that the requirement is more than completing a probabilistic risk

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1 Letter from A. Brenner, "SMR, LLC, Preapplication Meeting Materials for October 4, 2023," dated September 22, 2023, Agencywide Documents and Access Management System (ADAMS) Accession No. ML23265A216, part of ML23265A215.

2 Title 10 of the *Code of Federal Regulations* (10 CFR) 50.34(f), "Additional TMI-related requirements."

3 SMR, LLC, "Holtec SMR, LLC, TMI Requirements," dated October 4, 2023, ML23265A217, part of ML23265A215.

assessment (PRA); i.e., the requirement is to use PRA to improve the design through cost beneficial safety enhancements. SMR (Holtec) noted that it has been taking advantage of the PRA findings throughout the development of its design and making improvements in the design.

- SMR (Holtec) noted on Slide 7 that its design does not have an auxiliary feedwater system; however, the design has a similar system for decay heat removal. Nonetheless, SMR (Holtec) concluded that it does not intend to further address this requirement because it is not applicable to the SMR (Holtec) design.

- The NRC staff noted that there are several slides in the presentation that state that the SMR (Holtec) design does not have the systems referred to in the TMI requirement but have systems with similar functions. The NRC staff encouraged SMR (Holtec) to consider addressing how the systems with similar functions address the TMI requirement. The NRC staff elaborated that it is not in the position to say a TMI requirement is not applicable to a design and that an applicant could take the literal requirement and conclude that it does not apply to its design or take a different approach by considering the intent of the regulation and how it applies to its design. SMR (Holtec) noted that it is difficult to determine the intent of the requirement. In its review of other design applications, SMR (Holtec) noted that the applicants have stated that a TMI requirement is not applicable even if the intent of the requirement could be applicable. The NRC staff noted a response to a requirement could provide information to demonstrate conformance, justify conformance or discuss why the requirement is not applicable. An applicant determining that a requirement is not applicable would need to provide a justification against the basis of the requirement which, in this case, is the need for decay heat removal. The NRC staff also noted that other designs have a system called emergency feedwater which meets the intent of the auxiliary feedwater system requirement and still address it. In response to the NRC staff's suggestion to review recent applications, SMR (Holtec) stated that it had reviewed the NuScale design certification application and that SMR (Holtec) is responding in a consistent manner.

- With respect to the TMI requirement for an evaluation of reactor coolant pump seal damage after a loss-of-coolant accident (LOCA) described on Slide 8, SMR (Holtec) indicated that it is still finalizing the design and may not be seal-less. If the final design results in a seal-less design, SMR (Holtec) stated that it would consider this requirement to not be applicable or pursue an exemption from this requirement. The NRC staff noted that if the design has no seal and an evaluation determined that there is no damage, then the intent of the requirement is met. SMR (Holtec) responded that it could indicate that it conforms with the regulation because an evaluation would have been completed or determine that the requirement is not applicable.

- SMR (Holtec) stated that it does not plan to evaluate a stuck-open power-operated relief valve (PORV) because these valves are not included in the design (related to information on Slide 9). In response to the NRC staff's question, SMR (Holtec) indicated that it has evaluated a stuck-open safety valve as an initiating event. Since some analysis has been completed, the NRC staff suggested that the evaluation may be one way to address this TMI requirement. SMR (Holtec) noted that previous applications stated that that power-operated relief valves are not used and therefore, the TMI requirement is not applicable. The NRC staff noted that NUREG-0578 may provide

additional context for the requirements.[4] NUREG-0578 describes the possibility of both steam and water flow through these valves. SMR (Holtec) responded that only single-phase steam will be passing through the pressurizer safety valves in its design. The NRC noted that the regulations require an analysis of the probability of a small break LOCA caused by a stuck-open PORV and not an analysis of the design.

- SMR (Holtec) provided details regarding the requirement for the automatic depressurization system (ADS) and how its design has a similar system but plans to note that the requirement is not applicable to its design. The NRC staff suggested that the AP1000 design certification application may provide additional insights on how this requirement might be addressed.

- SMR (Holtec) noted on Slide 12 that its simulator capability conforms with the requirements of the regulation. The NRC staff noted that this requirement is within the scope of the 10 CFR Parts 50 and 52 alignment rulemaking and noted as duplicative to 10 CFR 55.59. Therefore, an applicant who meets the simulator requirements in 10 CFR Part 55 has addressed this TMI requirement.

- With respect to conforming with the high point venting requirements, the NRC staff asked a question concerning the capability in the SMR (Holtec) redesign and would it include ADS removal of noncondensables. SMR (Holtec) responded that the main noncondensables are from the accumulators during a LOCA and is not anticipated to change with the uprated design. In response to the question on whether the design conforms with the requirement, the NRC responded that the effectiveness of the proposed approach remains to be seen. No information was discussed during the meeting concerning specific high points in the reactor coolant system at which accumulation or venting of noncondensable gases could occur.

- As described on Slide 19, SMR (Holtec) noted that it is considering an exemption from the post-accident sampling requirement. The NRC staff requested confirmation that there was no capability in the SMR (Holtec) design to sample the reactor coolant system. SMR (Holtec) responded that sampling capability is available during normal operations but there are other effective means in assessing core damage. The NRC staff noted that the use of instrumentation to take measurements could be done without the need for an exemption and still retain capability to draw a sample. SMR (Holtec) noted that this requirement had been discussed extensively with an owners' group that resulted in the NRC agreeing that the post-accident sampling system is not the best way to make decisions.

- In its discussion of hydrogen control requirements described on Slide 20, SMR (Holtec) requested how much detail is expected for the discussion and on the discussion of alternatives. The NRC staff suggested that SMR (Holtec) consider looking at past submittals of passive advanced light-water reactor applications with passive autocatalytic recombiners and hydrogen igniters as templates.

- With respect to relief and safety valve testing described on Slide 21, SMR (Holtec) noted that it is pursuing an exemption for other anticipated transient without scram conditions and asked whether an exemption is needed for this requirement because of the related

[4] U.S. NRC, NUREG-0578, "TMI-2 Lessons Learned," July 1979, ML090060030.

exemption. The NRC staff did not provide a response since the details of the exemption are not under review.

- SMR (Holtec) noted that its plans for pursuing an exemption from the pressurizer heaters requirement described on Slide 24 is under further considering due to the design updates. The NRC staff suggested that, in principle, SMR (Holtec) might justify it conforms with the requirement if there is no emergency power. However, confirmation would be necessary that design changes would not affect conclusions concerning the capability to maintain natural circulation without reliance upon pressurizer heaters.

- The NRC staff requested more information on the justification for the exemption described on Slide 27 regarding the inclusion of instruments for sampling hydrogen in containment atmosphere. SMR (Holtec) responded that details will be provided should the exemption be pursued. In response to a question from the NRC staff, SMR (Holtec) responded that it plans additional preapplication engagements to discuss its exemptions.

- The NRC staff requested clarification on the Class 1E DC distribution system and whether the design does not require Class 1E power. SMR (Holtec) responded that the design includes Class 1E batteries to provide power in the event of system actuation or loss of all other power sources, and a one-time valve actuation to maintain long term cooling which may be similar to the AP1000 design.

- SMR (Holtec) requested clarification on the intent of the containment penetration requirement described on Slide 38. The NRC staff responded by describing the approach taken for the AP1000 design, i.e., the AP1000 design complied with the requirement without exemption and having penetrations equivalent in size. The NRC staff further noted that the intent is to preclude the need for future penetrations because the existing penetrations can be used.

- For several requirements described in the remaining slides, the regulations include an applicability statement for a specific reactor design. SMR (Holtec) noted that it is evaluating whether the intent of the relief valves is similar to the accumulators in the SMR (Holtec) design. SMR (Holtec) requested clarification on whether the NRC staff would be looking for a discussion on this potential applicability since a review of recent applications did not provide specific discussions. The NRC staff noted that these items may have been based on a particular design and would need to look more closely at the available information. In response to an SMR (Holtec) question, the NRC staff responded that it would try to get additional information included in the meeting summary. SMR (Holtec) noted that it looks forward to additional future engagements to understand the intent of the regulations if needed.

- The NRC staff noted that the boiling-water reactor specific requirements may have been singled out because other designs had incorporated these requirements.

- There were no questions or comments from members of the public observing the meeting.

- There was no closed session to discuss proprietary information.

The meeting adjourned at 2:51 PM.

After the meeting, the NRC staff provided the following information in response to the fifth bullet on Page 4 of this summary:

- Concerning the anticipatory reactor trip in response to a loss of main feedwater or turbine trip on Slide 51, the NRC staff reviewed the discussion in NUREG-0560 and confirmed that the requirement was specific to Babcock and Wilcox pressurized-water reactors because, based on the design configuration at that time, such reactors were found to experience elevated potential for the lifting primary relief valves during secondary-side transients.[5] Westinghouse and Combustion Engineering pressurized-water reactors were found not to experience the same challenge because these designs have larger secondary-side inventories and typically already incorporated anticipatory reactor trips. Therefore, the NRC staff found the intent of this post-TMI requirement associated with an anticipatory reactor trip for secondary-side transients to be that primary relief valves are not unnecessarily challenged by such transients.

[5] U.S. NRC, NUREG-0560, "Staff Report on The Generic Assessment of Feedwater Transients in PWRs Designed by B&W (Generic Letter 79-22)."