

**U.S. NUCLEAR REGULATORY COMMISSION SUMMARY OF THE JUNE 7, 2023,
OBSERVATION PREAPPLICATION PUBLIC MEETING WITH SMR, LLC (A HOLTEC
INTERNATIONAL COMPANY) TO DISCUSS THE SMR-160 ANTICIPATED TRANSIENT
WITHOUT SCRAM**

Meeting Summary

The U.S. Nuclear Regulatory Commission (NRC) held an observation public meeting on June 7, 2023, with SMR, LLC (SMR), a Holtec International Company (Holtec), to discuss preapplication information related to the SMR-160 design.¹ Specifically, SMR (Holtec) requested the meeting to provide a high-level overview of the SMR anticipated transient without scram (ATWS) methodology as it relates to Title 10 of the *Code of Federal Regulation* (10 CFR) 50.62, "Requirements for reduction of risk from anticipated transient without scram (ATWS) events for light-water-cooled nuclear power plants," and obtain NRC feedback. SMR (Holtec) provided proprietary and non-proprietary slides for this public meeting.^{2, 3} This meeting summary satisfies the SMR (Holtec) request for review and feedback on its preapplication meeting materials.

The following summarizes the discussion during the meeting:

SMR (Holtec) provided a high-level overview of the SMR-160 response to an ATWS event and discussed its diverse actuation system.

SMR (Holtec) stated that its design would meet the intent of the requirements of 10 CFR 50.62, specifically paragraph (c), which states that "Each pressurized water reactor must have equipment from sensor output to final actuation device, that is diverse from the reactor trip system, to automatically initiate the auxiliary (or emergency) feedwater system and initiate a turbine trip under conditions indicative of an ATWS. This equipment must be designed to perform its function in a reliable manner and be independent (from sensor output to the final actuation device) from the existing reactor trip system."

SMR (Holtec) noted that SECY-83-293, "Amendments to 10 CFR 50 Related to Anticipated Transients Without Scram (ATWS) Events, July 19, 1983," establishes a safety goal for the expected core damage frequency (CDF) of an unmitigated ATWS to be no more than 1.0E-5/reactor year. Also, Standard Review Plan (SRP) 15.8, "Anticipated Transients Without Scram" (ML070570008), in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," states that the acceptance criteria for evolutionary designs is either: 1) provide a diverse scram system or, 2) demonstrate the consequences of an ATWS are acceptable. Regarding the two options, SMR (Holtec) stated that because it plans on demonstrating the intent of 10 CFR 50.62 is satisfied by meeting the safety goal underlying the rule, neither criterion in SRP 15.8 will be met.

NRC staff noted that the criteria provided in SRP 15.8 is established Commission policy for new reactors and not meeting either criteria would be a deviation from Commission policy. NRC staff encouraged SMR (Holtec) to review SECY 90-16 (ML010170143), "Evolutionary Light Water Reactor (LWR) Certification Issues" and its associated Staff Requirements Memorandum (SRM). Specifically, SRM-SECY-90-016, dated June 26, 1990 (ML051800192), approved the position that evolutionary LWRs include a diverse scram system, and the Commission added "if the applicant can demonstrate that the consequences of an ATWS are acceptable, the staff should accept the demonstration as an alternative to the diverse scram system." NRC staff also encouraged SMR

(Holtec) to consider how a previously licensed small modular reactor design satisfied Commission policy and associated SRP criteria.

SMR stated that, while an ATWS associated with the loss of normal feedwater (LOFW) flow initiating event is assumed to be bounding, all anticipated operational occurrences (AOOs) will be evaluated in combination with a failure to scram. NRC staff commented that even though SMR (Holtec) considers an ATWS a beyond design basis event (BDBE), if the SRM-160 design does not include a diverse scram system, a thermal hydraulic analysis will need to be performed that demonstrates acceptable mitigation of the event. SMR (Holtec) indicated that it has done conservative, preliminary analyses, and the resultant system pressure after the event indicates that the relief valves could lift. SMR (Holtec) stated that these initial calculations included substantially conservative input values for the moderator temperature coefficient. SMR (Holtec) expressed confidence that for more realistic calculations, to be done later, the relief valves will not lift. NRC staff clarified that because an ATWS is categorized as a BDBE it is reasonable to use realistic and best-estimate assumptions and parameters, and the use design-basis conservatism to account for uncertainties is not necessary.

SMR (Holtec) indicated that it will be requesting an exemption from 10 CFR 50.62(c)(1) regarding a diverse means to automatically initiate the auxiliary feedwater system and initiate a turbine trip under conditions indicative of an ATWS. NRC staff stated the approach for an exemption to 10 CFR 50.62(c)(1) seemed reasonable if the SMR-160 does not have an auxiliary feedwater system and does not rely on a turbine trip to demonstrate acceptable performance during an ATWS. This approach appears generally consistent with a previously approved small modular reactor design.

SMR (Holtec) discussed the probability of an AOO and ATWS in relation to other design basis events. SMR (Holtec) also discussed preliminary calculation results regarding how the core damage frequency resulting from these events compares to the SECY-83-293 safety goal without accounting for a diverse scram system. The NRC staff reiterated the Commission policy for new reactors to provide a diverse scram system or analyze the consequences of an ATWS. Given the criteria for acceptable consequences from an ATWS (specified in Section II.3.C of SRP 15.8) is different from the criteria used in probabilistic risk assessments (PRAs) for generic BDBEs, using a PRA-based determination for design or analysis considerations of an ATWS would not adequately satisfy ATWS criteria.

- 1 Letter from J. Hawkins, "SMR, LLC Preapplication Meeting Materials for June 7, 2023," dated May 25, 2023, Agencywide Documents and Access Management System (ADAMS) Accession No. ML23145A024, part of ML23145A023.
- 2 "SMR, LLC Meeting Presentation Materials for June 7, 2023 (P)," dated June 6, 2023, ML23145A025 (Proprietary), part of ML23145A023.
- 3 "SMR, LLC Meeting Presentation Materials for June 7, 2023 (NP)," dated June 6, 2023, ML23145A026 (Public), part of ML23145A023.