U.S. NUCLEAR REGULATORY COMMISSION SUMMARY OF THE APRIL 19, 2023, OBSERVATION PREAPPLICATION PUBLIC MEETING WITH SMR, LLC (A HOLTEC INTERNATIONAL COMPANY) TO DISCUSS THE SMR 160 OPERATIONAL PROGRAMS

Meeting Summary

The U.S. Nuclear Regulatory Commission (NRC) held an observation public meeting on April 19, 2023, with SMR, LLC (SMR), a Holtec International Company (Holtec), to discuss preapplication information related to the operational programs for the SMR-160 design. SMR (Holtec) provided presentation slides and an operational programs matrix to discuss during the public meeting. 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, (Holtec), NRC staff, and members of the public. There was no closed session to discuss proprietary information. The open session was extended due to the number of operational programs discussed.

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 meeting:

- SMR (Holtec) opened its presentation with an overview of the agenda and described the
 purpose of the meeting as providing its understanding of the operational programs
 required for the SMR-160 design. The desired outcome of the meeting was to obtain
 NRC staff feedback and gain alignment on the technical content threshold and
 implementation milestones of various operational programs for a future construction
 permit application.
- SMR (Holtec) described how it reviewed Standard Review Plan (SRP) Section 13.4, the design certification application for the NuScale design, and the Vogtle combined license application to determine the applicable operational programs to its design and the

Letter from J. Hawkins, "SMR, LLC Preapplication Meeting Materials for April 19, 2023 (Project No. 99902049)," dated April 17, 2023, Agencywide Documents and Access Management System (ADAMS) Accession No. ML,23107A002 part of ML23107A001.

SMR, LLC, "Enclosure 1: SMR, LLC Meeting Presentation Materials for April 19, 2023," dated April 17, 2023, ML23107A003, part of ML23107A001.

SMR, LLC, "Enclosure 2: SMR, LLC Meeting Operational Programs Matrix for April 19, 2023," dated April 17, 2023, ML23107A004, part of ML23107A001.

threshold of information in the preliminary safety analysis report (PSAR) accompanying a future construction permit application.^{4, 5, 6}

 Before going through each operational program, SMR (Holtec) noted that the column containing "implementation milestones," describes when the specific program will be in place or completed and does not correspond to when information about the program will be provided. SMR (Holtec) confirmed that, unless otherwise noted, the PSAR will have information on the program and the full program description will be detailed in the final safety analysis report (FSAR) accompanying the operating license application.

The following summarizes the staff's feedback on each operational program described on Slides 5 -28:

- Inservice Inspection Program:
 - The NRC staff noted that the Inservice Inspection Program should specify the components in scope and the applicable section and edition of the ASME Boiler and Pressure Vessel Code.
 - The application should include a commitment that the components will be inspected with the specified inspection techniques and designed to be inspected consistent with the applicable requirements of the ASME Code as incorporated by reference in 10 CFR 50.55a.8
- Preservice Inspection Program:
 - The NRC staff noted that requirements for the Inservice Inspection Program as discussed above apply to the preservice inspection program.
 - Because the preservice inspection is related to aspects addressed during construction, the NRC staff anticipates that details related to preservice inspection will be provided in the PSAR or a commitment to provide such details with sufficient time for NRC review and the implementation of the program prior to component installation.
 - The NRC staff commented that although a more detailed preservice inspection program provided earlier in the construction permit application supports the overall licensing process and associated risks; the full preservice inspection

U.S. NRC, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Section 13.4, "Operational Programs," draft Revision 4, September 2018. https://www.nrc.gov/docs/ML1813/ML18131A304.pdf

NuScale Design Certification Application. https://www.nrc.gov/reactors/new-reactors/smr/licensing-activities/nuscale/documents.html

Vogtle Combined License Application. https://www.nrc.gov/reactors/new-reactors/large-lwr/col/vogtle.html

⁷ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPV), Section XI, "Inservice Inspection of Nuclear Power Plant Components." https://www.asme.org/codes-standards/bpvc-standards

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, "Codes and standards." https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0055a.html

- program is not needed in the PSAR. The preservice program should address how inspection results will be dispositioned during the construction phase.
- The NRC staff requested clarification on whether the implementation milestone included completion of the inspection prior to initial plant startup to meet preservice testing requirements. The NRC staff noted that preservice inspection covers inspections after the component is built and prior to installation. SMR (Holtec) responded that it planned to schedule a future clarification call on this topic.

Inservice Testing Program

- The NRC staff referenced the guidance in Regulatory Guide (RG) 1.70, Revision 3, for the information to include in a PSAR for this operational program, in particular Section 3.9.3.2, "Pump and Valve Operability Assurance," and Section 3.9.6, "Inservice Testing of Pumps and Valves." 9
- The NRC staff noted that 10 CFR 50.43(e) would apply for new reactor operating licenses related to design features not experienced in the current fleet of nuclear power plants, and that information on the design feature and the process for demonstrating it would be needed in the PSAR.¹⁰
- The NRC staff referenced recent lessons learned on the need to understand the schedules to complete the qualification of pumps and valves to support the evaluation of inservice testing results.
- The NRC staff anticipates that newer plants will use QME-1 which provides for qualification and demonstration while components that fall within RTNSS would be addressed in terms of capabilities to perform the intended functions.^{11, 12}
- In response to a question from SMR (Holtec) on the applicability of 10 CFR 50.43(e) for a construction permit application, the NRC staff noted that while the regulation is applicable to an operating license application 10 CFR 50.35 also includes a requirement to identify additional research and testing of safety features or components.¹³ Accordingly, the PSAR should include a discussion of the plans to develop a research program with additional testing of

10 CFR 50.43, "Additional standards and provisions affecting class 103 licenses and certifications for commercial power." https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0043.html

U.S. NRC, Regulatory Guide, 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," Revision 3, November 1978. https://www.nrc.gov/docs/ML0113/ML011340122.html

ASME Standard for Qualification of Mechanical Equipment, QME-1, "Qualification of Active Mechanical Equipment Used in Nuclear Facilities." https://www.asme.org/codes-standards/find-codes-standards/qme-1-qualification-active-mechanical-equipment-used-nuclear-facilities/2023/drm-enabled-pdf

Regulatory Treatment of Non-Safety Systems (RTNSS) discussed in SECY-94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs," dated March 28, 1994. https://www.nrc.gov/docs/ML0037/ML003708068.pdf

¹⁰ CFR 50.35, "Issuance of Construction Permits." https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0035.html

any new design features. The NRC staff stated that it is open to additional preapplication engagements as the SMR-160 design matures and to discuss testing plans.

Preservice Testing Program

o The NRC staff noted that the discussion for the Inservice Testing Program applies to this operational program.

Motor Operated Valve Testing

- The NRC staff referenced the lessons learned summarized in the NRC Generic Letter (GL) 89-10, for valves not adequately qualified at the outset.¹⁴
- The NRC staff noted that the qualification of these valves to QME-1 or an alternative should be addressed in the PSAR.¹¹
- The NRC staff emphasized that the initial qualification of the valves is critical to performing the inservice testing.

Initial Test Program

- The NRC staff noted that the information in RG 1.70, Revision 3, for the initial test program is in Section 14.1, "Specific Information to be included in Preliminary Safety Analysis Reports.9
- The following subsections in RG 1.70, Revision 3, provide details for the initial test program in the PSAR:
 - Section 14.1.1 describes the scope of the initial test program.
 - Section 14.1.2 describes the information for a first-of-a-kind feature.
 - In addition to RG 1.68 referenced in Section 14.1.3, RG 1.118 and RG 1.40 would also be applicable. 15, 16, 17
 - Section 14.1.4 describes the information related to plant operating experience.

U.S. Nuclear Regulatory Commission, Generic Letter (GL), GL 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," Revision S7, dated January 24, 1996. https://www.nrc.gov/reading-rm/doc-collections/gen-comm/gen-letters/1989/gl89010s7.html

U.S. NRC, Regulatory Guide 1.68, "Initial Test Programs for Water-Cooled Nuclear Power Plants," Revision 4, June 2013. https://www.nrc.gov/docs/ML1305/ML13051A027.pdf

U.S. NRC, Regulatory Guide 1.118, "Periodic Testing of Electric Power and Protection Systems," Revision 3, April 1995. https://www.nrc.gov/docs/ML0037/ML003739468.pdf

U.S. NRC, Regulatory Guide 1.40, "Qualification of Continuous Duty Safety-Related Motors for Nuclear Power Plants," Revision 1, February 2010. https://www.nrc.gov/docs/ML0930/ML093080087.pdf

- Section 14.1.5 describes the information related to the initial test program schedule.
- Section 14.1.6 describes the information related to plant operating procedures.
- Section 14.1.7 describes the information related to augmenting staff during the test program.
- The NRC staff noted it is open to further discussing the details and schedule of the initial test program at an appropriate time.
- o In response to a question from SMR (Holtec), the NRC staff noted that information in SRP Section 14.2 might not detail the different information provided in the PSAR versus the FSAR because the information in this SRP section focuses on the 10 CFR Part 52 licensing process. ^{18, 19} The NRC staff encouraged SMR (Holtec) to consider the information in RG 1.70, Revision 3, and SRP Section 14.2 and follow-up with the program owner to determine what would be appropriate for the license application.

• Environmental Qualification Program

 Although this program is primarily focused on electrical equipment, the NRC staff noted that there is a mechanical aspect and information related to both technical areas for this program is provided in RG 1.70, Revision 3.

Reactor Vessel Material Surveillance Program

- The NRC staff noted that during the construction permit phase, the surveillance program should contain an adequate amount of the appropriate reactor vessel material specimens to satisfy regulations of 10 CFR Part 50, Appendix H.²⁰
- The NRC staff referenced 10 CFR Part 50, Appendix H, and ASTM E185 to address the aspects of the surveillance program.²¹
- The NRC staff noted that the Slide 12 refers to ASTM E-185-2021 which is a more recent standard than that referred to in 10 CFR Part 50, Appendix H, and that the PSAR should address how the program using the more recent standard will satisfy the regulation.

U.S. NRC, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Section 14.2, "Initial Plant Test Program - Design Certification and New License Applicants" Revision 3, March 2007. https://www.nrc.gov/docs/ML0705/ML070550027.pdf

^{19 10} CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." https://www.nrc.gov/reading-rm/doc-collections/cfr/part052/full-text.html

²⁰ 10 CFR Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements.," https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-apph.html

American Society for Testing and Materials (ASTM), ASTM E-185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels."

Containment Leakage Rate Testing Program

 The NRC staff referenced 10 CFR Part 50, Appendix J, and noted that the selection of an option would determine the implementing document to meet the regulations.²² For example, if the construction permit applicant chooses Option B in the regulations, consideration should be given to RG 1.163 and NEI 94-01.^{23, 24}

Fire Protection Program

- The NRC staff noted the importance of how the construction permit application defines the parts of the fire protection program for evaluating each milestone phase.
- The NRC plans to issue fire protection guidance for non-light water reactors in the near term that is consistent with feedback provided regarding this program and the existing guidance in RG 1.189.²⁵
- The NRC staff encouraged the inclusion of as much information on the Fire Protection Program in the PSAR. Identification of all safe shutdown equipment is not needed in the PSAR; however, the identification of the safe shutdown state and identification of the source of functions to mitigate an accident would result in a more efficient review of the construction permit application.
- Process and Effluent Monitoring and Sampling Program
 - In response to the NRC staff's question, SMR (Holtec) confirmed that monitoring will be discussed in the PSAR.
 - Although applicable to an application submitted under 10 CFR Part 52, the NRC staff referenced NEI 07-09A and NEI 07-10A which provide insights on an acceptable program.^{26, 27}
 - The NRC staff noted that it is available for discussion of effluent releases and doses that are part of the environmental review of a construction permit application.
- Radiation Protection Program (including ALARA principle)

²² 10 CFR Part 50, Appendix, J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-appj.html

²³ 10 CFR Part 50, Appendix J, Option B, "Performance Based Requirements."

U.S. NRC, Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," Revision 0, September 1995. https://www.nrc.gov/docs/ML0037/ML003740058.pdf

U.S. NRC, Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants," Revision 2, October 2009, ML092580550.

NEI 07-09A, "Generic FSAR Template Guidance for Offsite Dose Calculation Manual (ODCM) Program Description." https://nei.org/home

NEI 07-10A, "Guidance for Process Control Program (PCP)." https://nei.org/home

- The NRC staff commented that the information in a PSAR should focus on the radiation protection and minimization of contamination design features including major sources of radiation and shielding. A high-level description of the radiation protection and ALARA program and minimization of contamination programs should be provided in the PSAR and the FSAR accompanying the operating license should include the full programs.
- Although applicable to an application submitted under 10 CFR Part 52, the NRC staff referenced NEI 07-03A, NEI 07-08A, and NEI 08-08A which provide insights on an acceptable radiation protection and ALARA program and minimization of contamination program, including relevant NRC RGs.^{28, 29, 30}
- With respect to 10 CFR Part 37, the NRC staff encouraged early development of a security plan for Categories 1 and 2 of radioactive material but is not required to accompany a construction permit application.³¹
- Non-Licensed Plant Staff Training Program
 - The NRC staff noted that the PSAR should consider the information in SRP Section 13.2.2 and include commitments to RG 1.8 and RG 1.149, or equivalent alternatives.^{32, 33, 34}
 - With respect to cold plant licensing, the NRC staff referenced NEI 06-13A for an applicant to consider.³⁵
 - The NRC staff noted that, while training program accreditation by the Institute of Nuclear Power Operations (INPO) is not mandatory, INPO accreditation of facility training programs serves as an acceptable means of meeting certain requirements for implementing Systems Approach to Training-based training programs.³⁶

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NEI 07-03A, "Generic FSAR Template Guidance for Radiation Protection Program Description." https://nei.org/home

NEI 07-08A, "Generic FSAR Template Guidance for Ensuring that Occupational Radiation Exposures are as Low as Reasonably Achievable (ALARA)." https://nei.org/home

NEI 08-08A, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination." https://nei.org/home

³¹ 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material." https://www.nrc.gov/reading-rm/doc-collections/cfr/part037/full-text.html

U.S. NRC, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Section 13.2.2., "Non-Licensed Plant Staff Training," Revision 4, August 2016. https://www.nrc.gov/docs/ML1500/ML15006A129.pdf

U.S. Nuclear Regulatory Commission, Regulatory Guide 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," Revision 4, June 2019. https://www.nrc.gov/docs/ML1910/ML19101A395.pdf

U.S. Nuclear Regulatory Commission, Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training, License Examinations, and Applicant Experience Requirements," Revision 4, April 2011. https://www.nrc.gov/docs/ML1104/ML110420119.pdf

³⁵ NEI 06-13A, "Template for an Industry Training Program Description." https://nei.org/home

Institute of Nuclear Power Operations (INPO). https://inpo.info/

 If an applicant chooses not to pursue INPO accreditation and instead decides to pursue an alternative, the NRC staff encouraged early engagement and coordination to support the requisite NRC staff review.

Reactor Operator Training Program

 The NRC staff noted that the earlier comments on the non-licensed plant staff training program generally apply to this program as well.

• Reactor Operator Requalification Program

 The NRC staff noted that the earlier comments on the non-licensed plant staff training program generally apply to this program as well.

Emergency Planning

- The NRC staff referenced NUREG-0696 for design considerations of facilities and systems to improve responses to emergency situations.³⁷
- In response to an SMR (Holtec) question, the NRC staff noted that review of staffing is site-specific and will be reviewed once a site is selected and the information is available.

Security Programs

- In response to the NRC staff's question, SMR (Holtec) stated that it plans to meet the criteria in SRP Section 13.6.3, and the full details of the operational program would not be available in the PSAR.³⁸
- The NRC staff noted that a construction permit applicant should consider the site characteristics for the plant and whether those characteristics are such that adequate security plans and measures can be developed. The NRC staff recommended that an applicant review the guidance in RGs 5.69, 5.76, 5.75, 5.54, and 5.44 to understand the types of physical protection program features and measures that will eventually need to developed, so that it will be well-positioned to consider the site characteristics that are outlined in Table 1 of SRP Section 13.6.3 and explain any characteristics that may pose challenges and

U.S. Nuclear Regulatory Commission, NUREG-00696, "Functional Criteria for Emergency Response Facilities." https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0696/index.html

U.S. NRC, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Section 13.6.3, "Physical Security - Operational Program - Early Site Permits and Reactor Siting Criteria," Revision 2, October 2016. https://www.nrc.gov/docs/ML1506/ML15061A471.pdf

- potentially require special considerations in the design of a physical protection system.^{39, 40, 41, 42, 43}
- With respect to Fitness for Duty, the NRC staff referred to SRP Section 13.7.2 that contains details for the PSAR and FSAR and includes guidance to confirm physical security meets 10 CFR Part 73 requirements.^{44, 45}
- Physical Security Program (Category 1 and 2 Quantities of Radioactive Materials)
 - The NRC staff referred to NUREG-2155 and NUREG-7166 to meet the requirements of 10 CFR Part 37.^{46, 47}
 - The NRC staff noted that the security measures to meet 10 CFR Part 73 may cover the requirements in 10 CFR Part 37.
 - SMR (Holtec) noted that it plans to have a preapplication meeting with the NRC staff in October 2023 regarding security for the SMR-160 design.
- Quality Assurance Program
 - In response to the NRC staff's question, SMR (Holtec) confirmed that it has plans to submit its quality assurance program description prior to submission of its construction permit application.

U.S. Nuclear Regulatory Commission, Regulatory Guide 5.69, "Guidance for the Application of Radiological Sabotage Design-Basis Threat in the Design, Development and Implementation of a Physical Security Program that Meets 10 CFR 73.55 Requirements (SGI)," Revision 1, March 2022. https://www.nrc.gov/docs/ML1315/ML13151A355.pdf

⁴⁰ U.S. Nuclear Regulatory Commission, Regulatory Guide 5.76, "Physical Protection Programs at Nuclear Power Reactors (SGI)," Revision 1, November 2020. https://www.nrc.gov/docs/ML1315/ML13151A355.pdf

U.S. Nuclear Regulatory Commission, Regulatory Guide 5.75, "Training and Qualification of Security Personnel at Nuclear Power Reactor Facilities," Revision 1, March 2021. https://www.nrc.gov/docs/ML1711/ML17111A699.pdf

⁴² U.S. Nuclear Regulatory Commission, Regulatory Guide 5.54, "Standard Format and Content of Safeguards Contingency Plans for Nuclear Power Plants (SGI)," Revision 1, June 2009. https://www.nrc.gov/docs/ML1315/ML13151A355.pdf

U.S. Nuclear Regulatory Commission, Regulatory Guide 5.44, "Perimeter Intrusion Alarm Systems," Revision 3, October 1997. https://www.nrc.gov/docs/ML0037/ML003739217.pdf

U.S. NRC, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Section 13.7.2, "Fitness for Duty - Construction," Revision 0, October 2016. https://www.nrc.gov/docs/ML1511/ML15111A034.pdf

45 10 CFR Part 73, "Physical Protection of Plants and Materials." https://www.nrc.gov/reading-rm/doc-collections/cfr/part073/index.html

U.S. Nuclear Regulatory Commission, NUREG-2155, "Implementation Guidance for 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material." https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2155/index.html

47 U.S. Nuclear Regulatory Commission, NUREG-7166, "Radiological Toolbox User's Guide." https://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr7166/index.html

Maintenance Rule

- o In response to the NRC staff's questions, SMR (Holtec) confirmed that the high-level overview of the maintenance rule program in the PSAR will describe inputs to the program once it is developed, and that partial approval of the program will not be requested in the construction permit application.
- The NRC staff noted the requirements in 10 CFR 50.155 which applies to an operating license application and encouraged SMR (Holtec) to consider engaging the NRC staff early on how it intends to comply with this regulation.⁴⁸

• Fitness for Duty Program

- The NRC staff noted that the other requirements of 10 CFR Part 26 are missing from Row 2 on Slide 25 and referred SMR (Holtec) to Table 1 on page 13.7.2-3 in SRP Section 13.7.2 for more information.^{49, 42}
- The NRC staff noted that Row 3 on Slide 25 should be "either/or" and should include 10 CFR Part 26, Subpart I, to manage fatigue.⁵⁰

Cyber Security Program

- After the meeting, the NRC staff encouraged a future engagement to discuss development of this program.
- Special Nuclear Material (SNM) Material Control and Accountability Program
 - After the meeting, the NRC staff noted that the PSAR does not require a discussion of the program for material control and accounting because the applicant will not possess SNM during construction.
 - Based on the meeting materials, the NRC staff noted that SMR (Holtec) has acknowledged that it will provide information to meet 10 CFR Part 74 requirements at the appropriate time.⁵¹

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

The meeting adjourned at 3:40 pm.

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⁴⁸ 10 CFR 50.155, "Mitigation of beyond-design-basis events." https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0155.html

^{49 10} CFR Part 26, "Fitness for Duty Programs." https://www.nrc.gov/reading-rm/doc-collections/cfr/part026/index.html

⁵⁰ 10 CFR Part 26, Subpart I, "Managing Fatigue." https://www.nrc.gov/reading-rm/doc-collections/cfr/part026/full-text.html

^{51 10} CFR Part 74, "Material Control and Accounting of Special Nuclear Material." https://www.nrc.gov/reading-rm/doc-collections/cfr/part074/full-text.html