U.S. NUCLEAR REGULATORY COMMISSION SUMMARY OF THE JULY 26, 2023, OBSERVATION PREAPPLICATION PUBLIC MEETING WITH SMR, LLC (A HOLTEC INTERNATIONAL COMPANY) TO DISCUSS SMR-160 INSTRUMENTATION AND CONTROL DEFENSE-IN-DEPTH AND DIVERSITY EVALUATIONS

Meeting Summary

The U.S. Nuclear Regulatory Commission (NRC) held an observation public meeting on July 26, 2023, with SMR, LLC (SMR), a Holtec International Company (Holtec), to discuss preapplication information related to the instrumentation and control (I&C) defense-in-depth and diversity (D3) evaluations for the SMR-160 design.[1,2] SMR (Holtec) provided presentation slides and a white paper entitled "Diversity Evaluation Based on NUREG/CR-6303,"[3] to discuss during the public meeting.[4,5,] This meeting summary provides SMR (Holtec) with preliminary feedback on I&C D3, however SMR (Holtec) stated their intent to formally request NRC written staff assessment on the submitted white paper.

This virtual observation preapplication meeting had attendees from SMR, (Holtec), NRC staff, and members of the public. During the closed session of the meeting, SMR (Holtec) and NRC staff discussed proprietary information.

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:

- After introductions and opening comments, SMR (Holtec) opened its presentation with an overview of the agenda and described the purpose of the meeting was to familiarize the NRC staff with the diversity between the plant safety system (PSS) and the diverse actuation system (DAS) of the SMR-160 I&C system, to solicit feedback on the compliance of the diversity evaluation methodology and the sufficiency of the diversity with applicable regulations, and to identify additional evaluations and factors causing lack of diversity, if there are any.

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1 Letter from J. Hawkins, "SMR, LLC Preapplication Meeting Materials for July 26, 2023 (Project No. 99902049)," dated July 13, 2023, Agencywide Documents and Access Management System (ADAMS) Accession No. ML23194A057, part of ML23194A056.

2 SMR, LLC, "Enclosure 4, "Affidavit Pursuant To 10 CFR 2.390" dated July 13, 2023, ML23194A061, part of ML23194A056.

3 SMR, LLC, "Enclosure 3: JEXK-0143-1048-P, "Diversity Evaluation Based on NUREG/CR-6303," dated July 31, 2023, Proprietary ML23194A060, part of ML23194A056.

4 SMR, LLC, "Enclosure 1: SMR, LLC Meeting Presentation Materials for July 26, 2023," dated July 13, 2023, Proprietary ML23194A058, part of ML23194A056.

5 SMR, LLC, "Enclosure 2, "SMR, LLC, Meeting Presentation Materials for July 26, 2023" dated July 13, 2023, ML23194A059, part of ML23194A056.

- The discussion focused on the submitted white paper which described the methodology and high-level system architecture of accomplishing D3. SMR (Holtec) noted that implementation and follow on steps are separate from the scope of the white paper and discussions during the meeting.

- Clayton Crouch, of Dominion Energy, commented that he appreciates the open session of the public meeting; however, if the open session is limited to introductions and the purpose of the meeting, then would be good to know in advance that the open session will not be for an entire time slot listed in the meeting notice so that members of the public would in a better position to decide if attendance is worthwhile. The NRC staff acknowledged the feedback and stated that it will post the non-proprietary meeting materials on the public meeting website prior to the meeting to better inform the public on the scope and duration of the open session.

The open session ended at 1:48 PM.

The following summarizes the closed session discussion:

- SMR (Holtec) stated that its SMR-160 diversity evaluation is based on NUREG/CR-6303[6]. The purpose of the submitted white paper is to evaluate diversity between the PSS and the DAS based on NUREG/CR 6303, as a part of D3 analysis of the I&C system for SMR 160. The scope of the paper is focused on diversity evaluation of the architecture design, as functional diversity and signal diversity are plant design dependent, and therefore out of scope.

- The NRC Staff and Holtec discussed details about the purpose of an interface between the PSS and DAS and about the diversity of software between the DAS and PSS. SMR (Holtec) acknowledged that it received the NRC staff's initial email feedback prior to this public meeting,[7] which included three bullets. SMR (Holtec) indicated it would formally request a written NRC staff assessment on the submitted white paper and will include level of effort estimates for the review, and follow on questions on the NRC staff's emailed feedback. The NRC staff acknowledged this intention, and reminded SMR (Holtec) that if there is proprietary information, the standard affidavits (pursuant to 10 CFR 2.390[8]) as well as the proprietary and non-proprietary copy requirements apply. The NRC staff added that responses to the follow on questions will be included in the assessment of the White Paper.

    - The first bullet recommended that SMR (Holtec) consider the information in NUREG/CR-7007.[9] SMR (Holtec) stated its preference to use a diversity evaluation based on NUREG/CR-6303. The NRC staff provided initial feedback that using NUREG/CR-6303 is acceptable but added that the NRC staff would

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6 U.S. NRC, NUREG/CR 6303, "Method for Performing Diversity and Defense-in-Depth Analyses of Reactor Protection Systems," ML071790509.

7 Email from Manny Sayoc to Justin Hawkins, "Holtec SMR-160 Feedback on I&C D3 Diversity White Paper / Presentation," dated July 20, 2023, ML23213A038.

8 10 CFR 2.390, Public Inspections, Exemptions, Requests for Withholding."

9 U.S. NRC, NUREG/CR-7007, "Diversity Strategies for Nuclear Power Plant Instrumentation and Control Systems," ML100541256.

look into this further and provide follow on feedback if there was anything to the contrary or significant to relay on the topic.

- In response to the NRC staff's second bullet regarding the scope of D3 analysis, SMR (Holtec) indicated that a coping analysis will be done on the outcome of the overall D3 assessment that looks at the overall design bases for DAS and non-DAS functions. NRC Staff clarified that SMR (Holtec) will be following a wholistic D3 review to satisfy the criteria of BTP 7-19[10] to address the potential for common-cause failure of the safety related digital I&C systems.

- The NRC staff's third bullet noted the recent change in the NRC policy outlined SECY-22-0076.[11] The policy change introduces the possibilities of using risk-informed alternative methods for addressing common-cause failure in a D3 analysis, and SMR (Holtec) may want to consider use of these methods once the criteria becomes available. The NRC staff added that new policy will not invalidate analysis methods performed in accordance with the previous policies and guidance, therefore, the acceptability of the analysis provided in the White Paper would not be impacted by this policy change.

The meeting adjourned at 2:12 pm.

[10] U.S. NRC Standard Review Plan, Branch Technical Position, BTP 7-19 "Guidance for Evaluation of Defense In Depth and Diversity to Address Common-Cause Failure Due to Latent Design Defects In Digital Safety Systems," January 2021, ML20339A647

[11] U.S. NRC, "SECY-22-0076: Expansion of Current Policy on Potential Common-Cause Failures in Digital Instrumentation and Control Systems," ML22193A290.