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NUCLEAR REGULATORY COMMISSION  
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January 26, 2023

MEMORANDUM TO: Michelle W. Hayes, Chief  
Advanced Reactor Technical Branch 1  
Division of Advanced Reactors and Non-Power  
Production and Utilization Facilities  
Office of Nuclear Reactor Regulation

FROM: Jason H. Schaperow, Senior Reactor Systems Engineer  
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Office of Nuclear Reactor Regulation

Signed by Schaperow, Jason  
on 01/26/23

SUBJECT: SUMMARY OF SEPTEMBER 13 AND 20, 2022, PUBLIC  
WORKSHOPS ON THE SCALE/MELCOR SOURCE TERM  
DEMONSTRATION PROJECT – MOLTEN-SALT-FUELED  
REACTOR AND SODIUM-COOLED FAST REACTOR

To prepare for safety reviews of non-light water reactor (non-LWR) license applications, the U.S. Nuclear Regulatory Commission (NRC) is performing the SCALE/MELCOR source term demonstration project. The project involves modifying and performing demonstration calculations with the SCALE and MELCOR codes for the following objectives:

- Understand severe accident behavior in non-LWRs,
- Provide insights for developing regulatory guidance,
- Develop publicly available input models for representative designs, and
- Facilitate dialogue on the staff's approach for determining source term.

Following completion of code modifications and demonstration calculations for a molten-salt-fueled reactor and a sodium-cooled fast reactor, the NRC held public workshops on September 13, 2022, and September 20, 2022, respectively. During each workshop, NRC, Sandia National Laboratories, and Oak Ridge National Laboratory staff presented SCALE and MELCOR modeling methods and results for simulating core fission product inventory and decay heat during normal operation and core heat up and fission product release to the environment during an accident. About 100 people from the NRC, U.S. nuclear industry, international organizations, and other stakeholders (e.g., Union of Concerned Scientists) attended each workshop.

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In 2021, the NRC completed code modifications and demonstration calculations for a heat pipe reactor, a high-temperature gas-cooled reactor, and a pebble-bed salt-cooled reactor, and held public workshops on June 29, 2021, July 20, 2021, September 14, 2021, respectively. The meeting summaries are available at Agencywide Documents Access and Management System (ADAMS) accession numbers ML21202A380, ML21236A285, and ML21288A039, respectively.

The NRC put links to the video recordings, slides, and related reports for the 5 workshops at the [NRC public webpage on advanced reactor source term](#). The slides for each workshop also are available at the following ADAMS accession numbers:

- Heat pipe reactor – ML21179C060
- High-temperature gas-cooled reactor – ML21200A179
- Pebble-bed salt-cooled reactor – ML21256A231
- Molten-salt-fueled reactor – ML22353A101
- Sodium-cooled fast reactor – ML22353A109

SUBJECT: SUMMARY OF SEPTEMBER 13 AND 20, 2022, PUBLIC WORKSHOPS ON THE SCALE/MELCOR SOURCE TERM DEMONSTRATION PROJECT – MOLTEN-SALT-FUELED REACTOR AND SODIUM-COOLED FAST REACTOR DATED JANUARY 26, 2023

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**NRC-001**

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