UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SECRETARY

June 17, 2025

MEMORANDUM TO: Mirela Gavrilas, PhD
Executive Director for Operations

FROM: Tomas E. Herrera, Acting Secretary TOMAS HERRERA Digitally signed by TOMAS HERRERA Date: 2025.06.17 15:07:23 -04'00'

SUBJECT: STAFF REQUIREMENTS – SECY-24-0008 – MICRO-REACTOR LICENSING AND DEPLOYMENT CONSIDERATIONS: FUEL LOADING AND OPERATIONAL TESTING AT A FACTORY

The Commission has approved three policy issues as recommended by the staff. For Topic 1, the Commission has approved Option 1b, the position that a factory-fabricated micro-reactor with features to preclude criticality would not be "in operation" when loaded with fuel, that operation in these circumstances would begin with removal of those features, and that the removal of those features is the best analogue to "initial loading of fuel" for a reactor without such features.

For Topic 2, the Commission has approved Option 2b, which authorizes fuel loading in the factory under a 10 CFR Part 70 license as long as the factory-fabricated module includes features to preclude criticality.

For Topic 3, the Commission has approved Option 3b, which will allow the NRC staff to use the regulations for non-power reactors to authorize operational testing of commercial micro-reactors at a factory.

The staff should keep the Commission informed, as appropriate, as they develop technology-inclusive guidance on the use of features to preclude criticality. In developing guidance and policy recommendations for the concept of features to preclude criticality, the staff should consider that the dynamics of transporting manufactured modules should, at minimum, require some form of physical measures to preclude criticality for modules in transit, especially those that have undergone preoperational testing at the factory. Additionally, staff should confirm that unintentional contradictions with Title 10 of the *Code of Federal Regulations* Part 70 are not introduced, specifically in relation to the double contingency principle.

While the Commission has approved options 1b, 2b, and 3b, nothing in this Staff Requirements Memorandum should be construed to prevent the staff or applicants from utilizing options 1a, 2a, and 3a on a case-by-case basis as specific circumstances warrant.

The staff should apply Congress' regulatory direction in Section 208 of the Accelerating Deployment of Versatile, Advance Nuclear for Clean Energy Act of 2024, Public Law 118-67 (ADVANCE Act), which states that the "Commission shall…develop risk-informed and performance-based strategies and guidance to license and regulate micro-reactors… including

strategies and guidance for…. risk analysis methods, including alternatives to probabilistic risk assessments." to more than just microreactors.

The staff should explore additional recommendations by stakeholders, such as using existing meteorology and weather data from the National Oceanic and Atmospheric Administration, National Weather Service or other established nearby sources to support analyses and design bases for applications.

The staff should ensure that it is clear that when features to preclude criticality are inserted to support transportation after completion of operational testing or at the end of the operating cycle, the license for the reactor does not authorize operation at power.

As part of subsequent papers that may be submitted to the Commission on policy or regulatory issues, the staff should analyze what changes could or should be made to the Atomic Energy Act to better accommodate the production and deployment concepts currently under consideration, while preserving the NRC's core mission in safety, security, and environmental protection.

The staff should plan proactively to develop a comprehensive regulatory framework and licensing options for microreactor manufacturers that seek to combine the activities of a microreactor applicant (e.g., factory fabrication, operational testing, fuel loading, and transportation of microreactors) in a single license, engaging the Commission as necessary. Such a framework could clarify the appropriate use of using license conditions or technical specifications to address unique technical considerations such as the need for features to preclude criticality while the microreactor is in transit.

The staff should consider whether certain proposed licensing and oversight strategies for microreactors – whether in this paper or in future endeavors – would be applicable to other types of nuclear reactors, including larger power reactors, research reactors, and testing facilities.

The staff should engage with Department of Energy (DOE) and Department of Defense (DOD) efforts to build and operate microreactors on DOE/DOD sites or as part of critical national security infrastructure. The goals of this engagement should include identifying and implementing licensing process efficiencies, consistent with the ADVANCE Act and relevant executive orders, to streamline the transition of microreactor technology to the commercial sector.

cc: Chairman Wright
Commissioner Caputo
Commissioner Crowell
Commissioner Marzano
OGC
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OPA
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PDR