Integrated Microreactor Activities Plan Workshop

February 20, 2025

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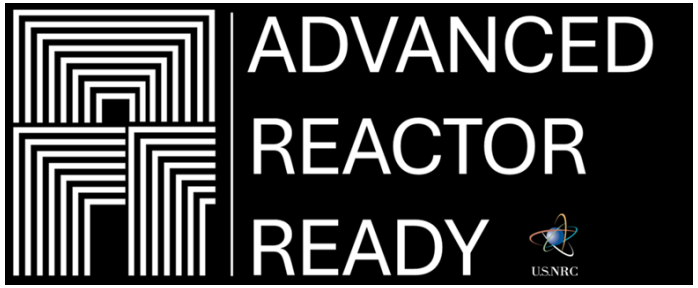

https://www.nrc.gov/reactors/new-reactors/advanced.html

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Agenda

- Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024 (ADVANCE Act) Implementation
- Overview of Microreactor Activities:
  - Background on Microreactors
  - Microreactor Policy Initiatives
- Integrated Microreactor Activities Plan:
  - Purpose
  - Priority Ranking Factors Considered
  - Proposed High Priority Topics
- Workshop discussion
- Q&A

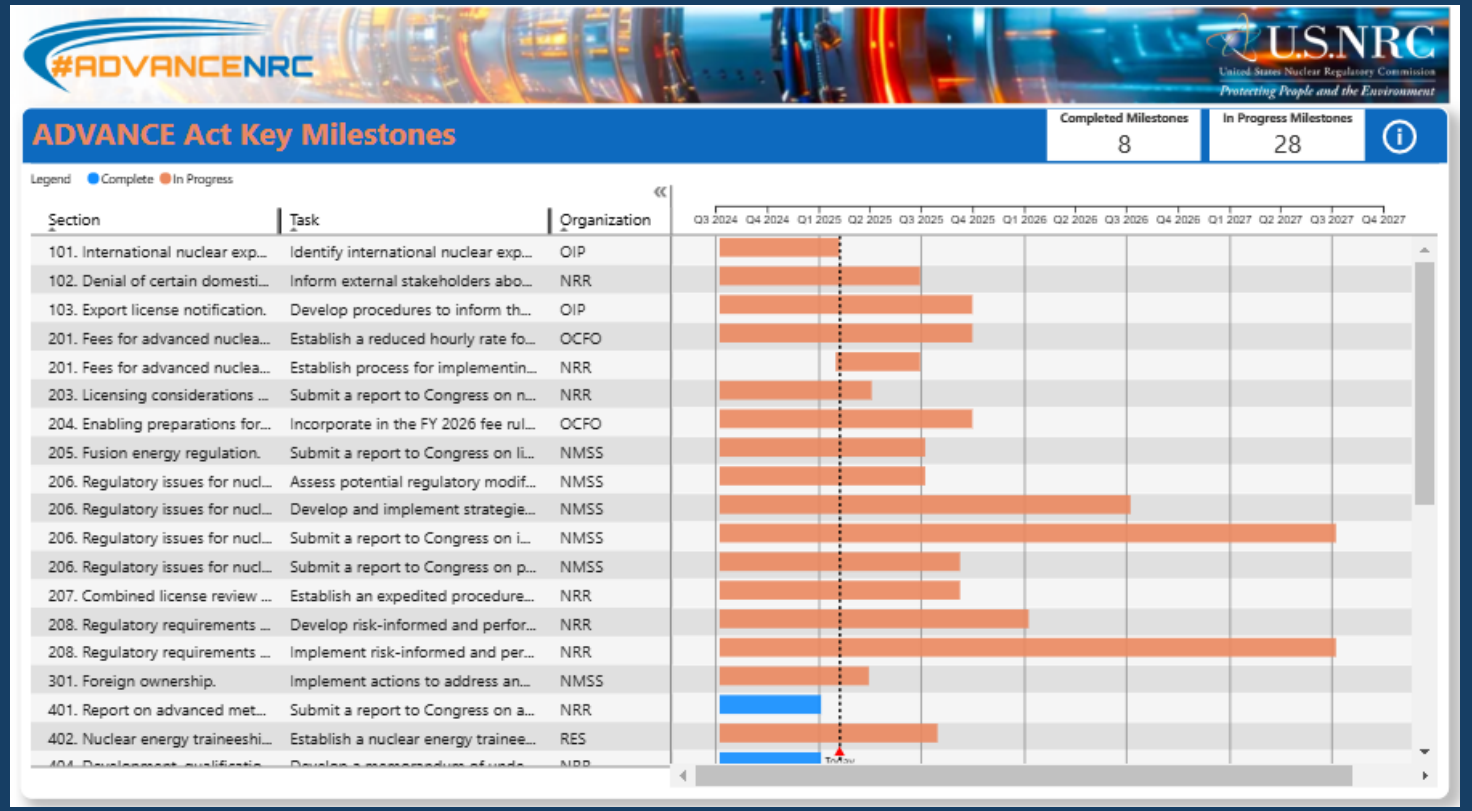
ADVANCE Act Implementation

Mike King
Special Assistant for ADVANCE Act Implementation

February 20, 2025

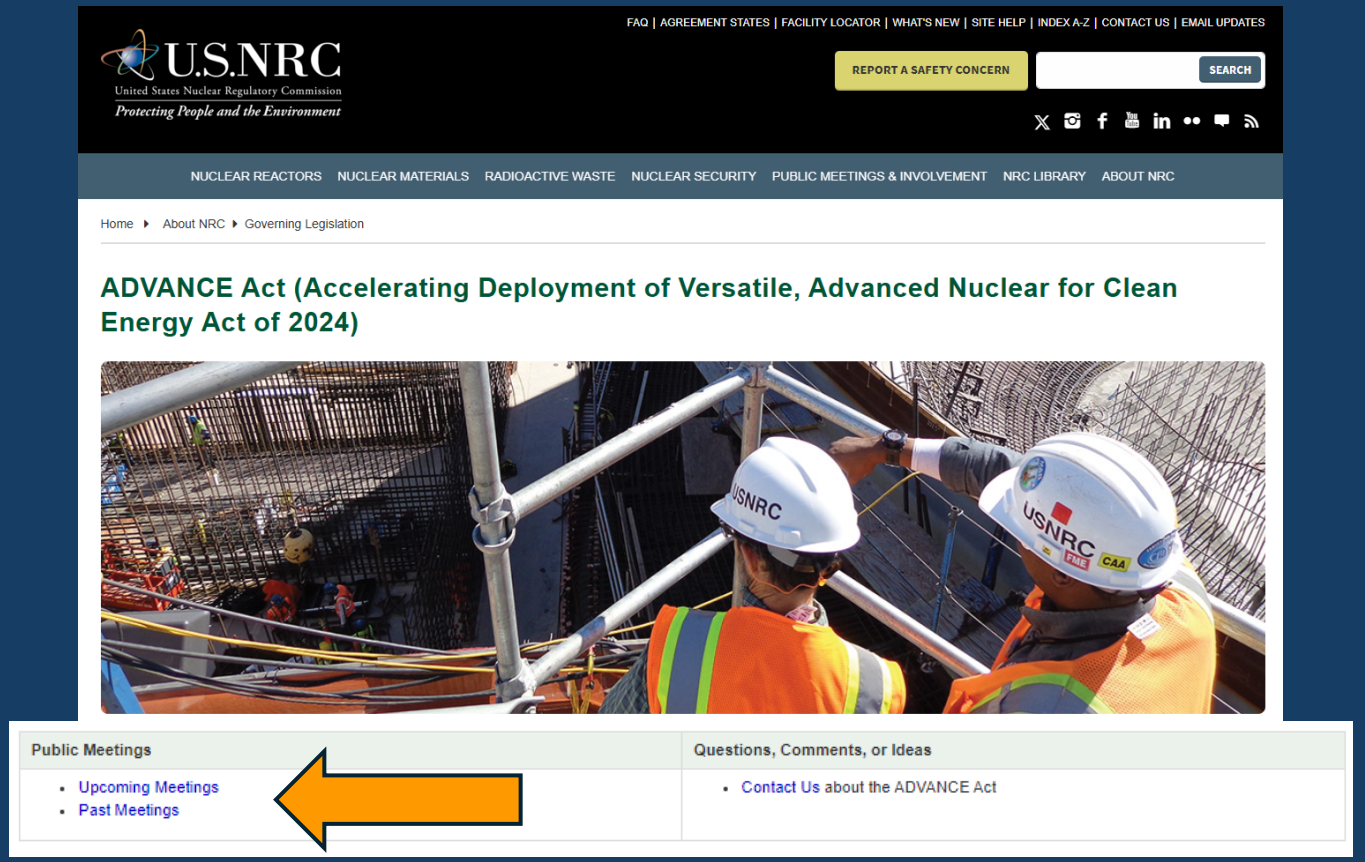
How to Follow Our Progress

Follow NRC's ADVANCE Act implementation with this Dashboard

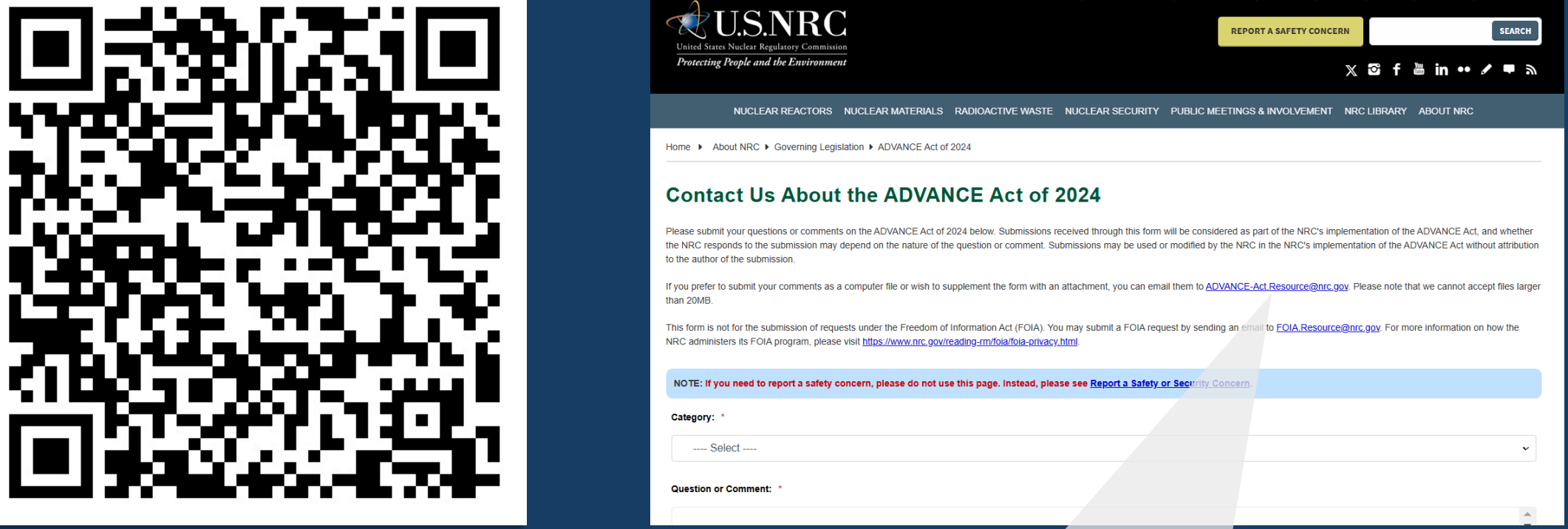


How to Stay Engaged

For NRC's public meeting information on ADVANCE Act



How to Ask Questions and Submit Ideas



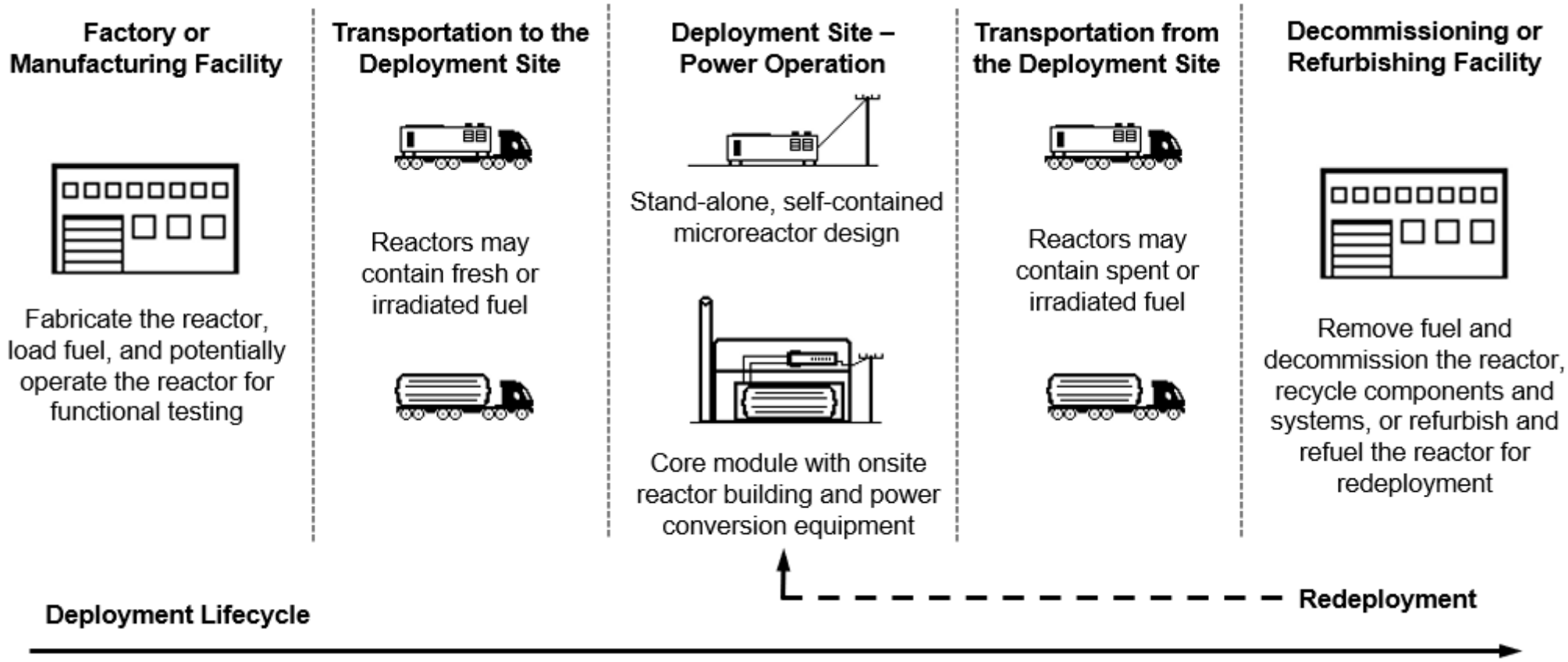
Contact us with ADVANCE Act questions, comments, and ideas

ADVANCE-Act.Resource@nrc.gov

Background

- For licensing purposes, microreactors are commercial power reactors licensed under Section 103 of the Atomic Energy Act of 1954, as amended (AEA).
- Microreactors are anticipated to have power levels on the order of several tens of megawatts thermal or less, small site footprints, low potential consequences in terms of radiological releases, and may have increased reliance on passive systems and inherent characteristics to control power and heat removal.
- NRC staff anticipates that microreactors will have a standard design approved by the NRC through a design certification (DC), manufacturing license (ML), or final safety analysis report for a first-of-a-kind (FOAK) combined license (COL) or construction permit and operating license (CP/OL).
- The NRC staff considers a transportable microreactor to be a microreactor that could be fabricated in a factory and transported to the deployment site where it would be operated at a fixed location.
- The NRC staff considers a mobile microreactor to be a microreactor that is intended to be operated at more than one fixed location on an as-needed, where-needed basis.

Conceptual Deployment Model for Transportable Microreactors



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Microreactor Policy Initiatives

- The NRC staff's activities aim to increase the flexibility of the regulatory framework to support the diverse technologies and deployment models being considered by microreactor developers and potential applicants.
- The NRC staff will continue to engage with stakeholders and other interested party's as it identifies, develops, and establishes new or revised strategies or guidance that may be needed for licensing and regulation of microreactors.

Microreactor Policy Initiatives

- SECY-20-0093, “Policy and Licensing Considerations Related to Micro-Reactors” (ML20254A363), provided information on 10 topics related to microreactor licensing and identified potential policy issues.
- SECY-24-0008, “Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory” (ML23207A252), seeks Commission direction on fuel loading and operational testing at a factory and transportation of fueled reactors.
- The staff issued a draft white paper, “Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations” (ML24268A310, ML24268A314, ML24268A317, and ML24302A292), that discusses policy matters and strategies related to licensing microreactors of a standard design.

Microreactor Policy Initiatives

- Other ongoing activities also address or may affect aspects of microreactor licensing and deployment, such as
  - 10 CFR Part 53 proposed rule, “Risk Informed, Technology Inclusive Regulatory Framework for Advanced Reactors,” published October 31, 2024 (Volume 89 of the *Federal Register* (FR), Page 86918)
  - NUREG-2249, “Generic Environmental Impact Statement for Licensing of New Nuclear Reactors, Draft Report for Public Comment” (ML24176A220)
  - SECY-24-0046, “Implementation of the Fiscal Responsibility Act of 2023 National Environmental Policy Act Amendments” (ML24078A013)
  - Proposed rule, “Alternative Physical Security Requirements for Advanced Reactors,” published August 9, 2024 (89 FR 65226)
  - “Staff Requirements – SECY-24-0032 – Revisiting the Mandatory Hearing Process at the U.S. Nuclear Regulatory Commission” (ML24200A044)

ADVANCE Act Section 208, Regulatory Requirements for Microreactors

- Section 208 of the ADVANCE Act directs the NRC to develop and implement risk-informed and performance-based strategies and guidance to license and regulate microreactors in eight topical areas:
  - staffing and operations
  - oversight and inspections
  - safeguards and security
  - emergency preparedness
  - risk analysis methods
  - decommissioning funding assurance
  - transportation of fueled micro-reactors, and
  - siting
- The ADVANCE Act provides for the NRC staff to address Section 208 through the existing regulatory framework, the risk-informed and technology-inclusive regulatory framework for advanced reactors (Part 53) proposed under the Nuclear Energy Innovation and Modernization Act of 2019, or other ongoing or new rulemaking, as appropriate.

Integrated Microreactor Activities Plan

- The NRC staff drafted an Integrated Microreactor Activities Plan that is intended to cover topics associated with microreactor licensing and regulation.
  - The plan identifies activities related to microreactor licensing and deployment considerations and related completed, ongoing, and planned actions to address them.
  - The plan is intended to provide a comprehensive view of microreactor activities and their integration to support communication and engagement.
  - The plan includes the staff's proposed prioritization to address the topics and planned completion timeframes.
  - The draft plan can be found at: Microreactor Activities Integration Tables (ML25036A199)

Priority Ranking Factors

- The list of topics and the NRC staff's current prioritization of the actions consider factors and feedback from a variety of sources, such as:
  - direction in legislation (e.g., the Nuclear Energy Innovation and Modernization Act of 2019 and the ADVANCE Act)
  - ongoing rulemakings and guidance development
  - priorities of interested and affect parties
  - preapplication engagement with individual microreactor developers
- The priorities reflect the microreactor-specific importance of an action and may not align with the prioritization of the action for other purposes. For example, a proposed rulemaking might be a "high" priority for the NRC in general but be prioritized as "medium" as it relates to addressing a microreactor-specific topic.

Proposed High Priority Topics

- Staffing, Training, and Qualification Requirements
- Approval of Standardized Operational Programs
- Oversight and Inspections during Construction
- Oversight and Inspections during Operation
- Physical Security
- Risk Analysis Methods, including Alternatives to Probabilistic Risk Assessments
- Transportation of Fueled Microreactors
- Population Density Criterion for Siting
- Licensing Mobile Deployment of Microreactors
- Environmental Reviews
- Features to Preclude Criticality
- Loading Fuel at a Factory
- Operational Testing at a Factory
- Nth-of-a-Kind Microreactor Licensing and Deployment

Workshop Goals

- Engender a dialog with stakeholders and other interested parties on the topics listed in the Integrated Microreactor Activities Plan.
  - proposed prioritization
  - planned timeframes
  - potential interdependencies
  - lead organizations
- Provide an opportunity for the NRC staff and attendees to discuss additional microreactor topics of interest.
- Foster a common understanding of near-term activities and next steps.

Microreactor Activities Integration Tables (ML25036A199)

INTEGRATED MICROREACTOR ACTIVITIES PLAN DISCUSSION

BREAK

Microreactor Activities Integration Tables (ML25036A199)

INTEGRATED MICROREACTOR ACTIVITIES PLAN DISCUSSION (CONT.)

Question & Answer Session

Topics for Consideration:

- General questions or feedback for NRC staff on microreactor activities.
- Externally led near-term activities.
- External initiatives related to deployment and licensing.
- Opportunities for additional NRC interactions.