

**RIC 2024 Hybrid**

U.S. Nuclear Regulatory Commission  
36<sup>th</sup> Annual Regulatory Information Conference

**MARCH 12-14, 2024**

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# Optimizing the Regulatory Landscape for Licensing and Deployment of Factory-Fabricated Micro-Reactors

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

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**The NRC staff is proactively enhancing clarity, reliability, and efficiency for licensing and regulation of factory-fabricated micro-reactors**

## Clear

Coherent, logical, and practical regulatory approaches that will allow for safe and secure deployment

## Reliable

Prompt, fair, and decisive regulation that lends stability to licensing and deployment

## Efficient

Risk-informed and performance-based regulation that delivers timely results and uses resources effectively

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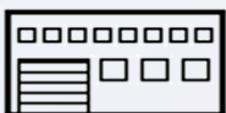
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## Fabrication, Fueling, and Testing at a Factory



Fabricate the module, load fuel, and potentially operate the module for functional testing

## Transportation to the Deployment Site



Factory-fabricated modules may contain fresh or irradiated fuel



## Power Operation at a Deployment Site

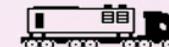


Stand-alone, self-contained micro-reactor design



Core module with onsite reactor building and power conversion equipment

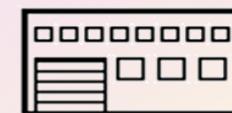
## Transportation from the Deployment Site



Modules may contain spent or irradiated fuel



## Decommissioning or Refurbishment for Redeployment



Remove fuel and decommission the module or refurbish and refuel the module for redeployment

Redeployment

Deployment Life Cycle

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The NRC staff is taking actions to prioritize and address licensing and deployment considerations related to factory-fabricated micro-reactors

- SECY-24-0008, “Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory” (ML23207A252), seeks Commission policy direction on regulatory approaches related to three topics:
  - (1) Features to preclude criticality
  - (2) Fuel loading at a factory
  - (3) Operational testing at a factory

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SECY-24-0008 recommends the following:

- An approach in which a factory-fabricated module that included features to preclude criticality would not be “in operation” when loaded with fuel and operation would begin with the removal of those features
- An approach for authorizing only fuel loading into a utilization facility that includes features to preclude criticality under a manufacturing license for the utilization facility and a special nuclear material license for the fuel
- An approach that would apply most of the safety (and possibly the environmental) regulations for nonpower reactors to authorize fuel loading and operational testing at a factory

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- SECY-23-0021, “Proposed Rule: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors (RIN 3150-AK31)” ([ML21162A093](#)), also proposes questions to ask stakeholders about the desirability of addressing authorization of fuel loading at a factory under a manufacturing license

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## Factory-fabricated micro-reactor licensing and deployment models involve numerous regulatory considerations and policy topics

- Loading fuel at a factory
- Operational testing at a factory
- Timeframe for authorization to operate at the deployment site
- Licensing replacement reactors
- Autonomous operation and remote operation
- Transportation of fueled reactors
- Storage of fuel after irradiation in a power reactor
- Siting in densely populated areas
- Decommissioning process and decommissioning funding assurance
- Commercial maritime applications
- Commercial space applications
- Commercial mobile micro-reactors
- Staffing, training, and qualification requirements
- Standardization of operational programs
- Physical security
- Cybersecurity
- Environmental review

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## Success Strategies

### Optimizing Licensing Reviews



### Proactive Stakeholder Engagement



### Robust Preapplication Activities



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