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Enabling the Safe and Timely Deployment of Microreactors Through Regulatory Innovation and Readiness

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ADVANCED REACTOR READY

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

Microreactor Characteristics and Opportunities for Regulatory Innovations

Microreactor Characteristics

- Low potential consequences in terms of radiological releases
- Reliance on passive systems and inherent characteristics for safety
- Small site footprints
- Standardized designs and fleet deployment
- Potential for factory-fabricated, transportable reactors

Opportunities for Innovations

- Risk-informed, performance-based regulatory framework
- Simplified safety analysis emphasizing design attributes
- Graded site characterization and flexible siting
- Streamlined licensing processes with fewer steps
- Loading fuel and operational testing at a factory

Enabling Deployment Through Regulatory Innovation

- Staff Requirements Memorandum SRM-SECY-24-0008, “Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory” (ML25168A133)
  - The Commission approved the position that a microreactor with features to prevent criticality would not be “in operation” when loaded with fuel and that operation in these circumstances would begin with removal of those features.
  - The Commission approved authorizing fuel loading in a factory under a special nuclear material license as long as the microreactor includes features to prevent criticality.
  - The Commission approved the NRC staff to use the regulations for non-power reactors to authorize operational testing of commercial microreactors at a factory.

Enabling Deployment Through Regulatory Innovation

- Staff Requirements Memorandum SRM-SECY-25-0052, “Nth-of-a-Kind Microreactor Licensing and Deployment Considerations” (ML25317A650)
  - The Commission authorized the staff to review and approve, and afford finality, as appropriate, information on standard operational programs or requirements submitted by applicants in connection with a design certification or manufacturing license application.
- SECY-25-0052, “Nth-of-a-Kind Microreactor Licensing and Deployment Considerations” (ML24309A266)
  - Potential for a 6-month licensing timeframe
  - Enhanced efficiency of right-sized environmental reviews

Accelerating Innovation to Meet the Moment

- Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024, section 208:
  - Develop and implement risk-informed and performance-based strategies and guidance to license and regulate microreactors, including within the existing regulatory framework and through rulemaking.
- Executive Order 14300, section 5(e):
  - Establish a process for high-volume licensing of microreactors and modular reactors, including by allowing for standardized applications and approvals and by considering to what extent such reactors or components thereof should be regulated through general licenses.