

NRC Public Meeting Licensing Requirements for Microreactors and Other Low Consequence Reactors Rulemaking

July 14, 2025

1:00-5:00pm

Microsoft Teams and OWFN-1G05B

Purpose

- Describe the background and drivers for new regulations for licensing microreactors and other low consequence reactors
- Discuss the high-level concepts that the rule would address
- More detailed discussions on technical topics in the follow-on meeting on July 17-18, 2025

Agenda

- 1:00-1:10pm Welcome, Introductions, Logistics
- 1:10-2:00pm Presentation on Rulemaking Scope and Concepts
- 2:00-3:00pm Open Discussion
- 3:00-3:15pm BREAK
- 3:15-4:45pm Open Discussion (cont.)
- 4:45-5:00pm Closing Remarks

Logistics

- This meeting is being recorded
- When prompted for questions and discussion, please indicate your desire to speak by using the “Raise Hand” button in Teams (or press “*5” if participating by phone)
- Once your name has been called, you will need to unmute yourself (press “*6” if participating by phone)
- Chat feature is also enabled
- Presentation slides will be shown on the Microsoft Teams screen
- Phone attendees should e-mail george.tartal@nrc.gov for attendance record

Background

- There is increasing external interest in microreactors to support the electric grid, serve as an independent power source, and provide thermal energy for industrial applications.
- The staff is currently aware of over 15 potential microreactor design applications.
- The staff and external stakeholders agree that a more efficient, streamlined licensing process than the current power reactor licensing process is needed to support microreactors.
- Effort is consistent with the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act (ADVANCE Act) of 2024 and recently issued Executive Orders (EOs).

ADVANCE Act and EOs

- Section 208 of the ADVANCE Act requires the NRC to develop “risk-informed and performance-based strategies and guidance to license and regulate microreactors.”
- Per the ADVANCE Act, the NRC recently updated its mission statement to underscore the need for efficiency in regulatory approaches. The resultant mission statement reads:

“The NRC protects public health and safety and advances the nation’s common defense and security by enabling the safe and secure use and deployment of civilian nuclear energy technologies and radioactive materials through efficient and reliable licensing, oversight, and regulation for the benefit of society and the environment.”
- On January 20, 2025, the President declared a National Energy Emergency in EO 14156 (90 FR 8433 (Jan. 29, 2025))
- On January 20, 2025, the President issued an EO titled “Unleashing American Energy” (EO 14154, 90 FR 8353 (Jan. 29, 2025))
- On May 23, 2025, the President issued an EO, titled “Ordering the Reform of the Nuclear Regulatory Commission” (EO 14300, 90 FR 22587 (May 29, 2025)).

ADVANCE Act and EOs (Continued)

Stakeholder Interest

- A May 15, 2025 letter was co-signed by ClearPath, Veriten, and the Clean Air Task Force (ML25136A333), and endorsed by Kairos Power (ML25139A429) and the United States Nuclear Industry Council (ML25139A530).
- Encouraged the NRC to allow microreactors to use a regulatory framework similar to that used for non-power production and utilization facilities, as long as the microreactor applicant can demonstrate a 1-rem site-boundary radiological dose consequence.
- Emphasize that such an approach would be “the most timely and effective way to establish a more efficient regulatory framework for new and advanced reactors” and “would result in right-sized regulation, enabling innovation, supporting energy dominance and national security,” among other cited outcomes.

Rule Goal

- Create a licensing process for microreactors to protect public health and safety, promote the common defense and security, and protect the environment.
- The licensing process would complete, as much as possible, the safety and environmental reviews with public engagement at one time, prior to the identification of a site.
- Site license reviews would verify that the site characteristics are within the reactor design envelope where pre-existing generic data can be leveraged as much as possible.
- The reactor design envelope would need to meet three entry criteria to justify an alternative risk-informed and performance-based regulatory framework for various requirements and operational programs (e.g., safety, security, operational programs, environmental).

Rule Fundamentals

1. Entry Criteria:

Staff is considering:

- Dose-acceptance criteria
- Maximum Hypothetical Accident approach (consequence analysis)
- Special Nuclear Material limit (Metric Tons Uranium and Plutonium)

2. Design Criteria Attributes (Safety and Security):

- Reactivity control
- Provide heat removal
- Retain fission products
- Provide shielding (Part 20)
- Radioactive effluents control (Part 20)

3. Environmental Review Considerations

4. Plant Parameter Envelope

5. General License Considerations

Additional Details

Rule could address other considerations, such as:

- Manufacturing (either at a facility or site, including operational testing and fuel loading)
- Possessing Fuel
- Transportation
- Construction
- Operation
- Onsite storage
- Inspections, Tests, Analyses, and Acceptance Criteria
- Security/Safeguards/Emergency Preparedness/Material Control and Accounting
- Risk analysis methods
- Staffing and operations
- Oversight and Inspections
- Decommissioning
- Price Anderson/Financial Assurance
- Operational programs

Additional Details (cont.)

Evaluate and streamline areas that traditionally have longer timelines:

- Environmental Reviews
- Siting
- Hearings (may require legislative changes; also in recent Executive Orders)
- ACRS engagement (may require legislative changes; also in recent Executive Orders)

Consider stakeholder comments and proposals

Rule Fundamentals: 1. Entry Criteria

1. Dose-Acceptance Criteria:

- Ensures adequate protection of the public in the event of credible accidents.
- Establishes a technology-neutral baseline for comparing different reactor designs and sites.

2. Maximum Hypothetical Accident Approach (Consequence Analysis):

- A siting analysis to assess whether a generic or specific site can accommodate a reactor design while meeting the dose-acceptance criteria.
- Not necessarily the most severe physically possible accident but chosen to bound the radiological consequences of a broad range of design basis accidents.
- Can be leveraged, with the dose-acceptance criteria, to establish alternative risk-informed regulatory frameworks.

3. Special Nuclear Material Limit (Metric Tons Uranium and Plutonium):

- Assessing amounts of SNM at other low consequence nuclear facilities and stakeholder recommendations.

Rule Fundamentals: 2. Design Criteria Attributes

- Design criteria attributes ensures safety throughout the proposed operating and handling regimes, as well as being resilient to potential accidents or upsets, whether they are caused by internal or external hazards.
 - Reactivity control – controls the power level during normal operations and provides instantaneous, and maintained, reactor shutdown under upset or accident conditions. Ensures subcriticality during transportation.
 - Provide heat removal – provides adequate cooling for fission and decay heat removal to limit core coolant and fuel temperatures.
 - Retain fission products – protection of engineered fission-product boundaries to limit the release of radionuclides during normal and accident conditions.
 - Provide shielding (Part 20) – protects workers and the public from exposure to radiation resulting from operations using the existing requirements in 10 CFR Part 20. Staff recognize that prescriptive requirements in 10 CFR Part 20 changes may be forthcoming.
 - Radioactive effluents control (Part 20) – ensures the safe control, monitoring, and release of radioactive materials to protect public health and safety and for the benefit of the environment. Staff recognize that prescriptive requirements in 10 CFR Part 20 changes may be forthcoming.
- Elements of the design criteria attributes would be used to demonstrate compliance with the Entry Criteria.

Rule Fundamentals: 3. Environmental Review Considerations

- Several ongoing NEPA actions by the NRC need to be coordinated and integrated with Section 5(e) microreactor rulemaking
 - Categorical Exclusion Final Rule
 - Fiscal Responsibility Act NEPA Amendments Rule
 - ADVANCE Act Sections 206 (brownfield sites), 207 (combined licenses), 208 (microreactors) and 506 (modernization of env reviews)
 - New Reactor GEIS and guidance (PPE/SPE values based on Large LWR env reviews)
 - Environmental Alternatives from the Nth-of-a-Kind SECY-25-0052 on microreactor licensing and deployment (online portal for environmental submissions)
 - EO 14300 Section 5(c) (must reflect Congress's 2023 NEPA amendments and Section 2 & 5 of EO 14154)
 - Council on Environmental Quality Permitting Technology Action Plan and Standard (digital processing of NEPA data)
- Further discussions during the Friday, July 18th session

Rule Fundamentals: 4. Plant Parameter Envelopes

- Used to establish a set of bounding values for both key reactor design and site characteristics.
 - Technology Neutral: supports a range of nuclear reactor designs or technologies.
 - Licensing Flexibility: enables flexibility for staged licensing site and design choices.
 - Public and Stakeholder Confidence: creates certainty, informed by stakeholder interaction.

Rule Fundamentals: 5. General License Considerations

- Staff are assessing EO 14300, Sec. (e), to consider to what extent high-volume licensing of microreactors and modular reactors or components should be regulated through general licenses.

Rule Fundamentals: Address all phases of deployment and other considerations

- Scope should be inclusive of all future applications and technologies.
- To the extent technology-specific information is needed, it should be provided in guidance, not in the regulations themselves.
- Should address licensing, administrative, procedural, and reporting matters for microreactor applications.
- Should clarify how regulatory oversight and inspection will be done (e.g., should regulatory oversight process be left to policy and guidance documents)
- Alternative ways of meeting decommissioning should be provided—recognizing some advanced microreactors will only operate for 10 years and require replacement or refueling, while others may be sealed and operate for 40-60 years and then decommissioned.

Rule Fundamentals: Address all phases of deployment and other considerations (cont.)

- Assessing several nuclear reactor licensing frameworks:
 - Standalone rule (e.g., Parts 50, 52, 53).
 - Build upon DOE 10 CFR Part 830 regulations and IAEA framework.
 - Amend existing rules to limit applicability to microreactors (e.g., NPUF approach)
- Understanding the business models and need for several licensing pathways.
- Desired guidance:
 - Leverage existing guidance for advanced reactors?
 - Customize existing guidance for non-power reactors?

Rule Fundamentals: Consider stakeholder feedback and proposals

- The NRC is holding these public meetings to discuss this microreactor rulemaking.
- Stakeholders are encouraged to provide feedback to the staff on technical or policy issues.

Schedule

- The schedule for this rulemaking must comply with Executive Order 14300
 - Proposed rule published within 9 months (Feb '26)
 - Final rule published within 18 months (Nov '26)
- The rulemaking is also required to undergo a review from OMB/OIRA under Executive Order 12866
 - This is part of the 9-month schedule for the proposed rule

Where to Find Information

The screenshot shows the Regulations.gov website. At the top left is the logo "Regulations.gov" with the tagline "Your Voice in Federal Decision Making". At the top right is a "SUPPORT" button. Below the logo is a blue banner with the text "Make a difference. Submit your comments and let your voice be heard." In the center is a search bar containing the text "NRC-2020-0036" and a green "Search" button. Below the search bar is a white section with a "Welcome to the new Regulations.gov" message. The message states: "The new Regulations.gov is a re-envisioning of the classic Regulations.gov, with enhanced search capabilities, a simplified commenting process, and an interface that adapts to various screen sizes for mobile devices." Below this message are two buttons: "Read More" and "Watch Our Introduction Video". To the right of the welcome message is an "Explore" section with a sub-section "Comments Due Soon" containing a table:

Time Period	Count
Today	78
Next 3 Days	104
Next 7 Days	178

Below the "Comments Due Soon" section is a "Posted Recently" section. At the bottom left of the white section is a "What's Trending" section with a flame icon.

Go to <https://www.regulations.gov>
and search for docket ID **NRC-2025-0379**

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