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The Next 5 NRC Activities to Watch—and Why They're Critical for Advanced Reactors



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Takeaways

- Prompt and bipartisan collaboration among the NRC Commissioners is essential to achieving regulatory modernization over the next decade and during a pivotal period for the development and deployment of advanced reactors.
- The Commission needs to swiftly move forward on a new Policy Statement on New Reactor License Reviews that includes aggressive review schedules and performance metrics and align the timeline for implementing this policy with the completion of the Part 53 rulemaking.

- The deployment potential of US advanced reactors will hinge on the ambition and productivity of the Commission's agency-level activities, just as much as it will on Congress statutory modernization efforts.

Through the Inflation Reduction Act, Project Phoenix, and the G7 Partnership for Global Infrastructure and Investment, the Biden Administration has made it clear that a robust domestic civilian nuclear power sector is critical for the United States and a central part of the nation's energy, climate, and foreign policies. The US is in the midst of an economic and security race with the Russian and Chinese governments for geopolitical leadership in nuclear energy—and we're trailing. At the same time, the global community is wrestling with the challenges of climate change and the transition to clean energy. To unlock the potential of American advanced nuclear technology and enable the fastest and fairest path to net-zero, the NRC must be ready to act with authority, vision, and promptness.

Major Near-term NRC Activities for Advanced Reactors

To meet our climate goals and ensure US national security with respect to energy needs and geopolitical competitiveness, the US must demonstrate effectiveness as a world leader in advanced nuclear technology, licensing, and the relevant supply chains. To achieve this mission, the United States must deploy 20 advanced reactor plants by 2035, thereby planting American leadership across multiple new technologies. Effecting President Biden's ambitious agenda requires an unprecedented level of understanding and preparation by the Nuclear Regulatory Commission (NRC), Congress, and the nuclear energy industry. The following are the near-term NRC activities that are critical to the development and deployment of advanced reactors.

Major NRC Activities for Advanced Reactors through 2025

Activity	Significance	Estimated Completion
Alignment of Licensing Processes and Lessons Learned from New Reactor Licensing Rulemaking	Would align requirements between Part 50 and 52, using lessons learned through their implementation, to improve efficiency and ensure that all new reactor applications conform to consistent policies and requirements, regardless of the selected licensing approach	June 2024
Advanced Nuclear Reactor Generic Environmental Impact Statement Rulemaking	Would provide for more efficient generic site characterization and streamline the SEIS needed for a specific design at a specific site	February 2025
Risk-Informed, Technology Inclusive Regulatory Framework for Advanced Reactors (Part 53) Rulemaking	Would provide a flexible, risk-informed, performance based, comprehensive licensing pathway for a variety of activities related to ARs	June 2025
Population Related Siting Considerations Guidance for Advanced Reactors	Would allow an applicant to demonstrate suitability for an AR to be sited near or within a population dense area	TBD – Likely Winter 2023/24
Commission Policy Statement on New Reactor Licensing Reviews	Would outline Commission expectations for review timelines and staff focus re: subsequent license applications of a design	TBD

source: US Nuclear Regulatory Commission.



1. Alignment of Licensing Processes and Lessons Learned from New Reactor Licensing Rulemaking

New reactors can currently be licensed using one of two pathways—known as Part 50 and Part 52 under the Code of Federal Regulations (CFR). At a high level, the major distinction between these two options is that Part 50 allows for a two-step process, wherein an applicant can apply for a “construction permit” to build a nuclear reactor and separately for an “operating license” to operate a nuclear reactor facility. Part 52 was designed as a more integrated approach to allow an applicant to receive a “combined license” that encompasses both the construction permit and the operating license.

The NRC is currently undertaking the alignment rulemaking to amend existing regulations for new reactors to make them more consistent and effective. This rulemaking will be the first time the NRC has updated Parts 50 or 52 for new reactors, specifically looking at ways to incorporate lessons learned from reviews and making the regulations more “technology-inclusive” and “risk-informed”. This rulemaking has the opportunity to affect multiple procedural and safety-related changes that would affect the landscape for advanced reactor licensing in the near and mid-term—at least until the NRC passes a viable and effective rule under Part 53.

Status: Proposed Rule Sent to Commission for FR Publication — *Awaiting Commission Action*

2. Advanced Nuclear Reactor Generic Environmental Impact Statement Rulemaking

Generic Environmental Impact Statements (GEIS) are used by the NRC and applicants to assess the environmental impacts of a reactor technology prior to the selection of a site on which a reactor will be constructed. Conducting a GEIS benefits the regulatory process by allowing applicants and staff to move forward scoping out environmental analyses that would apply broadly to many sites—noted as “generic”, thereby providing a head start on the review process, eliminating the need to reproduce the same analyses for each application, and largely focusing the scope of supplemental environmental review activities to site specific elements.

This rulemaking would augment the regulations related to the NRC’s National Environmental Policy Act (NEPA) reviews to maximize efficiency for advanced reactors according to the findings in the NRC’s Draft Advanced Nuclear Reactor Generic Environmental Impact Statement Report. By implementing a technology-neutral framework and performance-based assumptions to determine environmental impacts, the advanced reactor GEIS would streamline the NEPA reviews for future advanced reactor applications and reduce environmental review timelines while upholding the important requirements of NEPA.

Status: Proposed Rule Sent to Commission for FR Publication — *Awaiting Commission Action*

3. Risk-Informed, Technology Inclusive Regulatory Framework for Advanced Reactors (Part 53) Rulemaking

Congress mandated the Risk-Informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking, also known as Part 53 for its reserved section in the CFR, under NEIMA. Under this mandate, the NRC is to put forth a final rule for the efficient, effective licensing of a wide-range of advanced reactor technologies by December 31st, 2027. However, the NRC has made this rulemaking a high-priority and supported a schedule to complete the rulemaking by the end of 2025.

The goal of the rulemaking is to develop a comprehensive regulatory framework tailored for advanced reactors based on principles of being technology-inclusive, risk-informed, and performance-based. While intended to be a

revolutionary step forward in reactor licensing and regulatory efficiency, the approaches reflected in the draft rule package have drawn concerns from stakeholders, including members of Congress and the nuclear industry. Additionally, the Part 53 rulemaking will include issues from a separate rulemaking on Financial Qualifications for Reactor Licensing that was disapproved by the Commission in July 2022. The financial qualifications rule will have significant implications for advanced reactor developers' ability to own and operate nuclear power plants through a power purchase agreement (PPA) model as a “merchant power plant applicant” rather than as a partner with a utility. As such, many issues that will determine the viability of business models and potential markets for SMRs and microreactors are at stake if the final rule does not come out to be as effective and streamlined as intended.

Status: Proposed Rule Sent to Commission for FR Publication — *Awaiting Commission Action*

4. Population Related Siting Considerations Guidance Update

The NRC's guidance documents do not have the ability to amend the CFR in the way that rulemaking activities do, however guidance has a substantial impact in defining how applicants are able to meet regulatory standards and move an application forward. The NRC staff proposed revising the “General Site Suitability Criteria for Nuclear Power Stations” guidance related to Reactor Site Criteria (Part 100) in the CFR. The population related siting considerations guidance is used to determine how far from a populated area a reactor must be sited to comply with such criteria.

Title 10 CFR Part 100 states that a reactor “should be located away from very densely populated centers”. The NRC has reflected this standard in guidance as a limitation on population density not to exceed 500 person per square mile (ppsm) within 20 miles of a reactor site. The revision would amend guidance to provide risk-informed and performance-based criteria to assess population-related siting issues for advanced reactors, while also identifying hypothetical major accidents that applicants must evaluate to satisfy the new approach.

Advanced reactor developers have combined knowledge of legacy nuclear technology, data from nuclear energy research conducted at US National Labs, and historical lessons with large light-water reactors (LLWRs) to develop new technology that is safer, more secure, and more versatile in comparison to LLWRs. As a result, advanced reactors have been designed to be sited close to, or within, population centers due to their enhanced passive safety profiles. The development of this guidance is crucial to enabling advanced reactors to be deployed for a wide range of scenarios—such as co-location with industrial facilities for decarbonization, desalination, or deployment of reactors on community microgrids. Modernized guidance that is risk-informed and performance-based will unlock the full potential of advanced reactors and allow developers to prove that a reactor technology is safe to site in areas with population density greater than 500 ppsm.

Status: Commission Approved (2-1) Staff Plan to Update Guidance — *Awaiting Staff Action*¹

5. Commission Policy Statement on New Reactor Licensing Reviews

Several NRC Commissioners have indicated a desire to produce a new policy statement that would outline Commission expectations for new reactor license application review timelines and direction regarding which elements of the application NRC staff should focus on.² A policy statement is an internal document that expresses the direction of the Commissioners in regard to specific Commission activities. As such, a strong policy statement on effective, efficient, risk-informed license application review would have direct impacts on the staff's disposition of new applications and implementation of regulatory guidance.

To achieve the necessary target of deploying 20 new reactor facilities by the end of 2035 and enabling the US to compete with Russia and China, the Commission must set firm expectations that reflect truly ambitious schedules for the safety and environmental reviews of applications for first-of-a-kind advanced reactor designs; and efficiently streamline these processes for subsequent, or next-of-a-kind, applications using the same design. Effectively, such a model would mean that while a new design may take 24 months to review, subsequent applications based on the same reactor

design would be completed in roughly half the time. A Commission policy statement that outlines aggressive review schedules and performance metrics, with support for improved management, dispute resolution, and community education practices, will enable the NRC to optimize advanced reactor reviews with a risk-informed focus on safety, effectiveness, and efficiency. The Commission needs to swiftly approve this activity and align the timeline for implementation with the completion of the Part 53 rulemaking.

Status: Not Started, Commissioners' Objectives Proposed — *Awaiting Commission Action*

Conclusion

Zooming Out: Why Commission Leadership Matters

For each of the actions noted above, the Commission has a major say. This includes shaping how a rulemaking or guidance revision moves forward, and in approving the final product that NRC staff develops. If a majority of Commissioners—which can be as low as two—voted to prevent the staff from moving forward with an approach, or steered the staff towards a less ambitious alternative, many of these significant activities would not be on the NRC's docket at the moment. As such, the need for bipartisanship and collaboration among Commissioners is essential to moving regulatory modernization forward at a zealous pace.

Four out of the five activities identified in the memo are currently awaiting the Commission's voting and, in some cases, specific direction on key issues within the proposed draft rule. It is the Commission's responsibility to act promptly so that these critical activities progress and are completed in a fashion that ensures usefulness and readiness for the multiple new advanced reactor applications that are expected by mid-decade. This responsibility includes acting on delayed rulemakings and setting aggressive implementation timelines for new policy.

The Commissioners of the NRC exercise a significant ability to shape the culture of the NRC, whether toward the status quo or towards modernization, which they balance with a responsibility to uphold "reasonable assurance of adequate protection" as noted by federal law. As such, ambitious, diverse, and thoughtful leadership is needed to ensure that the Commission takes every opportunity available to modernize regulations without short-changing safety. These actions include activities that the NRC has the full authority to expand without prior direction from Congress, such as updating the NRC's mission, enhancing public education of how safety is considered when a new facility is proposed, and developing ambitious policy statements on performance and public education.

The NRC and Congress must work together to ready the regulatory infrastructure for US technology as quickly as possible. Through cooperation and transparency regarding the Commission's needs and opportunities to grow, the US nuclear energy industry can be bolstered by both regulations and [policies to help America lead](#) in the development of advanced reactors. It's up to the Commission of the NRC to effect the vision of the Biden Administration and Congress by enabling US global leadership in clean energy, climate, and as a national security partner.

TOPICS

NUCLEAR 209

ENDNOTES

1. SRM-SECY-20-0045, “STAFF REQUIREMENTS – SECY-20-0045 – POPULATION-RELATED SITING CONSIDERATIONS FOR ADVANCED REACTORS”. July 13, 2022. <https://www.nrc.gov/docs/ML2219/ML22194A885.pdf>. Accessed 10/9/23.
2. Hearing on “Oversight of NRC: Ensuring Efficient and Predictable Nuclear Safety Regulation For A Prosperous America”. Timemark 2:21:20. June 14th 2023. <https://democrats-energycommerce.house.gov/committee-activity/hearings/hearing-on-oversight-of-nrc-ensuring-efficient-and-predictable-nuclear>