ALL PLANNED NRC RULEMAKING ACTIVITIES RELATED TO FUSION MACHINES

A Report for the
U.S. Senate Committee on Appropriations and the
U.S. House of Representatives Committee on Appropriations

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INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) developed this report as directed by the explanatory statement accompanying the Commerce, Justice, Science; Energy and Water Development; and Interior and Environment Appropriations Act, 2026 (Public Law 119-74) (Reference 1). Specifically, the explanatory statement directs the NRC to "provide notification not later than 60 days after the date of enactment of this Act outlining all planned rule-making activities related to fusion machines."

The NRC is actively developing a reliable and efficient regulatory framework for fusion machines and is on track to issue regulations related to fusion machines by December 2027, consistent with the Nuclear Energy Innovation and Modernization Act (NEIMA) (Reference 2). This effort will formally incorporate fusion machines into the NRC's existing regulatory framework for byproduct material.

Further, in response to Section 205(c) of the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024 (ADVANCE Act) (Reference 3), the NRC evaluated several existing internal and external certification frameworks to identify factors that could be leveraged to simplify the review process for certifying and licensing fusion machine designs intended for mass-production and scaled commercial deployment across multiple jurisdictions. The NRC documented the results of this evaluation in a report (Section 205(c) report) delivered to Congress on July 10, 2025 (Reference 4).

In alignment with the Congressional recommendation in Reference 1 to consider factors that may enable and accelerate commercialized deployment, the NRC is using the key findings of the ADVANCE Act Section 205(c) study to inform the development of a framework to support streamlined licensing of mass-manufactured fusion machines. The Section 205(c) report also documents several actions the NRC will take to ensure timely issuance of informed regulations and guidance to enable safe deployment of commercial fusion machines.

This report documents all currently planned and ongoing fusion-related rulemaking activities that the NRC is undertaking.

CURRENT NRC FUSION RULEMAKING ACTIVITIES

The NRC has made important strides in amending rules to provide regulatory certainty for near-term fusion machines. On February 26, 2026, the NRC published a proposed rule for fusion machines (Reference 5) and associated draft licensing guidance (Reference 6) in the *Federal Register* for a 90-day public comment period ending May 27, 2026. This rulemaking effort was initiated in response to NEIMA, which requires the NRC to complete rulemaking to establish a technology-inclusive regulatory framework for licensing advanced reactor technologies, including fusion machines. Following completion of the comment period, the NRC will proceed to finalize the rule, which will be completed by December 2027.

Prior to achieving this milestone, the NRC evaluated options to determine the appropriate approach for regulating fusion machines (Reference 7) and made the pivotal decision to perform a limited-scope rulemaking to incorporate the regulation of fusion machines into the NRC's existing regulatory framework for byproduct material. This decision was based on the risk profile of near-term fusion machine designs with hazards that can be safely and efficiently regulated within this performance-based, risk-informed framework.

In addition to the fusion rulemaking above, the NRC is performing a wholesale revision of its regulations, as required by Executive Order 14300, “Ordering Reform of the Nuclear Regulatory Commission” (Reference 8). In carrying out this mandate, the NRC is evaluating potential changes to requirements and guidance, including environmental reviews, that could increase the efficiency of byproduct material licensing actions, which apply to fusion machine applicants.

Finally, in January 2025, the NRC established the Materials Licensing Efficiencies and Processes initiative to identify enhancements to its materials licensing processes to streamline licensing reviews and enable efficient, timely, and predictable regulatory decisions. As part of this effort, the NRC launched an online licensing application submission portal and developed pre-application engagement guidance and tools (Reference 9) for materials license applicants to promote efficient and complete application submissions. These enhancements may benefit fusion machine applicants that choose to take advantage of these resources.

PLANNED FUSION RULEMAKING AND GUIDANCE DEVELOPMENT ACTIVITIES

This section outlines the NRC’s currently planned fusion-related rulemaking efforts specific to the near-term landscape of fusion regulation. The NRC is monitoring the industry’s progress towards fusion licensing and will consider accelerating the development of its planned guidance or regulations for fusion machines, if warranted.

LESSONS LEARNED FROM OPERATION OF FIRST COMMERCIAL FUSION MACHINE

As discussed above, the NRC published draft guidance with the proposed fusion rule that consolidates materials licensing information into one document to support fusion machine applications. This guidance is technology-neutral and can be used by all applicants regardless of the fusion machine design. Agreement States have already used this guidance to license fusion machines.

Looking ahead, as documented in the Section 205(c) report, the NRC will consider updates to, or the issuance of, new regulatory guidance for fusion machines following the licensing and initial operation of the first commercial fusion machine within the United States, which is expected to be operating as early as 2028 based on engagement with the industry. This guidance would capture the operational experience gained from the licensing, inspection, and operation of the fusion machine and address any regulatory gaps that may exist and apply broadly to the industry and regulators. The timing of this guidance will depend on industry progress, but the NRC anticipates its issuance within one year of initial operation of the first commercial fusion machine in the United States.

RULEMAKING TO ESTABLISH RISK-INFORMED, PERFORMANCE-BASED DESIGN CERTIFICATION FRAMEWORK FOR FUSION MACHINES

As discussed above, Section 205(c) of the ADVANCE Act mandated the NRC to evaluate risk-informed, performance-based, design-specific regulatory frameworks that could be used as models for a regulatory framework to support efficient licensing of mass-manufactured fusion machines. There is significant industry interest in developing fusion machine designs that are widely and rapidly deployable throughout the United States and internationally.

In response, the NRC updated its vision and strategy for fusion (Reference 10) and published a Fusion Program Roadmap (Reference 11) to outline planned actions to shift from establishment of initial regulations and guidance for fusion machines to a design certification framework that will enable efficient scaled commercial deployment of this technology. This rulemaking,

anticipated in 2028, will aim to establish a program that would facilitate certification of fusion machine designs through up-front safety reviews that could be leveraged across jurisdictional boundaries to streamline site-specific licensing applications.

To inform the timing of this framework, the NRC established a Fusion Industry Indicator Action Matrix, documented in Appendix B to Reference 10, that outlines milestones that will be monitored to assess industry readiness for guidance or regulations that will support licensing of mass-manufactured fusion machines. The action matrix further details associated actions the NRC will take following the achievement of each milestone.

In addition to the monitoring and action plan described above, the NRC is proactively initiating foundational work for a fusion machine design certification process, while the industry progresses on these milestones. Also documented in Reference 10, the NRC will be developing a technical and policy white paper to evaluate and address additional agency actions required to enable efficient certification and licensing of commercial fusion machines. The paper will address key considerations, including environmental review pathways, applicability of general licensing concepts, and evaluation processes for commercial fusion applications. This document will be completed by September 30, 2026, and will serve as a foundation for future rulemaking, guidance development, and stakeholder engagement.

As currently planned, the NRC will initiate rulemaking to establish a design certification framework for fusion machines following the successful licensing, construction, and operation of the first commercial fusion machine within the United States. The rule will be informed by the results of the implementation of the Fusion Industry Indicator Action Matrix and technical and policy white paper, and continued stakeholder engagement with the industry and Agreement States.

CODES AND STANDARDS

The NRC is monitoring the development of third-party industry codes and standards for fusion machines that could enhance safety and design consistency and will consider adopting them as progress continues. Depending on timing and scope, adoption or endorsement of these codes and standards could be a standalone activity or be consolidated into the other planned activities outlined in this report.

FEES

The NRC will establish both service and annual fees for licenses to possess, use, and produce byproduct material associated with fusion machines. These fees will be incorporated into the NRC's Fiscal Year 2027 Final Fee Rule and updated annually thereafter.

TECHNICAL READINESS

The NRC is taking steps to ensure both NRC and Agreement State personnel have access to the technical training and analytical tools they need to ensure readiness for licensing and inspection of fusion machines. On December 22, 2025, the NRC launched the training course "Fusion Fundamentals," which introduces participants to the foundational concepts, physics, and technologies underpinning nuclear fusion as a next-generation energy source. This training program can be used by both NRC and Agreement State staff and is the first in a planned series of technical courses to be developed to ensure technical readiness for staff working on fusion activities.

Additionally, following the publication of the proposed rule and associated guidance discussed above, staff will develop and provide training on its implementation. Looking forward, as the fusion industry matures and the first commercial fusion machines are successfully deployed, staff will work to develop an instructor-led fusion technology course similar to other NRC technology courses designed for various byproduct material operations licensed under the byproduct material framework (e.g., radiography, irradiators, well-logging, etc.).

Further, the NRC will perform an evaluation of its analytical computer codes to ensure the ability to perform high fidelity, independent safety analyses of the broad range of fusion machine designs under development. The NRC will update the codes, as necessary, to address any gaps identified during this evaluation.

CONCLUSION

The NRC's vision and strategy for fusion establishes a deliberate, proactive, and comprehensive approach to establishing a reliable, technology-neutral regulatory framework for fusion machines. The ongoing and planned rulemaking initiatives detailed in this report will provide regulatory certainty and facilitate the safe, efficient, and timely deployment of fusion technology in a manner that aligns with national energy objectives and industry needs.

ACRONYMS & ABBREVIATIONS

ADAMS	Agencywide Documents Access and Management System
ADVANCE Act	Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024
NEIMA	Nuclear Energy Innovation and Modernization Act
NRC	U.S. Nuclear Regulatory Commission

REFERENCES

1. Explanatory Statement Accompanying the Commerce, Justice, Science; Energy and Water Development; and Interior and Environment Appropriations Act, 2026, 172 CONG. REC. H255 (daily ed. Jan. 8, 2026).
2. Nuclear Energy Innovation and Modernization Act, Pub. L. No. 115-439, § 103, 132 Stat. 5565 (2019).
3. Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024, Pub. L. No. 118-67, div. B, § 205, 138 Stat. 1447 (2024).
4. "Study on Risk-Informed, Performance-Based, Design-Specific Regulatory Frameworks to Support Licensing of Mass-Manufactured Fusion Machines," July 10, 2025 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML25120A080).
5. "Proposed Rule: Regulatory Framework for Fusion Machines (3150-AL00; NRC-2023-0071)," 91 FR 9476 (February 26, 2026).
6. NUREG-1556, Volume 22, "Consolidated Guidance About Materials Licenses: Program Specific Guidance About Possession Licenses for Fusion Machines" Preliminary Draft, February 28, 2026 (ML24092A377).
7. SECY-23-0001, "Options for Licensing and Regulating Fusion Energy Systems," January 3, 2023 (ML22273A178 (package)).
8. Executive Order 14300, "Ordering Reform of the Nuclear Regulatory Commission," 90 FR 22587 (May 29, 2025).
9. U.S. Nuclear Regulatory Commission, "Materials Prospective Applicant and Pre-application Engagement Resources," (February 2026) https://www.nrc.gov/materials/miau/engagement-resources.
10. "Vision and Strategy: Regulating Fusion Machines Across the National Materials Program," Revision 1, January 7, 2026 (ML25344A070).
11. "Fusion Program Roadmap," October 29, 2025 (ML25301A006).