

NRC Public Meeting

Proposed Rule: Regulatory Framework for Fusion Machines

(NRC-2023-0071; 91 FR 9476)

March 25 & April 7, 2026



- Meeting Logistics
- Opening Remarks
- NRC Presentations
- Public Q&A



Posted times are estimated and, depending on the participation level, the meeting could adjourn earlier than scheduled. If there are concerns with a potential early meeting adjournment, please inform the point of contact for this meeting.



ML26070A178

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- Meeting Type: Information Meeting
- Participants are in listen-only mode until the designated comment period
- Meeting guidelines for participation will be maintained
- No regulatory decisions will be made at today's meeting



- NRC is not recording or transcribing the meeting
- Meeting is not avenue for submitting comments on proposed rule
 - Proposed rule Federal Register Notice (2/26/26, 91 FR 9476) describes how to submit timely written comments
- Comment period closes on May 27, 2026



Celimar Valentin Rodriguez, Acting Deputy Director
Division of Materials Safety, Security, State, and Tribal Programs
Office of Nuclear Material Safety and Safeguards
US NRC



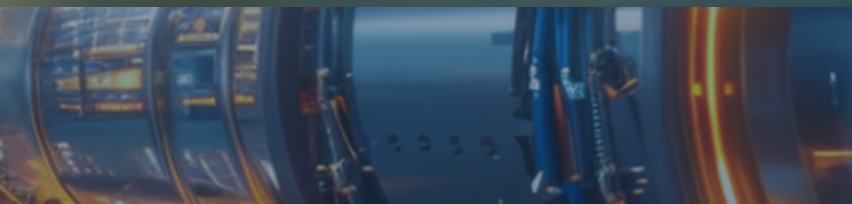
Proposed Rule Changes

Ed Harvey

Division of Materials Safety, Security, State, and Tribal Programs

Office of Nuclear Material Safety and Safeguards

U.S. NRC



How We Got Here

Jan. 14, 2019

The **Nuclear Energy Innovation and Modernization Act (NEIMA)**; signed into law

Jan. 3, 2023

NRC staff submitted SECY-23-0001, "Options for Licensing and Regulating Fusion Energy Systems"

Apr. 13, 2023

Commission issued SRM-SECY-23-0001 "Options for Licensing and Regulating Fusion Energy Systems"

July 9, 2024

The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act was signed into law on July 9, 2024, clarifying fusion-produced radioactive material is byproduct material

Dec. 11, 2024

NRC staff submitted the Fusion Machine proposed rule to the Commission, SECY-24-0085, "Proposed Rule: Regulatory Framework for Fusion Machines (3150-AL00; NRC-2023-0071)"

July 10, 2025

The NRC submitted "Study on Risk-informed, Performance-based, Design-specific Regulatory Frameworks to Support Licensing of Mass-manufactured Fusion Machines" to Congress in response to Section 205 of the ADVANCE Act

February 26, 2026

Published proposed rule and draft guidance for public comments (91 FR 9476).



Proposed Rule Language: Overview

Proposed Rule Changes to 10 CFR

*The posted unofficial redline
presents an easier format to
see the proposed changes
(ML25198A007)*

Adds a new definition of “fusion machine” and
modifies existing definitions of “byproduct material”
and “particle accelerator”

Application Requirements under 10 CFR 30.32(k)

Waste Disposal change under 10 CFR 20.2008(a)

*Environmental Report change under 10 CFR
51.60(b)(1)*



Proposed Rule Language: Revised Definitions

Byproduct material

any material that—(A) has been made radioactive by use of a particle accelerator, including by use of a fusion machine; and (B) if made radioactive by use of a particle accelerator that is not a fusion machine, is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity;

[10 CFR Parts 20, 30, 37, 50, 72, 110, 150, 170, and 171]

Particle accelerator

means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of 1 megaelectron volt, including fusion machines. For purposes of this definition, accelerator is an equivalent term.

[10 CFR Parts 20, 30, and 110]



Proposed Rule Language: New Definition

Fusion machine

a machine that is capable of—(1) transforming atomic nuclei, through fusion processes, into different elements, isotopes, or other particles; and (2) directly capturing and using the resultant products, including particles, heat, or other electromagnetic radiation.

[10 CFR Parts 20 and 30]



Proposed Rule Language: 10 CFR 30.32

* * * *

(k) An application for a specific license filed under this part for possession, use, and production of byproduct material associated with a fusion machine must include the following information:

(1) A general description of the fusion machine

(2) A summary of operating and emergency procedures, including, as applicable

(i) A description with diagram(s) of the radiation protection measures to be employed for the possession, use, and production of byproduct material associated with the fusion machine, including all interlocks, access control systems, shielding, and radiation monitors;

(ii) A description of the radioactive material handling procedures and inventory control procedures; and

(iii) A description of any other components or systems used to control radiation and radioactive material.



Proposed Rule Language: 10 CFR 30.32

(k) * * *

(2) * * *

(iv) As an alternative to paragraphs (k)(2)(i) through (iii) of this section:

(A) A description of any aspects of the fusion machine relevant to radiation safety that differ from the information listed in paragraphs (k)(2)(i) through (iii) of this section, and an explanation for how they ensure the possession, use, and production of byproduct material associated with a fusion machine can be performed safely; and

(B) Any other information requested by the NRC staff in preapplication communications to enable the NRC to evaluate whether the possession, use, and production of byproduct material associated with a fusion machine can be performed safely.



Proposed Rule Language: 10 CFR 30.32

(k) * * *

(3) A description of the applicant's organizational structure that describes the radiation safety responsibilities, authorities, and qualifications.

(4) Description of the staff training program for fusion machines and radiation protection.

(5) A description of the plan for inspection and maintenance of the fusion machine.

(6) A description of the methodology for radioactive material inventory.

*Additional conforming changes were proposed to 10 CFR 30.51 (Records), and 10 CFR 30.52 (Inspections) to incorporate production of byproduct material associated with fusion machines.



Proposed Rule Language: 10 CFR 30.33

(a) An application for a specific license will be approved if:

* * *

(6) In the case of an application for possession, use, and production of byproduct material associated with a fusion machine, the application demonstrates adequate training and planning to operate and decommission the fusion machine safely.



Proposed Rule Language:

10 CFR 20.2008

- (a) Licensed material as defined in paragraphs (3) and (4) of the definition of *Byproduct material* set forth in §20.1003 may be disposed of in accordance with part 61 of this chapter, even though it is not defined as low-level radioactive waste. Therefore, any licensed byproduct material being disposed of at a facility, or transferred for ultimate disposal at a facility licensed under part 61 of this chapter, must meet the requirements of § 20.2006. In addition, waste resulting from fusion machines must either be accompanied by an analysis showing the waste is manifested and labeled for disposal consistent with the description of the applicable waste class in § 61.7 of this chapter, based on the physical, chemical, and radiological characteristics of the waste, or be disposed of in a disposal facility that has completed a site-specific intrusion assessment that demonstrates the projected dose to an individual who inadvertently intrudes into the waste at the facility will not exceed 0.5 rem (5 mSv) per year.

Note: “Fusion machine” will be licensed material pursuant to paragraph (3) of the definition of “Byproduct material” in §20.1003.



Proposed Rule Language:

10 CFR 51.60

(b) As required by paragraph (a) of this section, each applicant shall prepare an environmental report for the following types of actions:

(1) Issuance or renewal of a license or other form of permission for:

* * *

(viii) Construction and operation of a fusion machine pursuant to part 30 of this chapter.



Draft Licensing Guidance

Allyce Bolger

Division of Materials Safety, Security, State, and Tribal Programs

Office of Nuclear Material Safety and Safeguards

U.S. NRC



- A license is granted to applicants that demonstrate:
 - Equipment and facilities are adequate to protect health and safety
 - Qualified by training and experience to use the material for the purpose requested
- NUREG-1556, Volume 22 “Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Possession Licenses for Fusion Machines” is guidance
 - Not all items will be applicable to every applicant
 - Additional discussion beyond the scope of the guidance may be needed for some applicants
- Information in application may become legally binding as a specific condition or incorporated by reference in the license



- Type/form/quantities of radioactive material possessed, used, and produced
 - Financial assurance or a decommissioning funding plan may be required (10 CFR 30.35)
 - Records important to decommissioning
- Purpose of radioactive material use
 - Use, production, storage for fusion activities
 - Possession and storage of incidentally activated products from fusion activities



- Training and Experience
 - Radiation Safety Officer
 - Listed on license
 - Responsible for radiation safety program
 - Individuals handling/using licensed material
 - Ancillary staff
 - Training should demonstrate experience with the types/quantities of material used and commensurate with job responsibilities



- Description of the facility and equipment
 - Facility diagram providing location of fusion machine and components involved in radiation protection
 - Description of fusion machine operation and tritium handling systems
 - Description of areas of radioactive material use, production, storage, transport
 - Shielding and access controls
 - Tritium handling systems and breeding blankets
 - Power failures and structural integrity



- Radiation Safety Program
 - Radiation monitoring
 - Material accountability and inventory
 - Dosimetry and bioassay
 - Effluents and environmental monitoring
 - Public dose
 - Operating and Emergency Procedures
 - Surveys, contamination, leak tests



- Emergency Plan
 - Dose evaluation if exceeding 10 CFR 30 Schedule C quantities
- Security
 - Applicability of 10 CFR 37 if possessing Category 1 or 2 quantities
 - NUREG-2155 “Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material”
- Waste Management
 - Decay-in-storage
 - Effluent release
 - Transfer
 - Disposal



Impact Assessments



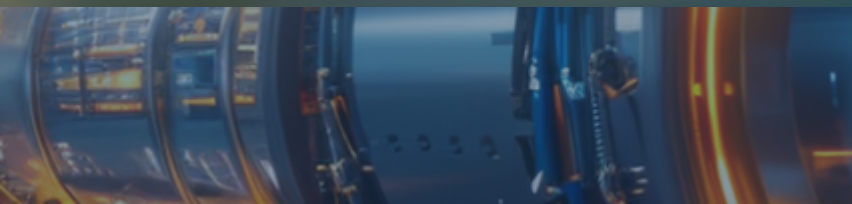
- Implementation of the proposed fusion machine regulations is consistent with the application of existing NRC regulations for a byproduct material facility
- The proposed requirements would either be:
 - administrative in application,
 - would be matters of procedure, or
 - provide clarity on licensing and regulating fusion machines
- The proposed requirements would not result in any new or different environmental impacts.
- A Finding of No Significant Impact is appropriate.
- The draft Environmental Assessment is available for public comment.



- Primary impact: clarifying how existing byproduct material regulations apply to fusion machines
- The benefits of safe and secure use of radiological materials are expected to be fully maintained while improving regulatory efficiency and providing for increased public confidence in the nuclear sector
- Provides cost savings to industry and to NRC. Implementation costs for Agreement State regulators are expected to exceed cost savings
- Cost savings are due to labor savings in clarified licensing process required for fusion machines
- Magnitude of cost savings is dependent on the unknown future of the fusion machine sector. Expected total net cost savings is \$150,000 per year over 20 years (2023 dollars, 7 percent discounting)
- The draft Regulatory Analysis is available for public comment



Additional Information



Specific Requests for Comment



Tritium
Reporting
Threshold



20.2008
Waste
Disposal
Options



20.2002
Fusion Waste
Disposal
Procedures



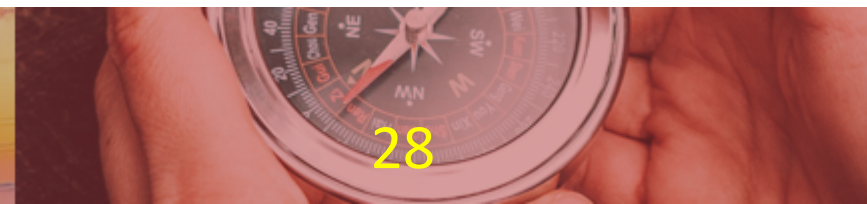
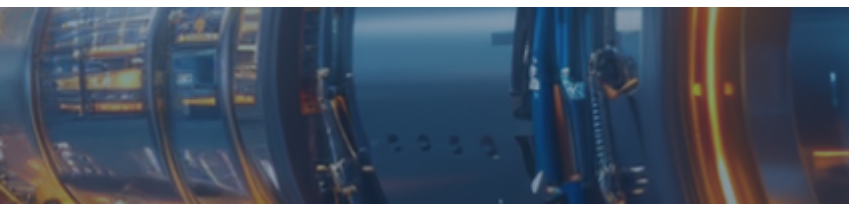
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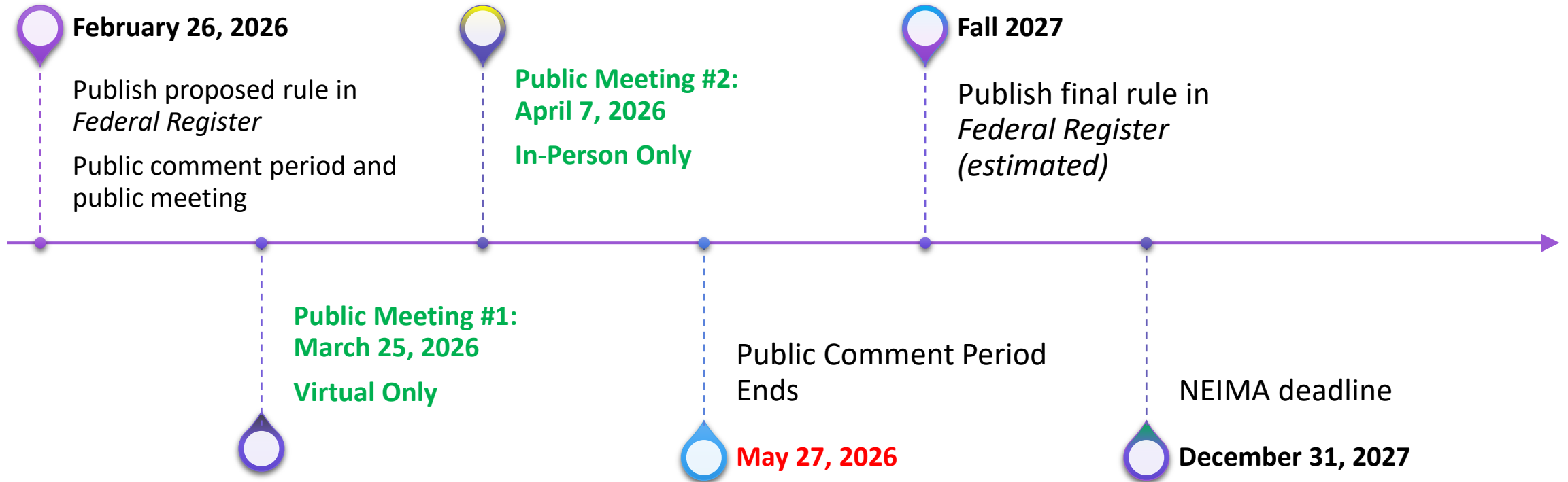
Compatibility
Categories &
Licensing
Process
Clarity



Particle
Accelerator
Definition –
unintended
consequences



Upcoming Milestones



- *NRC Public Website:* [Fusion](#)
- *Regulations.gov Rulemaking Docket :* [NRC-2023-0071](#)
(www.regulations.gov)
- *Meeting Feedback:*
<https://www.nrc.gov/pmns/mtg?do=details&Code=20260223>



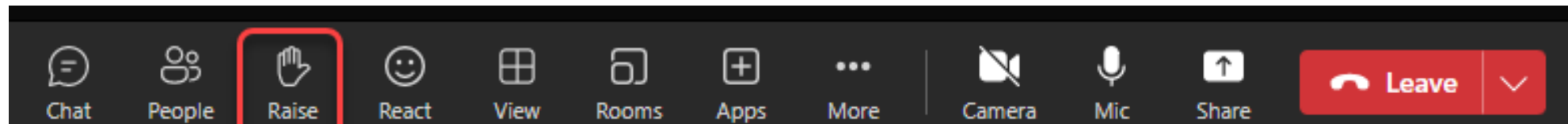
Questions and Answers



Virtual Participation



- 1) **“Raise”** your virtual hand to indicate your desire to be recognized
 - Teams: Use the “raise my hand” button
 - Phone: Press “*5”



- 2) **Wait** for the facilitator to acknowledge your turn to speak

- 3) **Unmute** yourself
 - Teams: Use the “unmute/mic” button
 - Phone: Press “*6”





Thank you for joining us today!

