

Public Meeting on the Proposed Rule: Regulatory Framework for Fusion Systems

U.S. Nuclear Regulatory Commission Public Meeting Summary

April 5 2024

Title: Proposed Rule: Regulatory Framework for Fusion Systems

Meeting Identifier: [20240278](#)

Date of Meeting: March 18, 2024

Location: Webinar (via Microsoft Teams)

Type of Meeting: Information Meeting with a Question-and-Answer Session

Purpose of Meeting:

The U.S. Nuclear Regulatory Commission (NRC) staff hosted a public meeting on the proposed rule that would establish the regulatory framework for fusion systems under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material." The purpose of this meeting was to share the staff's full preliminary draft NUREG-1556, Volume 22 guidance, share the revised preliminary proposed definitions and to receive feedback from external stakeholders on the proposed rule that would develop a regulatory framework under 10 CFR Part 30 for fusion systems.

General Details:

The NRC is proposing to amend its regulations in 10 CFR Part 30 to provide a regulatory framework for fusion energy systems.

As part of the proposed rule, the NRC staff also intends to issue, for public comment, the following supporting materials:

- draft guidance under a new volume (Volume 22) of NUREG-1556, "Consolidated Guidance About Materials Licenses"
- a draft regulatory analysis (cost analysis)
- a draft environmental assessment
- a supporting statement(s) for any proposed information collections under the Paperwork Reduction Act

This March 18, 2024, meeting, as a follow-up to the previous public meetings (October 11, 2023, November 1, 2023, November 9, 2023, and January 17, 2024), was focused on feedback from external stakeholders and sharing the full preliminary draft guidance.

During this virtual meeting, the staff provided revised preliminary proposed rule language regarding the definitions and provided the next milestone. The virtual meeting consisted of one NRC presentation with one handout (preliminary draft guidance: NUREG-1556, Volume 22) followed by a question-and-answer session where the public was provided an opportunity to pose any feedback and questions to the NRC. The meeting was well attended by 132 participants, including academia, Agreement States, Federal agencies, fusion industry, Fusion Industry Association, international stakeholders, non-government organizations, other members of the public, and NRC staff. A transcription of the

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meeting can be found in the Agencywide Documents Access and Management System (ADAMS), [ML24067A223](#).

Summary of Presentation:

Dennis Andrukat of the NRC opened the meeting, introducing himself as the rulemaking project manager for this rule and acting as the meeting's facilitator. He described the purpose of the meeting which was to provide specific topics of the preliminary proposed rule and guidance, and to listen to public feedback on what the rulemaking should accomplish. He then discussed the meeting logistics and advised participants on the features of the webinar platform. He noted the agenda in which the first half of the meeting included a presentation by the NRC staff, while the remaining half of the public meeting consisted of an open question and answer session. Instructions were provided for how members of the public attending via Microsoft Teams or via the phone could ask questions or offer comments. He encouraged public participation during the meeting from all stakeholders but noted that the NRC will not provide any formal responses to the feedback and questions offered during the meeting. He noted that this meeting will be transcribed, and that speakers needed to identify themselves and their affiliation for the record. Additional meeting logistics were provided before introducing the speakers for this public meeting.

He then turned the meeting over to the NRC's Theresa Clark, Deputy Director for the Division of Materials Safety, Security, State, and Tribal Programs (MSST) in the Office of Nuclear Material Safety and Safeguards (NMSS). She welcomed everyone and gave the opening remarks before turning the meeting over to Duncan White. She communicated the significance and effort to get out the full preliminary draft guidance and that feedback at these public meetings does help the NRC staff to better understand stakeholder ideas and concerns related to the development of the proposed rule.

Duncan White, of the NRC (NMSS/MSST/State Liaison and Agreement Programs Branch (SLPB)), is the rulemaking's technical lead for the NRC and commenced with the presentation. He began his slide presentation by providing a recent change to the preliminary proposed definitions of particle accelerator and fusion systems. These are revisions compared to the October 11, 2023, public meeting handout ([ML23258A145](#)) and the January 17, 2024, public meeting staff presentation ([ML23355A144](#)). He went on to showcase the full preliminary draft guidance (NUREG-1556, Volume 22), with focus on certain areas as highlighted in the presentation.

This concluded the presentation portion of the meeting.

Public Feedback and Questions:

Below is a summary of the feedback provided by the stakeholders for the NRC staff to consider as the NRC staff develops the draft proposed rule and guidance.

- The presentations resulted in several comments, questions, and suggestions for the NRC staff to consider regarding the preliminary draft guidance and revised preliminary proposed definitions.

Commented [SS1]: The link did not work for me btw...

Commented [DA2R1]: Thanks for checking. This is because this is the public ADAMS link and the transcript is not yet public (it will go public & the link will work, when this summary goes public)

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- A stakeholder asked if there are, or will be, any high-level agency safety goals/policy, similar to what the agency has for the [10 CFR] Parts 50 and 52 fission power plants?
- A stakeholder asked if there was a particular reason why the beginning of the guidance document used “risk-informed” instead of “performance-based” as used in other volumes of NUREG-1556? Staff to consider replacing with performance-based.
- Numerous stakeholders presented feedback related to the revised preliminary proposed definitions of “fusion systems,” and “particle accelerators,” including:
 - Several stakeholders, including fusion industry and DOE, asked about the revised fusion system definition’s use of “plasma” fusion with most suggesting reverting back to using “fusion reactions.”
 - A stakeholder asked what happens to components that get moved or removed, would they still be classified as part of the fusion system.
 - A stakeholder suggested to avoid using the term “facility” throughout the guidance document [Staff to consider doing the same with the proposed rule documentation.]
- A stakeholder asked about the criteria or threshold for what is considered a “near-term” fusion system for the purposes of this rulemaking.
- A stakeholder suggested the staff look into the Inflation Reduction Act for additional NEPA directions that could be applied to fusion systems.
- A stakeholder asked about the NRC’s advanced nuclear reactor generic environmental impact statement (a separate on-going rulemaking), and clarification on the applicability for use by research-and-development fusion systems.
- A stakeholder presented an example of a concern that the guidance would lead to a lot of essential discussions with the regulating body and which could be very cumbersome for an applicant to adequately meet: under Items 5 and 6, the applicant is to list the radionuclides expected for the fusion system and a list of those not anticipated.
- A stakeholder asked for clarification under Section 8.6 on the difference in the purpose indications for research-and-development versus other areas of the draft guidance.
- A stakeholder asked for clarification on why there were seismic guidance, which appeared too much like 10 CFR Part 100 requirements and that an applicant would have also have to meet the applicable building codes, including any seismic.
- A stakeholder commented that the Item 9 shielding discussion included language on inspections meant for NRC staff – is this guidance meant to be for applicants/licensees only? Or also for NRC staff?
- A stakeholder commented that this rule is aiming to be technology-neutral; however, some portions of the guidance refer to all fusion system designs having tritium while other places in the guidance refer to some or most fusion systems – stakeholder suggested consistency. In addition, the stakeholder asked if further guidance could be added for how non-tritium fusion designs should treat each guidance section.

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- Numerous stakeholders presented feedback related to Item 10: doses, including:
 - A stakeholder asked whether public dose should include accident or incident scenarios or just normal operations.
 - A stakeholder asked for clarification on the types of sources and activities that should be accounted for regarding effluent occupational dose.
- A stakeholder presented feedback related to Item 6: Purpose(s) for Which Licensed Material Will Be Used, including:
 - A stakeholder suggested adding Beryllium (Be) – as a toxic material – to Table 8-1 (Page 8-13) since it is extensively used in ceramic breeder blankets to help breed the needed tritium or if any pilot plant designs will be using the FLIBE (F+Li+Be) breeder that contains Be.
- Stakeholders presented feedback related to Item 11: Waste Management, including:
 - A stakeholder suggested replacing “disposal” with “disposal or recycling” throughout the report. The stakeholder noted that the recycling/clearance approach is essential for fusion that tends to generate sizable waste compared to fission. The stakeholder went on to note the adoption of this approach in the international community and that the IAEA will be publishing a TECDOC that strongly supports this approach.
 - A stakeholder suggested adding all NRC recycling and clearance documents in Page 4-1 in the list of APPLICABLE REGULATIONS. The stakeholder also mentioned their use of NUREG-1640, “Radiological Assessments for Clearance of Materials from Nuclear Facilities,” (2003 edition) to evaluate the clearance index for fusion materials.
- A stakeholder suggested that Appendix C, “Commencement of Construction at Existing and Proposed Byproduct Material Facilities,” include language to clarify what would and what would not be labeled as research-and-development. And the same for pilot plants, which the stakeholder thinks could be covered under research-and-development. The stakeholder also suggested adding a characteristic description related to limits on electrical production for research-and-development purposes.
- In general, stakeholders appreciated the staff’s release of the preliminary draft guidance and the interaction opportunities.

Closing:

The NRC’s Dennis Andrukat made brief closing remarks, including upcoming milestones and highlighting the staff has no further plans for another public meeting during the drafting stage and that the next public meeting would be held during the public comment period for the proposed rule. He then shared slides containing additional information and links regarding this rulemaking project including the rule’s www.regulations.gov Docket ID number ([NRC-2023-0071](https://www.regulations.gov/docket/2023-0071)), the public repository for key documents related to the development of this rulemaking, as well as contact information and the NRC’s public website for [Fusion Systems](https://www.nrc.gov/fusion).

In concluding, he informed participants of the [public meeting feedback form](#) available on the [NRC Public Meeting Schedule website](#) and ended the meeting by thanking everyone

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for their time and participation and that the NRC staff will be considering the feedback received during this public meeting.

The meeting ended at 3:08pm ET.

Action Items/Next Steps:

- The staff will review the public meeting's feedback for consideration in the drafting of the rule and guidance.
- Next public meeting to be held during proposed rule's public comment period.

Public Meeting Documents:

- [ML24067A206](#) – ADAMS PACKAGE: March 18, 2023 – Public Meeting -- Proposed Rule: Regulatory Framework for Fusion Systems
 - [ML24058A194](#) – 3/18/2024 – Notice of Public Meeting to Discuss the Proposed Rule: Regulatory Framework for Fusion Systems
 - [ML24067A207](#) – 3/18/2024 – Public Meeting Presentation – Proposed Rule: Regulatory Framework for Fusion Systems
 - [ML24067A227](#) – 3/18/2024 – Public Meeting Handout – Proposed Rule: Regulatory Framework for Fusion Systems
 - [ML24067A223](#) – 3/18/2024 – Public Meeting Transcript – Proposed Rule: Regulatory Framework for Fusion Systems
 - [ML24067A237](#) – 3/18/2024 – Public Meeting Summary -- Proposed Rule: Regulatory Framework for Fusion Systems

Information Referenced:

- [ML23355A142](#) – 1/17/2024 – Public Meeting Summary -- Proposed Rule: Regulatory Framework for Fusion Systems
- [ML23258A182](#) – 11/9/2023 – Public Meeting Summary -- Proposed Rule: Regulatory Framework for Fusion Systems
- [ML23258A169](#) – 11/1/2023 – Public Meeting Summary -- Proposed Rule: Regulatory Framework for Fusion Systems
- [ML23258A146](#) – 10/11/2023 – Public Meeting Summary -- Proposed Rule: Regulatory Framework for Fusion Systems
- [ML23258A145](#) – Handout: Preliminary Proposed Rule Language – October 2023
- [ML22273A178](#) – SECY-23-0001, "Options for Licensing and Regulating Fusion Energy Systems," dated January 3, 2023
- [ML23103A449](#) – SRM-SECY-23-0001, "STAFF REQUIREMENTS – SECY-23-0001 – Options for Licensing and Regulating Fusion Energy Systems," dated April 13, 2023
- [ML24068A081](#) – Letter, Commonwealth Fusion Systems to NRC dated March 6, 2024
- [ML23354A236](#) – Letter, Fusion Industry Association to NRC dated December 15, 2023
- [ML24005A181](#) – Letter, NRC response to Fusion Industry Association's December 15, 2023, dated January 12, 2024

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- NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"
<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0654/index.html>
- NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs"
<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1748/index.html>
- NUREG-1556, "Consolidated Guidance About Materials Licenses"
<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1556/index.html>
- NUREG-1640, "Radiological Assessments for Clearance of Materials from Nuclear Facilities"
<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1640/index.html>
- NRC Public Website for Fusion Systems
<https://www.nrc.gov/materials/fusion-energy-systems.html>
- NRC's Public Rulemaking Website - Regulatory Framework for Fusion Systems
<https://rulemaking.nrc.gov/Rules/Detail/2185>
- Regulations.gov Website for Docket ID: NRC-2023-0071
<https://www.regulations.gov/docket/NRC-2023-0071>
- NRC's Agreement States Website
<https://www.nrc.gov/agreement-states.html>

LIST OF ATTENDEES*

March 18, 2024, PUBLIC MEETING – Proposed Rule: Regulatory Framework for Fusion Systems

NRC

Adelaide Giantelli
Allyce Bolger
Araceli Billoch Colon
Binesh Tharakan
Booma Venkataraman
Caty Nolan
Caylee Kenny
Charles Murray
Christianne Ridge
Cindy Bladey
Cindy Rosales-Cooper
David Brown
David Cullison
Dennis Andrukat**
Derek Widmayer
Donald Palmrose
Duncan White**
Emma Duncan
Gary Purdy
Greg Bowman
Heather Frey
Helen Chang
Isaac Johnston
Jill Shepherd
Joey Rolland
Jonathan Fiske
Joseph Giacinto
Joseph Staudenmeier
Julie Ezell
Lisa Dimmick
Marilyn Diaz Maldonado
Michael Waters
Michelle Albert
Peter Habighorst
Ronald Raunikar
Scott Burnell
Sheldon Clark
Soly Soto Lugo
Suzanne Dennis
Ted Smith
Theresa Clark**
Trisha Gupta Sarma
Tyler Hammock

EXTERNAL STAKEHOLDERS

Aaron Suntag
Adam Ekstedt
Adam Stein
Addison Hall
Allan Offenberger
Alyse Peterson
Andrew Holland
Andrew Proffitt
Behnam Dastvareh
Ben Byboth
Brent Heilman
Brian Grierson
Bruce Pint
Cameron Goodwin
Cameron Tarry Hughes
Catherine Peters
Chris Ajemian
Christina Suarez
Christopher Salz
Colleen Nehl
Craig Jacobson
Cyril Draffin
Dan Daroy
David LaGraffe
David Reindl
Diana Grandas
Don Gregoire
Edward Waller
Eric Sezgen
Floyd DesChamps
Fred Beranek
Fred Hughes
Geerald Navratil
Jana Bergman
Jed Styron
Jeffrey Merrifield
Jessica Milligan-Taylor
John Echols
John Phillips
Joyeux Kranz (Court Reporter)
Kevin Britton
Kevin Quach
Laila El-Guebaly
Lauren Boldon
Leo Holland
Leshinskie, Anthony
Luke Olson
Lumsdaine, Arnold
Masashi Shimada
Matthew Lipka
Michael Ford
Michael Hua
Mike O'Neill
Mike Stephens
Pascal Dumont
Patrick White
Perry Young
Podobed, Serguei

EXTERNAL STAKEHOLDERS

Reg DeFoe
Rich Hawryluk
Ryan Wagner
Sai Zhang
Sally Forbes
Sara Castegini
Scott Hsu
Scott Landry
Shon Mackie
Sidney Fowler
Stefanie Blum
Steve Cowley
Susan Gallier
Szymon Mudrewicz
Todd Whitehorne
Tyler Ellis
Victoria Hypes-Mayfield
Yasmin Yacoby

* List does not contain attendees who participated via a phone line or who did not provide first and last names.

** Presenter