

U.S. Nuclear Regulatory Commission Public Meeting Summary

October 24, 2023

Title: Proposed Rule: Regulatory Framework for Fusion Systems

Meeting Identifier: [20231012](#)

Date of Meeting: October 11, 2023

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 are hosting a series of three public meetings on the proposed rule that would form 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 these three meetings is to share the staff's progress on the preliminary proposed rule language (on October 11, 2023), preliminary draft guidance (NUREG-1556, "Consolidated Guidance About Materials Licenses," Volume 22) (on November 1, 2023), and specific topics (on November 9, 2023). This meeting, the first of the three, focused on the staff's current preliminary proposed rule language. The staff encouraged feedback from all stakeholders during these meetings. The staff will consider the feedback; however, no formal responses will be issued. This feedback discussion was intended to help staff develop the proposed rule.

General Details:

The NRC is proposing to amend its regulations in 10 CFR 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- draft guidance under a new volume (Volume 22) of NUREG-1556
- a draft regulatory analysis (cost analysis)
- an environmental assessment
- a supporting statement for any proposed information collections under the Paperwork Reduction Act

This October 11, 2023, meeting was the first in a series of three public meetings to present the staff's current preliminary progress – and focused on the preliminary proposed rule language. The virtual meeting consisted of one NRC presentation providing an overview of the Commission's direction for this proposed rule and the staff's current preliminary proposed rule language followed by a question-and-answer session where the public was invited to pose any feedback and questions to the NRC. The meeting was well attended by 180 participants, including academia, Agreement States, federal agencies, fusion industry, Fusion Industry Association, international

stakeholders, non-government organizations, a tribal nation, other members of the public, and NRC staff.

Summary of Presentation:

Dennis Andrukat of the NRC opened the meeting, introducing himself as the Project Manager for this rule and acting as the meeting’s facilitator. Mr. Andrukat described the purpose of the meeting - to present an overview of the proposed rule and to listen to public feedback on what this rule should accomplish. Mr. Andrukat then discussed logistics of the meeting and advised participants on the features of the webinar platform. Mr. Andrukat noted the agenda in which the first half of the meeting will be presentations by the NRC staff and various stakeholders, followed by a short break, and the remaining half of the public meeting will be an open question and answer session. Mr. Andrukat provided instructions for how members of the public attending via Microsoft Teams or via the phone could ask questions or offer comments. Mr. Andrukat expressed the desire that the meeting will help the NRC staff better understand stakeholder ideas and concerns related to the development of the proposed rule. Mr. Andrukat 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. Mr. Andrukat then introduced the speakers for this public meeting.

Mr. Andrukat then turned the meeting over to the NRC’s Adelaide Giantelli, Branch Chief for the State Agreement and Liaison Programs branch (SLPB) in the Division of Materials Safety, Security, State, and Tribal Programs (MSST) in the Office of Nuclear Material Safety and Safeguards (NMSS). Ms. Giantelli welcomed everyone and gave the opening remarks before turning the meeting back over to Mr. Andrukat.

The meeting then commenced with the presentations and Mr. Andrukat turned the meeting over to the rulemaking’s technical lead: the NRC’s Duncan White, NMSS/MSST/SLPB. Mr. White began his slide presentation by providing a short overview of the background of the rulemaking. Mr. White highlighted the Commission direction to pursue a regulatory framework under the Part 30 byproduct material framework and where we are within the NRC’s rulemaking process.

Mr. White continued by presenting the preliminary proposed rule language for 10 CFR Parts 20, 30, and 51 including definitions, content of applications, waste management, and environmental.

This concluded the presentation portion of the meeting.

Public Feedback and Questions:

Below is a summary of the feedback offered by the stakeholders for the NRC staff to consider as they develop the draft proposed rule and the draft implementation guidance.

- In general, stakeholders continued to have no objection for the proposed use of a 10 CFR Part 30 byproduct material regulatory framework.
- The NRC staff’s presentation and handout offered several comments, questions, and suggestions for the NRC staff to consider including, terminology/definitions, waste management, environmental, and general process.

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

- Numerous stakeholders presented feedback related to the development of the proposed rule, including:
 - A stakeholder asked about the rulemaking timeline and if the NRC had the needed experience and resources to complete the rulemaking and guidance. Another stakeholder asked if regulation efforts are moving fast enough for the commercial implementation of fusion energy.
 - A stakeholder asked how the proposed regulations would handle a fusion technology that is not explicitly described in this rulemaking. *For example, lattice confinement fusion combined with inertial confinement fusion is emerging as an option for affordable fusion prototypic neutron sources and may one day soon become interesting as an energy source.*
 - A stakeholder asked if quality control would be part of the licensing process.
 - A stakeholder asked if there are other countries already regulating fusion R&D that we could glean some insights from or are we pioneering the concept.
- Numerous stakeholders presented feedback related to terminology of the preliminary proposed definitions, including:
 - A stakeholder asked for clarification on what would be covered by near term known fusion systems.
 - A stakeholder asked if NRC is purposefully using the term “nuclear fusion” in the Part 20 and Part 30 definitions because this could cause confusion, as “nuclear” is traditionally associated with “fission”, and therefore Part 50.
 - A stakeholder used the term “power plant” to which the *NRC staff clarified that the NRC is steering clear of using the terms “power plant” and “reactor” as those are traditionally associated with the current operating fission nuclear power plants and the 10 CFR Part 50 & 52 frameworks.*
 - A stakeholder asked why the NRC was proposing a new term (“fusion systems”) as opposed to amend the current “accelerator” term.
 - A stakeholder presented a comment that the NRC should consider focusing the “fusion system” definition on fusion devices to eliminate any notion that the definition would or could encompass more than what is necessary to be regulated.
- Numerous stakeholders presented feedback related to environmental, including:
 - A stakeholder asked whether the NRC would propose environmental/energy justice regulation for fusion systems.
 - A stakeholder asked how an environmental assessment would be carried out and what’s the current experience level with licensing tritium on a scale relevant to fusion.
 - A stakeholder asked, related to categorical exclusions, where to find definitions or guidelines for what qualifies as research and development (R&D) activities.
 - *Staff pointed to 10 CFR 30.4 - Research and development means:*
 - (1) *Theoretical analysis, exploration, or experimentation; or*

(2) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials and processes. "Research and development" as used in this part and parts 31 through 35 does not include the internal or external administration of byproduct material, or the radiation therefrom, to human beings.

- Numerous stakeholders presented feedback related to waste management. Feedback included:
 - a tribal nation stakeholder asked where radioactive waste would be disposed and if there would be specific procedures for such disposal. The stakeholder noted the no landfill in Alaska must accept any kind of contaminated waste and that's just stuff like petroleum products.
 - a stakeholder asked if the radioactive waste from the fusion energy systems would need to show that they meet the waste acceptance criteria (WAC) of a disposal facility before they will get a license to operate.
 - a stakeholder asked if NRC plans to have separate mid to long term storage facilities (once implemented) for fusion waste vs fission waste containers. The stakeholder noted that this question might be more for Department of Energy or the Government Accountability Office, but they are very interested in the monitoring of unknown unknowns of those decays compared to each other.
 - a stakeholder asked whether existing LLW repositories could handle tritiated fusion waste. Another stakeholder elaborated that the concern about tritiated waste may also be whether the current facilities have evaluated the greater amount of tritium waste that they may receive from new fusion facilities that generate a larger amount of the waste (since the waste tables in Part 61 were generated so long ago these facilities were obviously not included in the waste stream inventories at that time).
- General process feedback included:
 - a tribal nation stakeholder asked when the NRC will be accepting official comments on this proposed rulemaking.
 - a stakeholder asked about NRC's discretion in determining the scope and definition of the proposed rulemaking.
 - a stakeholder asked whether the third public meeting (on November 9, 2023) will consist of new NRC presentation or planned to only receive stakeholders' comments.
 - a stakeholder asked when will the preliminary draft guidance be out for the 11/1 public meeting?
 - a stakeholder asked if written letters submitted to the NRC count as an appropriate mechanism to correspond with the NRC during rulemaking development.
- In general, stakeholders presented a friendly discussion environment and appreciated the staff's progress and interaction opportunities.

Closing:

Mr. Andrukat made brief closing remarks, thanking everyone for their time and attention. Mr. Andrukat displayed a slide with the rule's www.regulations.gov Docket ID number (NRC-2023-0071), the public repository for key documents related to the development of this rulemaking, as well as contact information and the NRC's new public website for [Fusion Systems](http://www.nrc.gov/materials/fusion-energy-systems.html).

Mr. Andrukat informed participants of the [public meeting feedback form](https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1556/index.html) available on the [NRC Public Meeting Schedule website](https://www.nrc.gov/rulemaking/rules/detail/2185) and ended the meeting by stating that the NRC looks forward to the public's comments on the proposed rule.

Action Items/Next Steps:

- The staff will review the public meeting's feedback for consideration in the drafting of the rule and guidance.
- The next public meetings will be held on November 1, 2023, and November 9, 2023.

Public Meeting Documents:

- [ML23258A139](https://www.nrc.gov/reading-rm/doc-collections/ml/2023/2023-0071-001) – ADAMS PACKAGE: 10/11/2023 – Public Meeting -- Proposed Rule: Regulatory Framework for Fusion Systems
 - [ML23254A325](https://www.nrc.gov/reading-rm/doc-collections/ml/2023/2023-0071-001) – 10/11/2023 – Notice of Public Meeting to Discuss the Proposed Rule: Regulatory Framework for Fusion Systems
 - [ML23258A147](https://www.nrc.gov/reading-rm/doc-collections/ml/2023/2023-0071-001) – 10/11/2023 – Public Meeting Presentation -- Proposed Rule: Regulatory Framework for Fusion Systems
 - ML23258A145 – 10/11/2023 – Public Meeting Handout – Preliminary Proposed Rule Language: Regulatory Framework for Fusion Systems
 - ML23258A146 – 10/11/2023 – Public Meeting Summary -- Proposed Rule: Regulatory Framework for Fusion Systems

Information Referenced During Public Meeting:

- [ML22273A178](https://www.nrc.gov/reading-rm/doc-collections/ml/2022/2022-001) – SECY-23-0001, "Options for Licensing and Regulating Fusion Energy Systems," dated January 3, 2023
- [ML23103A449](https://www.nrc.gov/reading-rm/doc-collections/ml/2023/2023-001) – SRM-SECY-23-0001, "STAFF REQUIREMENTS – SECY-23-0001 – Options for Licensing and Regulating Fusion Energy Systems," dated April 13, 2023
- NUREG-1556, "Consolidated Guidance About Materials Licenses," <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1556/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>
- Low-Level Waste Compacts and the four current LLW facilities in the US: <https://www.nrc.gov/agreement-states.html#compacts>

LIST OF ATTENDEES*

October 11, 2023, PUBLIC MEETING – Proposed Rule: Regulatory Framework for Fusion Systems

NRC

Aaron Kwok
Adelaide Giantelli**
Alexandra Terres
Allyce Bolger
Andrew Carrera
Barry Miller
Beth Alferink
Binesh Tharakan
Bob Orlikowski
Boby Abu-Eid
Brian Harris
Candace Spore
Carolyn Wolf
Carrie McCann
Catherine Kanatas
Cathy Nolan
Caylee Kenny
Christianne Ridge
Christopher Grossman
Christopher Ulmer
Cindy Bladey
Cindy Rosales-Cooper
Colleen Casey
Daniel Shaw
Dave McIntyre
David Brown
David Cullison
Dennis Andrukat**
Derek Widmayer
Duane White
Duncan White**
Emma Duncan
Helen Chang
Huda Akhavannik
Isaac Johnston
Jackie Cook
James Maltese
Janelle Jessie
Jill Shepherd
Joey Rolland
John Hughey
Jonathan Fiske
Joseph Staudenmeier
Kevin Bernstein
Lee Smith
Linda Howell
Lisa Dimmick
Mari de Jesus
Marilyn Diaz Maldonado
Michael Waters
Michelle Albert
Nicolas Mertz
Patricia Cline-Thomas
Patricia Jehle
Raj Iyengar
Ronald Raunikar
Ross Wagner

EXTERNAL STAKEHOLDERS

Aaron McOwen
Aaron Short
Adam Boyd
Aina Lagor
Alex Somers
Alyse Peterson
Andrea Peterson
Andrew Holcomb
Andrew Holland
Andrew Proffitt
Ashley Forbes
Augustinus Ong
B Colling
Brenda Garcia-Diaz
Brian Grierson
Brian Vamvakias
Cameron Goodwin
Cameron Hughes
Cara MacDonald
Charles Burns
Charlyne Smith
Christopher Salz
Colleen Nehl
Corinne Mitchell
Dan Garisto
Dave Babineau
Devin Mussell
Diego Saenz
Don Gregoire
Eddie Grant
Eric Sezgen
Eric Smith
Evan Koelker
Floyd DesChamps
Fred Hughes
Gene Nardella
Guinevere Shaw
Heather Jackson
Holly Flynn
Ian Miner
Isaac Gonzalez
James Klein
James Stubbins
Jana Bergman
Jane Hotchkiss
Jeffrey Bartelme
Jeffrey Semancik
Jerry Bingaman
Jon Menard
Jonathan Musgrove
Juliana Pacheco Duarte
Justin Cochran
Justin Cody
Kaci Studer
Yutaka Kadoya
Karen Gibson
Kevin Kunder
Kieran Furlong

EXTERNAL STAKEHOLDERS

Kyle Walton
Laila El-Guebaly
Lisa Davies
Luke Olson
M Tobin
Marion Cofer
Mary Woollen
Matthew Cooksey
Megan Shoher
Megan Wart
Melanie Snyder
Michael Costello
Michael Ford
Michael Hua
Miguel Cortez Jr
Mike O'Neill
Mike Stephens
Mirza Hamzic
Nabaraj Pokharel
Nathan Saunders
Nejdet Erkan
Pascal Dumont
Phillip Peterson
Pieter (SCSP)
R. Edelman
Rich Hawryluk
Richard Chiolero
Rob Burg
Rob Sweeney
Robert Jennings
Robert Sindelar
Ross MacDonald
Sachin Desai
Saira Hashmi
Sally Forbes
Sam Wurzel
Sara Castegini
Scott Brennan
Scott Clausen
Scott Hsu
Sidney Fowler
Stefanie Blum
Stephanie Freeman
Stephen Burdick
Stephen O'Hearn
Steven Pope
Sujayshen Meganathan
Susana Reyes
Tatsuya Sakurahara
Thomas Davis
Timothy Krentz
Todd Clark
Toni Hoffhine
Tyler Ellis
Victoria Diana Hypes-Mayfield
Wally Johnston

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

** Presenter