

# FUSION INDUSTRY ASSOCIATION

Fusion Industry Association  
800 Maine Ave SW  
Suite 223  
Washington, DC 20024

October 4, 2021

The Honorable Christopher T. Hanson  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C., 20555-0001

Dear Chairman Hanson:

As the unified voice of the fusion industry, the Fusion Industry Association (“FIA”) is writing to update the U.S. Nuclear Regulatory Commission (“NRC”) regarding your efforts to create the appropriate regulatory framework for fusion energy.

This letter is a follow up to our recent meetings with your staff and with your fellow Commissioners. As discussed in those meetings, the FIA has requested a six-month extension of the time frame for the NRC Staff to prepare an options paper they plan to present to the Commission on fusion regulation. The extension will allow for greater engagement and understanding of fusion technology, risk, and legal requirements. Further engagement will better develop the issues applicable to a regulatory framework for fusion.

This request was made in a [July 30 letter](#) from the FIA to the EDO, Margie Doane, proposing to facilitate monthly meetings during the six-month extension period to discuss regulatory topics applicable to fusion energy. The decision, however, is up to the Commissioners, not the staff, to grant an extension on the time provided to draft the options paper.

As a part of this plan, the FIA attaches a six-month outline of proposed engagement opportunities that would help increase engagement and understanding of fusion-specific regulatory issues. The FIA presents this reasonable request to the Commission that they grant the staff additional time to draft the options paper to allow us to participate in these engagement meetings.

Sincerely,

A handwritten signature in black ink, appearing to read "Andrew Holland". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Andrew Holland  
Chief Executive Officer  
Fusion Industry Association

cc: Commissioner Jeff Baran  
Commissioner David A. Wright  
Margaret Doane, Executive Director for Operations  
Andrea Vail, Director of the Office of Nuclear Reactor Regulation

Attachment: Fusion Industry Association Proposed Roadmap for NRC Regulatory Engagement

## **Fusion Industry Association Proposed Roadmap for NRC Regulatory Engagement**

In its [July 30, 2021 letter](#) to the U.S. Nuclear Regulatory Commission (NRC), the Fusion Industry Association (FIA) proposed that the NRC staff extend the timeline for preparation of a regulatory options paper for Commission consideration by six months, to allow greater engagement with FIA and understanding of the fusion technologies that the NRC intends to regulate. The FIA believes that this time could be productively used to build engagement between the commercial fusion industry and the NRC, and allow FIA members to share information about the scale, scope, time frame, and safety case of commercial fusion designs, and facilitate the NRC's development of an appropriately tailored risk-informed regulation to govern commercial fusion devices and facilities.

FIA's proposed time frame would involve six meetings, held once a month, between the NRC and members of FIA (and outside entities as appropriate). The meetings would be planned to enhance the NRC's understanding of the fusion technologies to be regulated, explore the more specific areas of risk associated with fusion, and finally to discuss regulatory frameworks for licensing fusion facilities and managing those risks.

The meetings would follow the following outline:

### **Session 1 – Overview of Commercial Fusion Technologies and Designs, Scale, and Timeframes**

This session would serve as an opportunity for FIA to provide an overview to the NRC about the variety of technologies being developed by the commercial fusion industry, help the NRC understand the scale of those technologies, and discuss the time frame commercial developers currently anticipate for bringing those technologies to commercial operation.

This session would help the NRC understand that even though there is a wide array of commercial fusion technologies, none of those technologies approaches the size of a project like ITER or DEMO. The participants can further explain how the risk profile of these devices appear similar in many ways to particle accelerators currently fielding across the country. While this session would not go significantly into discussions of specific risks, developers' presentations could note the (small) amount of tritium used by their designs, the safety features that are employed that are commonly used in other circumstances, as well as the smaller footprint and planned MW.

Another key goal of this session would be to communicate to the NRC the time frames in which FIA members anticipate hitting certain milestones, such as building a fusion demonstration device, a pilot plant, and finally commercial plants, as well as discussing the relevance of NRC regulation and licensing timelines to each of those stages.

The overall goal from the session would be for the NRC to come away with an enhanced awareness of the wide variety of commercial fusion designs, all of which are smaller in scale and risk than facilities like ITER or DEMO.

## **Session 2 – Tritium Management**

Tritium is considered by many to be the largest potential risk (albeit still small) for fusion devices and facilities. Therefore, the second session would focus on tritium management issues, including tritium breeding, extraction, storage, and handling systems, as well as management of tritium off-gassing and recovery. Approaches discussed herein can be compared and contrasted to what is anticipated for ITER and DEMO.

Presenters for this session could include FIA members who intend on using DT fusion for their commercial design, as well as at least one FIA member who is planning on using tritium in a test facility in the near future.

This session could include individuals from the Canadian Nuclear Safety Commission (CNSC) due to the CNSC's significant and longstanding experience with tritium management and approach to fusion regulation. FIA also believes that the Canadian Nuclear Laboratories (CNL), which has significant expertise in Tritium management, could also potentially provide useful insights on the civilian tritium management activities. Current licensees who possess or have possessed tritium may also be potential participants.

Finally, this session could include a presentation from the NRC Office of Research regarding its ongoing research activities in this area as well as engagement with outside experts including the Department of Energy and private research laboratories or consultants. This would allow the Agency to be transparent about its capabilities and expertise in this area.

## **Session 3 – Radioactive Waste and Dust Management**

One other area of potential risk for some fusion devices and facilities is the generation of activated materials and dust produced during operations, resulting in low-level waste. This session would discuss how fusion devices and facilities intend to manage low level radioactive waste, and include a discussion of potential day-to-day management, activation, handling of activated materials, maintenance in-vessel and removal/disposal of activated elements at periodic maintenance intervals, and container design and handling.

Potential participants could also include NRC licensees who currently manage low-level radioactive waste materials and how they could manage the generation of this material. This session would also discuss fusion facilities' plans for ongoing waste removal during operations, decommissioning and considerations regarding financial assurance for decommissioning.

This session could involve a discussion of the NRC's current approach for regulating low level radioactive wastes. This would provide stakeholders a better understanding regarding the Agency's capabilities and current practices in this area.

## **Session 4 – Shielding, Operational and Occupational Considerations**

This session would focus on the operational and occupational considerations of the proposed fusion devices and facilities. It can address shielding requirements for planned facilities, the types of radiation at issue, and how they compare to shielding requirements for current accelerator facilities or users of byproduct materials. It also could discuss the types and the appropriate level of training needed for device and facility operators, potential worker dose exposure and safety,

and impact during operation on areas outside the facility. The approaches anticipated by FIA members can be compared and contrasted to what is planned for ITER and DEMO.

### **Session 5 – Accident Scenarios**

This session would discuss potential accident scenarios with the different types of fusion facilities. Topics can include wall deterioration, disruptions or magnet failures, ventilation (noble gas production), loss of vacuum, loss of coolant, damage to the tritium management system, emergent site response / onsite emergency operations, the need (or lack thereof) for off-site response, and the applicability of emergency planning areas.

Because the NRC by this time would hopefully have a better understanding of different fusion technologies and risks, the NRC could provide more guidance on the issues they would like to explore, and presentations could be developed to those topics. It may also be appropriate to discuss the views of the Office of Nuclear Security and Incident (NSIR) on the secure storage of tritium at the relevant facilities that intend to utilize this material.

### **Session 6 – Regulatory Frameworks**

This final session would focus on discussion of the best regulatory approach to regulating fusion. This would essentially cap off the series of meetings by discussing the risks presented by fusion technologies and how they might align with risks controlled for under the existing Part 30/materials framework.

## Chairman Resource

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**From:** Fowler, Sidney L. <sidney.fowler@pillsburylaw.com>  
**Sent:** Monday, October 04, 2021 5:16 PM  
**To:** Chairman Resource  
**Cc:** Andrew Holland; Merrifield, Jeffrey S.  
**Subject:** [External\_Sender] Letter from the Fusion Industry Association  
**Attachments:** FIA Letter to Chairman and Commissioners 10.4.21.pdf

Please find attached a letter submitted on behalf of the Fusion Industry Association.

Best regards,

Sid Fowler

**Sidney L. Fowler | Senior Associate**

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