

**From:** [sarah.uraniumwatch.org](mailto:sarah.uraniumwatch.org)  
**To:** [Chowdhury, Prosanta](#); [Lynch, Steven](#)  
**Subject:** [External\_Sender] Comments on today's "Advanced" Reactor meeting  
**Date:** Wednesday, November 10, 2021 5:08:09 PM  
**Attachments:** [UW\\_NRC-2019-0062\\_Comments\\_53FRSubPartA\\_081021.pdf](#)

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Dear Mr. Chowdhury and Mr. Lynch,

Attached are my comments to NRC staff in regards to the proposed Part 53 Rulemaking, specifically, the Subpart A definition of "advanced" nuclear reactor. These comments are also relevant to the various NRC staff efforts to develop additional regulatory and guidance frameworks for reactor technologies deemed "advanced."

My comments relate to the NRC's use of the term "advanced" to describe new or old reactor technologies and in various NRC regulatory and guidance discussions.

Further, there is nothing "advanced" about a technology that produces highly radioactive wastes for which there is no permanent repository for disposition and long-term care and monitoring, and none anticipated in the near future.

I find no acceptable basis for the use of the term "advanced" nuclear reactor by the NRC for any organizational or regulatory purpose.

Please share my concerns with other NRC staff.

Sincerely,

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August 10, 2021

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RE: Docket ID NRC-2019-0062. 10 CFR Part 53 Rulemaking; Risk Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors. 85 Fed. Reg. 24387, November 6, 2020. Comments on Subpart A.

Dear Mr. Beall and Mr. Reckley:

Below please find comment on the draft proposed rule, 10 C.F.R. Part 53, Subpart A, submitted by Uranium Watch. Uranium Watch is a public interest 501(c)(3) organization. Uranium Watch has been closely following the Nuclear Regulatory Commission's (NRC's) NuScale Power LLC Small Modular Reactor Design Certification Process.

## 1. Part 53 Proposed Rule

These comments on 10 C.F.R. Part 53, Subpart A - General Provisions, reference the Preliminary Proposed Rule Language dated June 1, 2021.<sup>1</sup> Comments will focus on the Section 53.020 Definition of Advanced nuclear plant [or facility].

1.1. The proposed regulation 10 C.F.R. Part 53, Subpart A, Section 53.020, defines "Advanced nuclear power plant":

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<sup>1</sup> <https://www.nrc.gov/docs/ML2114/ML21148A062.pdf>

Advanced nuclear plant [or facility] means a utilization facility consisting of one or more advanced nuclear reactors [as defined in NEIMA] and associated co-located support facilities, which may include one or more reactor modules, [using nuclear fission, nuclear fusion, or accelerator-driven reactor technologies] that are used for producing power for commercial electric or other commercial purposes. The advanced nuclear plant includes the collection of sites, buildings, radionuclide sources, and structures, systems, and components for which a license is being sought under this part.

1.2. The Section 53.020 definition relies on the Nuclear Energy Innovation and Modernization Act (NEIMA) definition of “advanced nuclear reactors”

“a nuclear fission or fusion reactor, including a prototype plant (as defined in sections 50.2 and 52.1 of title 10, Code of Federal Regulations (as in effect on the date of enactment of this Act)), with significant improvements compared to commercial nuclear reactors under construction as of the date of enactment of this Act, including improvements such as —

- (A) additional inherent safety features;
- (B) significantly lower levelized cost of electricity;
- (C) lower waste yields;
- (D) greater fuel utilization;
- (E) enhanced reliability;
- (F) increased proliferation resistance;
- (G) increased thermal efficiency;
- or (H) ability to integrate into electric and nonelectric applications.

2. The NRC should not rely on the NEIMA definition of “advanced nuclear reactor.” “Advanced nuclear reactor” is a public relations term, not a regulatory term that has been defined with any accuracy. The NEIMA definition of “advanced nuclear reactor” is vague, contradictory, and has no scientific, technical, or regulatory basis. There are a number of issues with this definition.

2.1. The NEIMA advanced reactor definition references eight (8) “significant improvements,” compared to earlier commercial nuclear reactors. The definition does not state how many of these “improvements” a reactor design must have to be considered “advanced.” The definition does not indicate whether a reactor can be considered “advanced” if it meets one or more criteria, but does not meet another criteria in a significant manner. For example, some new reactor designs, such as the NuScale Power,

LLC, Small Modular Reactor considered for a design certification by the NRC, has higher waste yields than existing commercial reactors.

The NEIMA definition and, therefore, the NRC's definition of "advanced nuclear reactor" does not provide a regulatory evaluation explaining the methodology that will be used to determine that a specific new design can be considered to be "advanced" and subject to the new Part 53 regulations and applicable guidance.

2.2. The NEIMA definition uses the terms "additional," "significantly lower," "lower," "greater," "enhanced," and "increased." However, there is no baseline information, so one does not know how "lower," "significantly lower," "greater," "enhanced," or "increased" will be determined and what, exactly, will be evaluated or measured. Also, since these are new designs with no operational history, how and when will the NRC determine that a specific design meets any of these or other criteria. There is no mention of how uncertainties will be addressed in these determinations.

2.3. According to the NEIMA definition, a new design should have "additional inherent safety features." The definition does not explain how the NRC will determine whether a new design has inherent safety features and the significance of those features. There is no mention of features in a new design that may be less safe in some respects than current conventional reactor designs. There is no mention of how many additional "inherent safety features" will be required. There is no information as to how the NRC will determine whether the inherent safety features are not balanced by new safety considerations that are not present in current reactor designs, making them less safe.

2.4. The NEIMA definition states that a new design should have a "significantly lower levelized cost of electricity." There is no baseline levelized cost of electricity (LCOE) to be used for comparison, no mention of how the LCOE will be determined, or how the "significance" will be determined. LCOE is the average cost of energy over the life of a reactor. As far as I know, that information is not provided to the NRC in a design application and likely not in a Combined License (COL) application. Since these new designs have no operational history, the LCOE can only be estimated. It is not clear what data goes into that estimate. Further, the cost over the lifetime of a reactor does not indicate what the costs would be to rate-payers on a monthly and yearly basis, which is more important than a guess about the average costs over the unknown lifetime of the reactor.

2.5. The NEIMA definition includes "lower waste yields." Again, there is no baseline data and methodology to be used to determine whether a specific design produces "lower waste yields." The types of waste are not identified. The issues in regard to the long-term storage of irradiated fuel and the possibility of significant

emissions from the irradiated fuel during storage and transportation to a still non-existent permanent waste repository appear to be ignored. The possibility that a specific design will create greater amounts of irradiated fuel per kilowatt are not mentioned.

2.6. The NEIMA definition includes “greater fuel utilization,” but provide no baseline information on “fuel utilization” or indicate the methodology to be used to determine “greater fuel utilization.”

2.7. The NEIMA definition includes “enhanced reliability.” There is no baseline definition of “reliability” and no mention of the methodology that will be used to evaluate reactor reliability and whether or not it is “enhanced.” There is no mention of how “enhanced reliability” will be determined for new reactor designs that have no operational history.

2.8. The NEIMA definition includes “increased proliferation resistance.” As with the other definitions, there is no definition of “proliferation resistance,” no baseline data on “proliferation resistance,” and no regulatory methodology for determining “proliferation resistance.” There is no mention of the current concerns regarding proliferation related to new reactor designs.

2.9. The NEIMA definition includes “increased thermal efficiency.” There is no “thermal efficiency” baseline that would be used to compare thermal efficiencies. There is no mention of a methodology for determining “thermal efficiencies” for new reactor designs and making determinations regarding an “increase” in such efficiency.

2.9. The NEIMA definition regarding the “ability to integrate into electric and nonelectric applications” does not include a methodology for analyzing a new design’s ability to integrate into electric and nonelectric applications or whether, in fact, the design will actually be used to integrated into electric and nonelectric applications. If a reactor design has the ability to integrate into electric and nonelectric applications, does it matter if it has additional safety features, greater fuel utilization, thermal efficiency, or reliability?

### 3. Conclusion

There does not appear to be any rational regulatory basis for making a determination as to whether a new reactor design can be considered to be “advanced” under the Part 53 definition. If the NRC wants to apply the new Part 53 regulations and regulatory guidance to new reactor designs, then the NRC must accurately specify the types of reactor designs that the new regulations will apply to and how the NRC will determine that applicability. If the NRC is going to rely on the NEIMA definition of an

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advanced reactor, it must provide a meaningful basis and process to determine how a new design meets or does not meet any of these improvement criteria. As currently proposed, the Part 53 definition of “advanced nuclear power plant” is irrational and has no factual or regulatory basis. How can the NRC develop a regulatory framework when it has not identified with specificity and particularity the types of facilities and operations that the regulations will apply to?

Sincerely,

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