NUCLEAR REGULATORY COMMISSION BRIEFING ON 10 CFR PART 53 LICENSING AND REGULATIONS OF ADVANCED NUCLEAR REACTORS

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Thank you for the opportunity to appear before the Commission to discuss the proposed 10 C.F.R. Part 53 Regulations and related matters.

I. 10 C.F. R. Part 53 Subpart A Definition of "Advanced Nuclear Plant"

The Nuclear Regulatory Commission (NRC) must clearly specify the types of light-water and non-light water reactor designs that the new regulations will apply to and how the NRC will determine that applicability. The NRC must must clearly state the types of facilities that can use Part 53 as a basis for a license or design certification. Currently the Proposed Rule appears to apply to so-called "advanced nuclear reactors" or an "advanced nuclear plant," without providing a basis for what constitutes an "advanced" reactor or how such a determination will be made. Further, it now appears that NRC staff intends to consider an application for any type of nuclear reactor under Part 53.

The Proposed Part 53 Rule is described as a "Risk Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors." The NRC cannot use the term "advanced" to describe this Rule or include it in the proposed Rule. "Advanced" and "Advanced nuclear reactor" are public relations terms, not terms that have a sound factual or regulatory basis.

Part 53 Subpart A definition of "advanced nuclear plant" relies on the Nuclear Energy Innovation and Modernization Act (NEIMA) definition of "advanced nuclear reactors." Subpart A, Section 53.020, definition of "Advanced nuclear plant":

> 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.

The 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.

The NEIMA advanced nuclear 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, the NuScale Power LLC Small Modular Reactor, approved for a design certification by the NRC, has higher waste yields per megawatt hour than existing commercial reactors.

The NEIMA definition and, therefore, the NRC's definition of "advanced nuclear reactor" do 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.

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.

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.

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.

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 new types of fuel and 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 is not mentioned.

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." The impacts related to the fabrication of new types of highly enriched fuels are not mentioned.

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.

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."

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.

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 integrate into electric and/or nonelectric applications. If a reactor design has the ability to integrate into nonelectric applications, does it matter if it has additional safety features, greater fuel utilization, thermal efficiency, or reliability?

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 to determine whether an application can be submitted pursuant to Part 53, 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.

The NRC cannot develop a regulatory framework unless it has identified with specificity and particularity the types of facilities and operations that the regulations will apply to?

II. Public Participation

New Reactor Licensing Documents

One aspect of public participation in the NRC rulemaking and licensing decisions is the availability of NRC licensing records that have been properly accessioned to the applicable docket. There are currently a significant number of pre-application and license application documents for new reactor designs that have not been accessioned to the proper docket or any docket at all. So, it is difficult for the public to access all the NRC records related to a specific Part 52 application or pre-application docket. This is based on the review of the Oklo Aurora, TerraPower Natrium, and NuScale Small Modular Reactor documents on ADAMS. If not corrected, these document management problems will carry over to Part 53 application and pre-application records. Uranium Watch has

contacted NRC staff about this and hopes to meet with staff with oversight of the NRC Records and Document Management Program.

Docketing of Applications and Hearing Notice

It is the intent of the nuclear industry to site new reactors in communities that have never had any NRC-licensed facility or any experience with, or knowledge of, NRC regulations and licensing and decision making processes. Therefore, it is important that the NRC not docket an application and provide an opportunity to intervene in the licensing process before the NRC receives a complete application, makes a complete review of the application and supporting documentation, makes a determination that the application is complete and documents that decision, and establishes applicable review standards and procedures. The NRC staff guides this process—not the applicant.

Recently, the NRC staff issued a docketing statement and hearing notice for the Oklo LLC first-of-a-kind reactor Part 52 application (52-0049) before the staff determined that the application was complete and where that were glaring gaps in the application, NRC review of the application, and the NRC's own regulatory framework.

The docketing of an application and hearing notice before the NRC has made an application completeness determination, or developed review procedures and standards and requirements on a range of important new safety issues, and the applicant and NRC staff are still arguing about which NRC regulations apply is dangerous and unacceptable. The NRC staff cannot review an the already-docketed license application for compliance with NRC regulations at the same time it is negotiating with the applicant over questions of the applicability of NRC regulations and standards. The premature docketing of an incomplete application and a premature hearing opportunity set unfair precedents for future new reactor licensing proceedings. These will adversely affect the safety of new reactors and the rights of community members and potential petitioners. The NRC must not sacrifice objectivity in licensing proceedings.

The NRC must not abandon its existing docketing and hearing frameworks and commitment to a fair hearing process.

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