



March 3, 2021

Mr. John Tappert
Director, Division of Rulemaking, Environmental, and Financial Support
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: American Nuclear Society (ANS) Comments on the Nuclear Regulatory Commission (NRC) Rulemaking for a Risk-Informed, Performance-Based, and Technology-Inclusive Regulatory Framework for Advanced Reactors (10 CFR Part 53)

Dear Mr. Tappert,

In response to the November 6, 2020, *Federal Register* Notice on a Risk-Informed, Technology-Inclusive Framework for Advanced Reactors, I write on behalf of the 10,000 members of ANS and over 100,000 workers in the nuclear industry to provide comments on the proposed framework. The attributes of these advanced reactors extend beyond clean, zero-carbon-emission electricity production, as discussed in ANS Position Statement 35, "Advanced Reactors."¹ ANS recognizes the importance of this 10 CFR Part 53 rulemaking initiative, and we believe it is a step in the right direction to ensure successful and timely deployment of advanced reactor technologies. The timely completion of the rulemaking will support deployment of needed advanced reactor technologies as soon as feasible.

The following comments are provided for your consideration.

- ANS supports incorporating into the Part 53 rulemaking decades of experience with risk-informed and performance-based (RIPB) regulation and philosophy. ANS expects that this will facilitate achieving the NRC's stated objective of meeting the Nuclear Energy Innovation and Modernization Act (NEIMA) requirement by developing an optional technology inclusive Part 53 Rule. ANS has gathered significant experience modernizing our safety standards by incorporating the concepts resulting from the NRC's initiatives, which culminated in the White Paper on Risk-Informed and Performance-Based Regulation in March 1999 (SRM-SECY-98-0144). The key attribute of Part 53 should be to use RIPB platforms to provide flexibility to determine

¹ ANS Position Statement 35, "Advanced Reactors," June 2018;
<https://cdn.ans.org/policy/statements/docs/ps35.pdf>.



how to meet established performance criteria in ways that will enable and incentivize improved outcomes. ANS encourages the Staff, to the extent possible and consistent with Commission's direction in the RIPB White Paper, to introduce RIPB principles in all Subparts. For example, the Staff should explore the possibility of enabling a RIPB approach for consideration of distance from the population centers in Subpart D (which was recently provided) instead of retaining the current prescriptive language.

- Part 53 regulatory language should be formulated such that the determination of reasonable assurance of adequate protection is based on an integrated, transparent, and coherent decision-making method that only requires performance objectives of regulation to be achieved with appropriate level of defense-in-depth. This will enable innovation and flexibility in the features used by developers to meet the regulation. This will result in consistent treatment of different designs, deployment of safety features based on the needs of a specific technology/design, clarity of the regulatory expectations, operational flexibility, and avoidance of unnecessary burden. For example, designs that deploy highly reliable inherent and passive features with significant margin to meet performance objectives of regulation should not be required to add design features (e.g., redundancy or diversity) or regulatory elements (e.g., a 10-mile emergency planning zone). The current language in Subpart B provides a good foundation for achieving this objective.
- Anticipated attributes of advanced reactors are their improved safety and economics, along with more flexible operations. The flexible operations should be able to take advantage of design margins appropriately and not be burdened with additional requirements as long as defense-in-depth and safe operation are demonstrated.
- Lessons learned from 10 CFR Parts 50 and 52 should be utilized in the Part 53 rulemaking to ensure that the opportunity to meet the Commission's expectation and industry desire to transition to RIPB regulation is not missed. Specifically, many lessons learned from implementation of Part 52 in an overly prescriptive way should guide what to avoid relative to Part 53 rulemaking. Also, the Reactor Oversight Process has improved regulation of the operating fleet, and those benefits should be preserved in the new regulation.
- Regulatory Guide 1.233, "Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light-Water Reactors," offers a good foundation for use of a RIPB

approach to formulating the safety case for an advanced reactor over its life cycle.

- The existing guidance on the performance-based approach is NUREG/BR-0303, “Guidance for Performance-Based Regulation,” which incorporates a decision-making construct of performance objectives (called objectives hierarchy) that is substantially technology-inclusive and risk-informed. However, enabling such a construct to be used for the variety of technologies and designs under consideration requires additional guidance that supports licensing decision-making, which predictably and reliably leads to findings of reasonable assurance of adequate protection of public health and safety and the environment. For example, the safety cornerstones of limiting initiating events and assuring reliability of mitigating systems would look quite different in detail when applied to molten-salt or gas-cooled reactors but could employ standardized performance objectives at higher levels in the hierarchy for safety, radiation protection, and security. Many of these are likely to be unchanged over the life cycle of a plant. NUREG/BR-0303 also offers good foundations for use of a RIPB approach to formulating the safety case for an advanced reactor over its life cycle.
- ANS supports the structure and expected processes that would be part of the proposed Subparts B, C, and F of Part 53 rulemaking because, as presented so far, the provisions would support accomplishment of many of the most significant objectives articulated in ANS Position Statement 46, “Risk-Informed and Performance-Based Regulations for Nuclear Power Plants.”² This position statement was prepared with risk-informed and performance-based concepts and methods in mind.
- ANS supports the “as low as reasonably achievable” (ALARA) principle as a fundamental tenet of radiation protection. As noted in ANS Position Statement 41, “Health Effects of Low-Level Radiation”³:

ALARA is intended to be an optimization process in which the costs associated with any potential dose reduction are balanced against the benefits in a risk-informed decision-making process considering all appropriate factors. Unfortunately, current implementation of ALARA often results in a practice of dose minimization rather than a risk-informed optimization, which can lead to more harm than benefit.

² ANS Position Statement 46, “Risk-Informed and Performance-Based Regulations for Nuclear Power Plants,” February 2017; <https://cdn.ans.org/policy/statements/docs/ps46.pdf>.

³ ANS Position Statement 41, “Health Effects of Low-Level Radiation,” November 2020; <https://cdn.ans.org/policy/statements/docs/ps41.pdf>.



With respect to radiation protection, ANS believes adequate protection should be based on technology-independent limits derived from consensus national and international standards, not ALARA.

ANS would like to better understand the basis for the proposed quantitative ALARA guidelines [e.g., 53.810(a)]. Also, ANS would like to understand if all of the already existing radiation protection requirements in 10 CFR Part 20 (including those pertaining to ALARA) would apply to reactors licensed under 10 CFR Part 53.

ANS appreciates the opportunity to provide comments during this early stage of the Part 53 licensing initiative, and we look forward to working with the NRC on the rulemaking as it continues. If you have any questions about these comments or desire additional information, please contact John Starkey jstarkey@ans.org.

Sincerely,

A handwritten signature in black ink, appearing to read "C. H. Piercy".

Craig H. Piercy
Executive Director/CEO
American Nuclear Society

A handwritten signature in black ink, appearing to read "M. L. Dunzik-Gougar".

Dr. Mary Lou Dunzik-Gougar
President
American Nuclear Society

cc: John Starkey