



SECRETARY

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 4, 2024

MEMORANDUM TO: Raymond V. Furstenau
Acting Executive Director for Operations

FROM: Carrie M. Safford, Secretary

SUBJECT: STAFF REQUIREMENTS – SECY-23-0021 – PROPOSED RULE:
RISK-INFORMED, TECHNOLOGY-INCLUSIVE REGULATORY
FRAMEWORK FOR ADVANCED REACTORS (RIN 3150-AK31)

The Commission has approved, in part, the draft proposed rule that would amend regulations in Title 10 of the *Code of Federal Regulations* (10 C.F.R.) to establish a voluntary risk-informed, performance-based, and technology-inclusive regulatory framework for commercial nuclear plants as proposed by the staff. Specifically, the Commission has approved Framework A with exceptions and clarifications described below that must be addressed before publication in the *Federal Register*.

1. The Commission has disapproved the inclusion of the proposed Framework B. The staff should develop an options paper for Commission consideration for the use of Framework B within one year of the date of this staff requirements memorandum (SRM). The options should include, at a minimum:
 - a. an option to update 10 C.F.R. Parts 50 and 52 to include technology-inclusive improvements;
 - b. an option to use a separate part in 10 C.F.R. for Framework B; and
 - c. an option to create a less prescriptive regulation where methods of compliance, similar to Framework B, could be located in guidance.

The discussion should consider the legal and technical extent to which these options are feasible. This paper should take into account the experience and insights gained through the Part 53 rulemaking process and include innovative concepts such as alternative evaluation for risk insights and risk-informed seismic design. The paper should also incorporate relevant lessons learned from recent and ongoing advanced reactor licensing experience evaluating the applicability of Part 50 and 52 requirements. The staff should also explore ways to address compatibility with international safety standards such as use of common terminology in this options paper. The staff should propose timelines for potential future efforts that will cause neither a delay in the ongoing Part 53 rulemaking effort nor undue complications in ongoing advanced reactor licensing activities under Parts 50 and 52.

2. The Commission has disapproved codification of the quantitative health objectives in the proposed Part 53.

The staff should revise draft 10 C.F.R. 53.220 to specify that applicants must propose a comprehensive plant risk metric (or set of metrics) and a description of the associated methodology used to demonstrate that the proposed design meets said metric(s). The methodology must explain the initial and boundary conditions and key assumptions used to develop and calculate the risk metric(s).

The term “cumulative” as used in the preamble to the proposed rule or “comprehensive” in this context means that the risk metric(s) should approximate the total overall risk from the facility (i.e., all modes, all hazards) to the extent practicable. Screening tools and bounding or simplified methods may be used for any mode or hazard, provided that the applicant provides an acceptable technical basis. As with all risk-informed methodologies, treatment of uncertainties should be addressed.

The preamble should be revised to explain that the NRC’s approval of the metric or set of metrics is not, by itself, an indicator of adequate protection. Rather, the metric (or set of metrics) is part of a suite of regulatory requirements that when considered holistically, form the basis for the NRC’s decision making. This is analogous to the approach used for plants licensed under Part 50 and Part 52, where no single regulatory requirement governs whether a plant is “safe enough.”

The staff should explore ways to ensure that, once approved, the metric(s) and methodology cannot be changed without prior NRC approval (e.g., inclusion in license, addition to technical specifications).

The staff should add clear direction in Part 53 that the metric(s) and associated methodology will not constitute a real-time requirement that must be continuously demonstrated by the licensee. Instead, this methodology should serve as an input to the NRC’s initial licensing decision and to inform the NRC’s decision making (e.g., license amendments, certain backfit determinations, and other risk-informed applications).

To further refine this concept, the staff should conduct tabletop exercises and widespread public engagement with interested external stakeholders once it is reasonable to assess novel approaches to comprehensive plant risk. These exercises should simulate:

- a. Development of metrics for different plant designs (e.g., light-water reactors, gas-cooled reactors, molten salt reactors);
- b. Comparing a proposed design against the proposed metric(s);
- c. Evaluating likelihood and regulatory consequences of approaching and exceeding the metric(s) during plant operations; and
- d. Evaluating options for ensuring that post-licensing changes to the metric(s) and methodology receive the appropriate level of NRC oversight.

To explore future efficiencies, the staff should seek specific comment on whether and how comprehensive plant risk metrics should be codified or otherwise memorialized over time as the agency gains licensing experience with new designs licensed under Part 53.

3. The staff should not apply consensus probabilistic risk assessment (PRA) standards as a strict checklist of requirements for Part 53 PRA acceptability determinations. Rather, the staff should allow PRA acceptability determinations for Part 53 applications to be appropriately flexible, considering how PRA insights are relied upon to support the licensing application, together with factors such as safety margin, simplicity of design, and treatment of uncertainties. The staff should revise the proposed rule or preamble, as appropriate, to convey this point and also seek specific comment in the *Federal Register* Notice (FRN) for the Part 53 proposed rule on PRA acceptability for Part 53 applications in order to develop guidance.

In order to accommodate the potential for simplified designs and utilization of passive safety features in advanced reactor applications, the staff should collect and evaluate lessons learned from advanced reactor PRA acceptability determinations to better understand the extent to which other evaluation approaches may be used in combination with quantitative, probabilistic approaches. The staff should use this knowledge in future guidance development to improve regulatory certainty in this area.

4. The Commission has disapproved including “as low as reasonably achievable” (ALARA) related design requirements in Part 53. The proposed rule should retain the use of design objectives to demonstrate how effluent releases will be limited, consistent with their treatment under 10 C.F.R. 50.34a.
5. The Commission has disapproved including the proposed requirements for the facility safety program in Part 53.
6. The staff should explain in the preamble how, notwithstanding the elimination of the Facility Safety Program (FSP), the NRC will continue to perform its oversight of external hazards and changes to plant risk. This explanation should include how other requirements in the proposed Part 53 rule capture the ongoing evaluation of external hazards evaluations and changes to plant risk that otherwise would have been addressed by the FSP.
7. The staff should include a requirement for a design experience program, corresponding to the existing requirement under 10 C.F.R. 50.34(f)(3)(i), in subpart C to the proposed Part 53.
8. The staff should include factory fuel load provisions in the proposed rule. The staff should work with stakeholders following publication of the proposed rule to develop regulatory text that would also allow a holder of a manufacturing license to accomplish operational testing on a fueled manufactured reactor at the factory prior to delivery to the site where it will ultimately be used.
9. The staff should address the consideration of security-related events for an advanced reactor that addresses security through design and engineered safety features when it harmonizes this rulemaking with the Final Rule: Emergency Preparedness for Small Modular Reactors and Other New Technologies.
10. The staff should use Appendix B to Part 50 and the existing body of knowledge of quality assurance, which are both technology-inclusive, for the licensing and regulation of advanced reactors, in lieu of including a nearly identical set of requirements in Part 53. The staff should instead make conforming changes to Appendix B and Part 53 as necessary to apply the existing requirements to applicant and licensees utilizing the Part 53 framework.
11. The Commission disapproves the inclusion of the safety objectives in draft proposed section 53.200.

12. The staff should include a question in the FRN for the proposed rule that seeks stakeholder input on the draft proposed requirements currently included in section 53.1470. Specifically, the staff should seek comment on how best to allow added flexibility for applicants to submit an application or applications for multiple sites. This could include consideration of how applications that are not completely identical are evaluated under this provision; what the process would be for determining the appropriateness of a common review (including identifying the decisionmaker); and whether applications need to be submitted at the same time or could proceed on a staggered basis.
13. The staff should make conforming changes to the proposed rule text, regulatory analysis, and *Federal Register* notice to be consistent with the direction in this SRM before proceeding with the rulemaking process. The staff should also revise the proposed rule preamble and make other conforming changes as necessary to implement the clarifications and changes set forth in this SRM, but need not delay the proposed rule for the updated draft guidance. In making these changes, the staff should consider the suggested edits described in the enclosed "Table of Significant Comments and Edits" and shown in detail with accompanying comments in the attached edited *Federal Register* notice as well as the enclosed proposed framework for 10 C.F.R. Part 53, as potential methods of accomplishing the changes. If consideration of the enclosed edits results in any inconsistencies with this SRM, the SRM prevails. The staff should meet with Commissioners' Assistants (CAs) on a regular basis regarding the progress on implementing the direction provided in the SRM.
14. The staff should provide a copy of the final version of the *Federal Register* Notice for the proposed rule to the Commission within six months of the date of this SRM and twenty business days before its submittal to the Office of the Federal Register for publication. The staff should provide a final CA briefing upon delivery of the final version to the Commission.
15. The staff should review the enclosed table of potential typographical errors and inconsistencies to determine if they can be corrected through administrative rulemaking.

Enclosures:

1. Table of Significant Comments and Edits
2. Edited *Federal Register* Notice
3. Proposed Framework for 10 C.F.R. Part 53
4. Table of Typographical Errors and Inconsistencies

cc: Chair Hanson
Commissioner Wright
Commissioner Caputo
Commissioner Crowell
OGC
CFO
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PDR