



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

**U.S. NUCLEAR REGULATORY COMMISSION STAFF'S OBSERVATIONS REGARDING XE-100 WHITE PAPER: APPROACH TO MEETING SELF-RELIANT-MITIGATION FACILITY OPERATING AND TECHNICAL CHARACTERISTICS (EPID: L-2025-LRO-0052)**

**SPONSOR INFORMATION**

**Sponsor:** X Energy, LLC

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**Project No.:** 99902071

**DOCUMENT INFORMATION**

**Submittal Date:** September 5, 2025

**Submittal Agencywide Documents Access and Management System (ADAMS) Accession No.:** ML25248A306

**Brief Description of the White Paper:**

X Energy, LLC (X-energy) submitted this white paper to present its approach for the Xe-100 reactor design and planned operation to meet the Self-Reliant-Mitigation Facility (SRMF) characteristics as described in the proposed Title 10 of the *Code of Federal Regulations* (10 CFR) Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants." The white paper seeks Nuclear Regulatory Commission (NRC) staff feedback and confirmation that the Xe-100 design and planned operation are consistent with the intent of the SRMF characteristics, supporting future topical reports and license applications.

**Action Requested:**

X-energy requested written feedback by December 2025 on whether its proposed approach to the design and planned operation of the Xe-100 is consistent with meeting the intent of the SRMF characteristics in the proposed 10 CFR Part 53. The feedback is intended to inform development of future topical reports and operating license applications.

**FEEDBACK AND OBSERVATIONS**

The following feedback and observations on this white paper are preliminary and subject to change. The feedback and observations are not regulatory findings on any specific licensing matter and are not official agency positions.

Enclosure

**Translation of SRMF Characteristics (Table 2):**

- The approach to translating the SRMF characteristics from the proposed Part 53 rule into Xe-100-specific characteristics, as presented in Table 2, appears to be a reasonable and structured method for aligning facility-specific attributes with regulatory intent of the proposed rule. However, it is important to note that the Part 53 rulemaking is still ongoing, and the final criteria may differ from those currently proposed. Therefore, the acceptability of this translation is subject to change based on the final rule.

**Design, Programmatic, and Implementation Strategies (Sections 2.2.1–2.2.5):**

- The overall approach described for meeting the five SRMF characteristics appears to align with the intent of the proposed Part 53 framework. As the Part 53 rule has not been finalized, the NRC cannot provide definitive endorsement at this time, and the approach may need to be revisited once the final rule is issued.

**Viability of SRMF Classification under Parts 50 and 52 for the use of generally licensed reactor operators (GLRO):**

- The concept of formally classifying the Xe-100 as an SRMF under the existing 10 CFR Parts 50 and 52 framework appears viable in principle. However, since the SRMF designation is a construct of the proposed Part 53 rule, its application under Parts 50 and 52 would require careful consideration and may not be directly transferrable. Therefore, the ability to utilize the generally licensed reactor operator (GLRO) status through Part 50 and Part 52 would exist through the use of exemptions from Part 55 requirements with adequate justification for each exemption requested. The NRC staff encourages continued dialogue on this topic as regulatory frameworks evolve.
- Regarding the assessment of SRMF characteristics, the staff understands that X-energy plans to submit an exemption request from Part 55, supported by an analysis that demonstrates compliance with the SRMF characteristics and justifies the use of a GLRO. Acceptance of either the preliminary or final safety analysis report alone does not demonstrate compliance with the SRMF characteristics.

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