

10 May 2024

2024-XE-NRC-011

Project No. 99902071

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001**Submission of X Energy, LLC (X-energy) Xe-100 Licensing Topical Report Mechanistic Source Term Approach**

References: (1) “Xe-100 Licensing Topical Report, Mechanistic Source Term Approach and XSTERM Code Verification and Validation,” April 2021 (ADAMS Accession No. ML21120A342)

(2) NRC staff’s initial feedback regarding X Energy, LLC Topical Report, “Xe-100 Topical Report Mechanistic Source Term Approach XSTERM Code Verification and Validation” (ADAMS Accession No. ML21258A412)

The purpose of this letter is to submit the subject licensing topical report (LTR) to the U.S. Nuclear Regulatory Commission (NRC). This LTR describes the functional containment and mechanistic source term methodology used in Xe-100 design and safety analysis and the plans to verify and validate the computer code that model these physical phenomena. It is provided for NRC review and approval as indicated in the report and is expected to be referenced in future Xe-100 licensing applications. The specific review schedule will be coordinated by X-energy and NRC project managers.

This LTR replaces the withdrawn “Xe-100 Topical Report: Mechanistic Source Term Approach and XSTERM Code Verification and Validation.” The NRC staff provided feedback on the withdrawn LTR in September 2021 and that feedback was reviewed and incorporated into the subject LTR where applicable. Much of the NRC feedback was focused on the XSTERM code. X-energy decided the best path forward was to remove the XSTERM scope the subject LTR submit a separate XSTERM Verification and Validation LTR in the future and too address the NRC staff feedback on XSTERM.

The subject LTR contains proprietary information. As such, X-energy requests that Enclosure 3 be withheld from public disclosure per 10 CFR 2.390, “Public inspections, exemptions, requests for withholding.” Redacted information is identified using [[]]. An affidavit certifying the basis for the request to withhold Enclosure 3 from public disclosure is included as Enclosure 1. Proprietary information has been omitted from the LTR provided in Enclosure 2 that should be made publicly available.



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This letter contains no commitments. If you have any questions or require additional information, please contact Jessica Maddocks at jmaddocks@x-energy.com.

Sincerely,

A handwritten signature in black ink that reads 'S. Vaughn'.

Stephen Vaughn
Director, Licensing
X Energy, LLC

Enclosures:

- 1) Affidavit Supporting Request for Withholding from Public Disclosure (10 CFR 2.390)
- 2) "Xe-100 Licensing Topical Report Mechanistic Source Term Approach" (Public)
- 3) "Xe-100 Licensing Topical Report Mechanistic Source Term Approach" (Non-Public)

cc:

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