



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

December 14, 2020

Mr. J. Clay Sell
Chief Executive Officer
X-Energy, LLC
801 Thompson Avenue
Rockville, MD 20852

SUBJECT: PREPARING FOR EFFICIENT NRC REVIEWS OF ADVANCED REACTOR
LICENSING/CERTIFICATION APPLICATIONS

Dear Mr. Sell:

The U.S. Nuclear Regulatory Commission (NRC) Office of Nuclear Material Safety and Safeguards staff (the staff) is preparing for regulatory reviews of applications for the uranium enrichment, fuel material processing and fabrication, and transportation and storage of fuels in support of advanced non-light water reactors (non-LWR) applications. The purpose of this letter is to communicate the timelines associated with NRC review of fuel cycle facility and transport applications necessary to support advanced reactor licensing, as discussed during previous public stakeholder meetings.

Based on available information, the staff considers the current regulatory framework in Title 10 of the *Code of Federal Regulations* Part 70, "Domestic Licensing of Special Nuclear Material," Part 71, "Packaging and Transportation of Radioactive Material," and Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor Related Greater Than Class C Waste," to be adequate to support the review of future applications related to the development of non-LWR fuel cycles. However, the staff recognizes that new applications and designs may introduce technical issues that will have to be resolved during the approval process. These technical issues could include the consideration of (1) new material properties (particularly irradiated material) affecting the structural analysis of transportation and storage designs during normal and accident conditions, (2) new hazards in fuel processing and fabrication, and (3) uncertainty in criticality calculations for higher enrichments of uranium or new compositions of fissile material. As such, the NRC encourages you to seek early interactions with the staff to facilitate an efficient and effective review of these applications.

The staff continues to proactively assess the current regulatory framework and technical basis associated with greater enrichment levels for light water reactor and non-LWR fuels from a risk-informed, safety focused perspective. Consistent with the "NRC Vision and Strategy: Safely Achieving Effective and Efficient Non-Light Water Reactor Mission Readiness" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16356A670), and SECY-20-0010, "Advanced Reactors Program Status" (ADAMS Accession No. ML19331A034), the staff is monitoring industry's plans and assessing its own resources and workload priorities, so that it can plan effectively for the reviews of these applications.

Early engagement is critical for an efficient and effective review of these regulatory actions. The NRC is ready to support industry's plans for the fabrication and transportation of advanced reactor fuels. In order to support advanced reactor fuels licensing, the NRC must receive applications for these regulatory actions up to approximately 3 years prior to deployment depending on the type of licensing request. A typical license review, including the environmental review, for a new fuel fabrication facility is approximately 1.5 – 3 years. Certificate of Compliance for a transportation container amendment could take up to 6 months for an existing certificate, or up to 2 years for a new certificate. Under the Nuclear Energy Innovation and Modernization Act, the NRC will complete reviews for new fuel cycle facilities, and new or amended certificates of compliance within 3 years. Amendments for fuel cycle facility applications will be completed within 2 years.

I would encourage you to consider these timelines and find the appropriate opportunity to engage the staff early in the process. The staff also plans to discuss how applicants can prepare for efficient NRC reviews of fuel cycle facility and fuel transport to support advanced reactor licensing and certification applications at the next Periodic Advanced Reactor Stakeholder meeting. The NRC will publish a notice providing the location, time, and agenda of the future public meeting on the NRC's public meeting website at least 10 calendar days before the meeting. Stakeholders should monitor the NRC's public meeting website (<https://www.nrc.gov/pmns/mtg>) for information about the public meeting.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's ADAMS. The ADAMS database is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

Andrea L. Kock, Director
Division of Fuel Management
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ADAMS Accession Nos.: ML20255A160 (Pkg) ML20255A163 (Ltr) *via e-mail

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