NUCLEAR PROLIFERATION
PREVENTION PROJECT

July 5, 2022

Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001
ATTN: Rulemakings and Adjudications Staff

Re: XSNM-3828, Docket No. 11006444, NRC–2022–0118

Dear NRC Secretary,

I write to submit my comments below on the license application by ALARA Logistics,[1] for export of up to 113.2 kg of 93.2%-enriched, highly enriched uranium (HEU), in fabricated fuel for Belgium's BR2 research reactor. The HEU would be fabricated into fuel in the United States at BWXT prior to export. These comments are submitted in a timely fashion, by the deadline of July 5, 2022.

In the past, in response to preceding applications for export of HEU for BR2 fuel, I have petitioned for leave to intervene, because the reactor operator was out of compliance with Belgium's 1999 pledge to convert to low enriched uranium (LEU) fuel as quickly as possible,[2] which is a requirement for U.S. HEU exports under U.S. law, specifically the Schumer Amendment to the Energy Policy Act of 1992 (42 U.S.C. § 2160d). The operator had said it was postponing conversion until qualification of a future type of LEU fuel ("U-7Mo"), rather than converting expeditiously to a type of LEU fuel ("silicide") that has been qualified since 1988.[3]

More recently, however, the operator has aggressively pursued conversion to LEU with silicide fuel. In February 2020, the operator stated that:

> A BR2 LEU conversion project with high density silicide fuel at 5.3 g/cc loading was initiated and is well underway at SCK•CEN to pursue a more streamlined path to LEU conversion with significantly reduced risks then [SIC] with U-7Mo fuel. The detailed plan has been established, internal approval and funding has been secured, and external contracts have been signed and are currently being executed. The BR2 LEU design is now complete and includes the 5.3 g/cc silicide fuel loading… Upon successful results of the 5.3 g/cc fuel plate irradiation, LEU BR2 fuel assemblies will be fabricated and the "Lead Test Assemblies" (LTAs) will be irradiated. These are necessary to complete the submission of the BR2 LEU conversion licensing package in 2025.[4]

[1] *Federal Register* 87, 107 (June 3, 2022), 33842ff.

[2] Ann MacLachlan, "U.S. Agrees to Continue HEU Shipments to BR2 after Belgians Agree to Convert," *Nuclear Fuel* 24, 24 (November 29, 1999), 8.

[3] U.S. NRC, "Safety Evaluation Report Related to the Evaluation of Low-Enriched Uranium Silicide-Aluminum Dispersion Fuel for Use in Non-Power Reactors," NUREG-1313, July 1988.

[4] Sven Van den Berghe, "BR2 LEU Conversion with High Density Silicide Fuel," International Conference on Nuclear Security, IAEA, Vienna, Austria, February 10-14, 2020.

Last month, the operator stated that conversion activities have remained on schedule and that full conversion to LEU fuel is anticipated by the end of 2026.[5] (See slide appended to this submission.)

This aggressive program to convert to LEU fuel satisfies the aforementioned U.S. legal requirement for export of some HEU prior to conversion. However, the Commission still must address how much HEU to approve for export, over what duration, to comply with the U.S. law and policy of minimizing HEU exports, including the Schumer Amendment, and Section 53 of the Atomic Energy Act of 1954 as amended (42 U.S.C. § 2073) requiring exports not be "inimical to the common defense and security." Approving export of more HEU than necessary would violate the statutory requirements, potentially increasing risks of nuclear proliferation and nuclear terrorism via two pathways: (1) By reducing incentive for expeditious conversion to LEU fuel and thereby prolonging use of HEU fuel; and (2) By creating a surplus abroad of fresh U.S-origin HEU in the event the reactor were converted to LEU fuel prior to exhausting its stock of fresh HEU fuel.

The license application requests approval for export of considerably more HEU, over a much longer duration, than the reactor would need if it were converted to LEU fuel on schedule by the end of 2026. On March 3, 2017, the Commission approved license XSNM-3771, valid through the end of 2023, for export of 144kg of 93.2%-enriched HEU for BR2 fuel. The reactor requires only about 20kg of fresh HEU per year in fuel during normal operation, so this preceding and still valid license authorized export of HEU sufficient until 2024 at least. If the reactor were converted to LEU fuel as planned by the end of 2026, it would only need additional export of HEU under the proposed license for less than three years of normal operation – which is at most 60kg of HEU and likely much less. However, the application requests a license valid until 2030 for export of nearly twice that amount, 113.2kg of HEU. The application provides no justification for such excesses of amount and duration, although these may be intended to provide a buffer in the event of delay in the reactor's conversion to LEU.

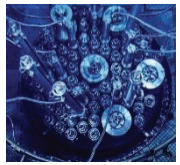
If the Commission approves the application, it must under U.S. law do so in a way that prevents the export of more HEU than is absolutely necessary prior to the reactor converting to LEU fuel as soon as possible. Any export of HEU fuel under the license should be permitted only if demonstrably required in the near term, and only if conversion to LEU continues expeditiously and in good faith, to avoid the dual dangers of disincentivizing conversion to LEU fuel and creating a surplus of fresh HEU abroad. At minimum, the Commission should obtain assurances that the Executive Branch will not permit export of more HEU than the reactor requires through the end of 2026, unless the reactor operator provides (1) proof of delays in conversion that are beyond the operator's control, and (2) proof that the reactor could not operate normally in the absence of additional export of HEU.

Thank you for considering these comments, and please let me know if you need further input.

Sincerely,

Alan J. Kuperman, Ph.D.
Associate Professor, LBJ School of Public Affairs
Coordinator, Nuclear Proliferation Prevention Project
University of Texas at Austin

[5] Sven Van den Berghe, "History and Status: EU Fuel Development and EU-HPRR Conversion," RRFM-2022, Budapest, June 6-10, 2022, slide 24.



SCK CEN BR2 LEU Conversion Roadmap