

APPENDIX A

HALEU INFORMATIONAL ATTACHMENT (applicable to *Demos*, *Risk Reduction* and *ARC-20*)

To maintain economic competitiveness, it is vital that the U.S. secure and maintain a supply of High-assay Low Enriched Uranium (HALEU) for industry applications, energy security, and national security. Currently, no commercial scale supply of HALEU exists. DOE looks to encourage the establishment of a reliable commercial HALEU supply chain in the United States by cost sharing demonstration of enrichment technology to mitigate market risk and facilitate emergence of a HALEU economy. Establishing a reliable HALEU supply chain will require effective execution of production, transportation, and fuel fabrication activities.

Production:

The only viable long-term approach for production of HALEU in commercial quantities is the establishment of additional enrichment capabilities. This includes capital investment, license amendments, and SWU capacity increases. There are currently two licensed enrichment facilities in the United States, both of which have expressed interest in license and capacity upgrades to accommodate dedicated HALEU production lines. The first, Louisiana Energy Services (LES) /URENCO USA is the U.S. branch of an international consortium, and is the only plant in the U.S. currently producing LEU to fuel reactors. The second is the Centrus Corporation, a company with which DOE has entered into a 3-year partnership (2019-2021) to demonstrate the capability to produce 19.75% enriched HALEU, as well as a path forward for licensing and upscaling of production. Either or both companies are looking to position themselves to enter into production contracts should the market demand be suitable. Additionally, interested applicants may look to procure HALEU for fuel fabrication from international sources, provided appropriate peaceful use obligations and nuclear material transfer protocols are observed.

Transportation:

In the traditional LWR fuel cycle, LEU is typically shipped in large volume containers limited to 5% enrichment (e.g., the 30-B container, which holds over 2,000 kg of UF_6) from enrichment facilities to fuel fabrication facilities where they are deconverted and fabricated into fuel.

- HEU containers, such as the ES-3100 and 5-B cylinder are limited to 25 kg, and are impractical for a commercial fuel cycle
- New packages, or modifications to existing packages would be required to ship HALEU in appreciable quantities (100s of kg)
- Packages must adhere to 49 CFR 173, Subpart I and 10 CFR 71 (DOT and NRC requirements)

Lower enrichment HALEU (e.g. 5% - 8%) would require a more modest modification for certifying new containers. Applicants should consider a strategy for transportation that fits their need profiles.

Fabrication:

Facilities authorized/licensed to receive and handle NRC Category II (CAT II) material, along with associated criticality, MC&A, and material protection considerations would be needed for the fabrication of HALEU fuel. A strategy for partnering with or procuring services or materials from a facility that is either currently licensed or plans to be licensed for CAT II material should be considered for applicants requiring HALEU.

Additional information regarding DOE's HALEU efforts can be found [here](#) and by clicking this link.

On April 28th and 29th, 2020, DOE, EPRI, and GAIN held a workshop on challenges related to HALEU. Visit this [link](#) for informational presentation materials from the HALEU workshop.