



Accelerating conservative clean energy solutions

RE: Excess Uranium Management: Effects of DOE Transfers of Excess Uranium on Domestic Uranium Mining, Conversion, and Enrichment Industries; Request for Information

We are writing today to provide comments on the practice of the Department of Energy downblending excess HEU to enrichments below 5% U-235. We primarily wish to add our support to a timely issue that, if left unaddressed, could have potentially significant negative implications for our emerging advanced nuclear energy industry: a lack of High Assay Low Enriched Uranium (HLEU).

Nuclear energy is an essential part of our electricity system, providing clean energy more reliably than any other source. It has safely provided 20% of our country's electricity for decades, and represents a triumph of American ingenuity. Advanced nuclear presents the opportunity to close the fuel cycle and continue the superiority of American technology.

The advanced nuclear industry is creating a variety of new product lines that aim for meeting different product sizes and functions. This includes high-temperature reactors producing heat for industry, reactors with flexible operation to meet the demands of a changing grid, and reactors of smaller size that could support remote communities or micro-grids designed to provide stability through loss of power due to major storms.

While current reactors typically require uranium enriched to approximately 5%, many advanced reactors will require enrichments ranging from 6% to as much as 19.75%, referred to herein as HLEU. (20% enrichment is the threshold of highly enriched uranium [HEU]). A tentative list of reactor designs and projected range of uranium enrichment is provided below:

<u>Vendor</u>	<u>Enrichment</u>
AREVA NGNP	12-15%
Gen4Energy	19.75%
Toshiba 4S	17-19%
GE PRISM	15-18%
TerraPower (TWR)	16-19%
Oklo	12-19%

Oak Ridge National Laboratory (SmATHR)	15%
Massachusetts Institute of Technology (FHR)	12-18%
University of California, Berkeley (PB-FHR)	19.90%
Advanced Reactor Concepts	10.1-17.2%
X-Energy	12-15%
General Atomics TPS	19.90%
General Atomics EM^2	15%
Transatomic	<19.75%
Terrestrial Energy	<19.75%
Thorcon	19.75%
Radix Power and Energy Corp.	19.75%

Supply Issues

Currently, there is no readily available domestic supply of civilian uranium in excess of 5%, which presents a potential stumbling block for the development of advanced nuclear technologies. While there is a potential domestic supplier of low enriched uranium (“LEU”) in the future, this capability will not be available, in the private sector, until 2023 at the earliest. Without a readily available domestic supply of HLEU in the U.S. from now through 2023, it will be extremely difficult to conduct research on advanced reactors, driving American innovators overseas, either to conduct their research or to obtain the needed fuel supplies. It is in America’s security and business interests to maintain a domestic supply of HLEU at levels up to 19.75%.

The most cost-effective way to generate HLEU in the short term is by downblending HEU with additional low enriched or natural uranium. HEU is used in nuclear weapons and the naval reactors that power our submarines. Downblending may make sense from a security standpoint – but downblending this valuable asset right now to 5% would be a strategic mistake. There is currently an oversupply of 5% enriched uranium, which has resulted in a 61% decrease in the spot price since the high in 2011.

Additional Considerations

In addition to the need for HLEU for advanced reactors, other concerns have been raised about the bartering of downblended HEU. The global market for 5% LEU is currently at all time low

prices, as noted in the 2015 EIA Uranium Markets Report. Adding additional LEU in the market both hurts struggling American uranium miners (as noted in [this](#) May 23, 2016 letter from Senator Barrasso), and disadvantages the US government by selling uranium when the price is low. US uranium output declined 33% between 2014 and 2015, and adding additional LEU at this time will further disadvantage US producers. As noted by Urenco USA in a [letter](#) regarding HEU downblending in 2015, DOE uranium constitutes a major portion of the uranium market in some years.

19.75% LEU: a Path Forward

Modifying downblending policy to HLEU instead of LEU solves several problems. The downblending contractor (in this case BWXT), is able to maintain downblending contracts, stockpiles of HEU are diminished per presidential directive, and the United States begins to prefer for a brighter nuclear future. In the interest of developing affordable clean energy and efficient nuclear waste management, maintaining a domestic strategic reserve of HLEU should be a federal priority.

We appreciate that the Department is aware of the need for this crucial fuel and has begun to investigate potential solutions. We would urge the Secretary to make a Secretarial Determination of the strategic need for a stockpile of 19.75% HLEU that could be used as a catalyst for our nation's developing advanced nuclear reactor technologies. This would avoid the movement of these technologies offshore, and would prevent an increased dependence on China and Russia to supply these needed fuel supplies.