



NUCLEAR PROLIFERATION  
PREVENTION PROJECT

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CONTACT: Prof. Alan J. Kuperman  
[ak@NPPP.org](mailto:ak@NPPP.org)

## Secret Reports: US Making Progress to End Bomb-Grade Uranium Fuel in Navy Ships But Congress is Endangering Funding, Even as US Plans AUKUS Submarine Exports to Australia

AUSTIN – The US government has made strides toward eliminating the use of weapons-grade, highly enriched uranium (HEU) fuel in the reactors that propel naval vessels, such as aircraft carriers and submarines, according to previously secret government [reports](#) obtained and released today by the Nuclear Proliferation Prevention Project (NPPP) at the University of Texas at Austin. These are the first U.S. government documents to be made public about the research.

The future of the program, which Congress has funded with [\\$100 million](#) since 2016, is now imperiled because a House subcommittee, chaired by Rep. Chuck Fleischmann (R-TN), voted to [terminate](#) it in a pending spending bill, despite Senate [approval](#) of an additional \$20 million for fiscal year 2024 (FY2024), so a legislative conference committee is expected to determine its fate this month. Ironically, Fleischmann’s action could endanger jobs in his own Congressional district at a federal research facility funded by the program.

The documents, from 2022 and 2023, reveal that US national laboratories are developing alternative naval reactor fuels composed of low-enriched uranium (LEU) – unsuitable for nuclear weapons – to reduce the dual risks of nuclear proliferation and nuclear terrorism. The need for this research was underscored recently when the US and UK announced plans to export nuclear-powered submarines to Australia under the new AUKUS partnership, which could set a [precedent](#) for other countries to acquire bomb-grade uranium.

According to the newly obtained reports from the U.S. National Nuclear Security Administration (NNSA) of the Department of Energy (DOE), the program’s objectives are “providing an alternative to the use of weapons grade highly enriched uranium (HEU) in naval nuclear propulsion and helping address U.S. Government nonproliferation goals.” The alternative LEU fuel being developed seeks to meet “the stringent requirements for the power output, compact size, and long-life the U.S. Navy requires.”

US Under Secretary for Nuclear Security, Jill Hruby, stated in one report last year that, “I am pleased with the progress DOE/NNSA has made in this technically challenging effort.”

The reports hint that Navy LEU reactors could be developed as soon as next decade. Congress [initiated](#) the funding in 2016, and NNSA is now exploring “novel R&D approaches that could accelerate a theoretical reactor development timeline, currently estimated to be a 20-to-25-year effort...that can lead to one or more fuel systems achieving Technical Readiness Level 3 (TRL3) sooner than projected.” Such an acceleration has the potential to qualify LEU fuel in time for Australia’s “SSN-AUKUS” submarine, which is currently under design and scheduled for delivery in the 2040s.

The research is administered by NNSA’s Office of Defense Nuclear Nonproliferation “in collaboration with the Office of Naval Reactors” and is conducted by three national laboratories – Idaho, Oak Ridge (Tennessee), and Argonne (Illinois) – entailing “fuel fabrication studies, irradiation testing, and computational modeling.” The work includes “an aggressive experimental campaign...to accelerate the feasibility assessments of candidate fuel systems” using LEU. In FY2021, the program inserted “over 160 experiments” into three government nuclear reactors in Idaho and Tennessee, and it planned to “continue with another 300-plus iterative experiments” in FY2023.

The documents caution that like any research program “success is not assured,” and they foresee an eventual “cost over \$1 billion,” which Congress would need to provide as a supplement so that the program does not “detract from higher-priority nonproliferation and naval propulsion R&D activities.”

Alan J. Kuperman, the NPPP’s coordinator and a professor at the LBJ School of Public Affairs, noted that the program’s price tag is a tiny fraction of the cost of the nuclear Navy or a nuclear terrorist attack. He said trillions of dollars are spent constructing and operating the Navy’s nuclear fleet, and a single terrorist nuclear weapon detonated in New York would inflict \$13 trillion of damage, according to a Pacific Northwest National Laboratory [estimate](#) in 2006, which would be much higher today due to inflation.