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**Fiscal Year (FY) 2023 National Defense Authorization Act (NDAA)
Member Day Written Testimony**

April 28, 2022

Good morning, and thank you, Chairman Smith, Ranking Member Rogers, and members of the committee for allowing me to testify. I am here today to request that the committee:

- Authorize \$20 million for research on low-enriched uranium (LEU) fuel for pressurized water reactors for aircraft carriers and submarines, and
- Reverse the FY18 NDAA provision restricting the provision of U.S. funds to the Comprehensive Nuclear-Test-Ban Treaty Organization's (CTBT) Preparatory Commission (PrepCom) also commonly known as the 'Wilson Amendment.'

For decades, ending the use of weapons-grade, highly enriched uranium (HEU) outside of nuclear weapons has been a U.S. policy priority. HEU carries nuclear proliferation risks because it can be used to make a simple nuclear bomb with a multi-kiloton yield. Currently, the largest remaining non-weapons use of HEU — and the biggest barrier to its elimination — is fuel for naval propulsion reactors. Public estimates assess that U.S. naval reactors use more than two tons of weapons-grade HEU annually, equivalent to hundreds of nuclear weapons.

The movement away from the use of HEU for non-weapons applications has only accelerated in recent years. NASA recently forswore the use of High-Enriched Uranium in all its propulsion and surface power reactors, for precisely the same reasons that the U.S. Navy should — that the marginal performance improvement from the use of HEU does not justify the vast increase in proliferation risk and security costs. These security costs make the use of HEU in commercial advanced reactors a non-starter, and the US Navy stands virtually alone in the world in using weapons-grade HEU for non-weapons applications.

As the only Ph.D. physicist in Congress, I believe it is crucial that we continue to research how to transition these reactors to LEU fuel. If this is found to be technologically and economically feasible, decreasing the need for HEU would have significant benefits for international nonproliferation and counterterrorism efforts. HEU fuel is vulnerable to theft during manufacturing and transportation. Additionally, the International Atomic Energy Agency exempts inspections of HEU facilities when countries declare they are for naval propulsion, offering cover for rising adversaries to develop nuclear weapons.

As new countries express their desire for nuclear navies, the imperative to reduce the use of HEU in these applications becomes increasingly urgent. By researching LEU fuel for naval propulsion, the United States can offer an alternative to these countries before they invest in nuclear technology, rather than convincing them to change once the program is up and running. Indeed, if the United States is operating its own naval vessels powered by low-enriched uranium, that will serve as a demonstration to other countries that this pathway could also serve their needs. It is now more important than ever for the United States to lead by example and continue exploring the feasibility of converting our naval nuclear propulsion to LEU fuel. As the committee has

done in previous NDAAAs, I urge the committee to include \$20 million to continue this research on LEU fuel.

I would also like to draw your attention to another pressing issue: The restriction of funding to the Comprehensive Nuclear-Test-Ban Treaty (CTBT) organization's Preparatory Commission (PrepCom). This commission is tasked with establishing a verification regime to monitor compliance with the comprehensive ban on nuclear explosive testing. During the FY2018 NDAA, an amendment known as the 'Wilson Amendment' was adopted, which restricted U.S. funding for this vital organization. It is time this provision is reversed.

As a scientist, I feel a special responsibility to speak out on the importance of strengthening our global nuclear security architecture. Prior to the enactment of FY2018 NDAA, the United States supported the on-site inspection work of the CTBT PrepCom in a number of ways, including U.S. experts who regularly provided training to the PrepCom's "surrogate inspectors." But with the restriction of U.S. funding, the quality and skill of the surrogate inspector corps has been hurt. This has resulted in experts from other countries filling the void left by the U.S. absence. These countries include Russia, China, Iran, and others whose efforts are focused on dumbing down the capability of the CTBT's verification regime.

Additionally, the Wilson Amendment inhibits our country's ability to eventually ratify, or even adhere to, the Comprehensive Nuclear-Test-Ban Treaty. The funding restriction also runs counter to U.S. national security interests by limiting opportunities for U.S. experts to develop key verification capabilities.

This year we have the opportunity to reverse this provision and take concrete action to curb the global proliferation of nuclear weapons and secure the safety of future generations. Short of ratification, U.S. support for the CTBT Preparatory Commission remains essential.

I urge your strong consideration of my requests. Thank you.