What About the Waste?

OPINION
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By Congressman Byron Donalds (FL-19)

When I discuss the benefits of nuclear energy with members of Congress, constituents, and the American public, one question consistently comes up—what about the waste? Ultimately, there are demonstrated solutions to safe keep and minimize the amount of spent nuclear fuel (SNF). In order to transform radioactive waste into an energy solution and combat misconceptions associated with SNF, it's important that individuals have the facts about the true nature of nuclear waste—while also understanding that there are safe, feasible, and innovative solutions to address the "fly in the ointment" (i.e. SNF unease) which hinders American global **nuclear** leadership today.

Generally speaking, nuclear waste must be isolated from the natural environment for approximately 100,000 years+ after it's removed from a reactor. In fact, the U.S. commercial nuclear **industry** has generated approximately 90,000 metric tons of SNF over the past 70+ years—which would only cover a single football field to a depth of less than 10 yards (i.e. less than half the volume of an Olympic-sized pool annually).

The U.S. even has enough SNF on-hand to power the nation for 400+ years—since nuclear "waste" still has 96% of its energy content available. Moreover, critical radioactive isotopes come from SNF—including Cesium-137 (used to treat cancer, used in industrial gauges, used in radiation detection equipment, etc.) and Strontium-90 (used for cancer treatments, used as a radioactive tracer in medicine and agriculture, and used to inspect industrial components and helicopter blades, etc.).

We must also recognize what "waste" really is. **Nuclear** waste actually comes from places like hospitals and research facilities—not *just* nuclear plants. In addition, the Nuclear Regulatory Commission (NRC) classifies nuclear waste in two categories: high-level waste or low-level waste.

High-level waste (e.g SNF) has the potential to produce fatal radiation doses during short periods of direct exposure. In comparison, low-level waste generally consists of secondary materials from reactor operations and items used during medical procedures (e.g. gloves, boots, rags, mops, protective shoe covers, radiation-exposed tools, etc.).

Nuclear reactors also generate "high-quality *waste* heat" (i.e. thermal energy), however, this beneficial "waste" product is often overlooked. In my view, we should embrace and welcome the use of thermal energy generated from zero-emission nuclear reactors. Such waste heat can then be utilized for district heating, hydrogen production, petroleum refining, desalination, and for various industrial applications (e.g. steel manufacturing, paper production, cement manufacturing, shaping plastics, etc.).

The question remains: what solutions are available to deal with our country's nuclear waste? First, on-site waste storage in dry casks is a proven option—as SNF is currently being stored safely at 79 sites in 35 different states. To emphasize, these steel-reinforced concrete containers (i.e. dry casks) are heavy and can only be moved with specialized equipment—not to mention the almost-impossible challenge of removing SNF from the extremely secure **nuclear** facility. The NRC has even confirmed that safekeeping SNF in dry casks provides adequate protection for public health, safety, and the environment.

Another option is interim disposal at deep geologic repositories—however this solution has come to be challenging (e.g. Yucca Mountain). Many members of congress don't understand that the U.S. Government is legally obligated to dispose of the nation's nuclear waste (c.f. in Canada, whoever produces the waste is responsible for its disposal). With that in mind, deep geologic repositories are one of the many proven solutions to address SNF—just ask Finland and Sweden. Nonetheless, deep geologic repository discussions should incorporate a consent-based, community-minded approach.

Another aspect of the "waste" discussion is transporting SNF. To emphasize, there have been over 2,500 cask shipments of SNF and approximately 30 million shipments of radioactive materials throughout the United States over the last 55+ years—without a single radiological incident or release to the environment. To be frank, transporting radioactive materials has proven to be safe. It's also worth noting that these dry casks are designed to withstand more than 99% of vehicle accidents (e.g. water immersion, impact, punctures, and fires).

Moreover, recycling spent nuclear waste may be an intriguing option. The 96% of energy content that remains in SNF has the potential to be recycled up to 3x. In turn, this will reduce the amount of SNF and reduce the potential impacts of uranium mining at the front end. However, the U.S. does not currently have SNF recycling capabilities, and several barriers remain for American SNF recycling, including: large infrastructure investment, economics associated with recycling, and nonproliferation concerns.

Nevertheless, it's 2023—let's embrace innovation on a bipartisan basis and adopt a solutions-based mindset to address barriers associated with SNF recycling. One innovative SNF recycling option even includes utilizing certain advanced nuclear reactors—which produce lower waste yields and operate for years at a time without refueling.

In terms of nonproliferation, SNF contains small levels of plutonium, and the use of such plutonium for **nuclear** weapons is not inconceivable. However, this should not halt America's potential to deploy SNF recycling technologies. Simply put, a political decision surrounding SNF recycling must be made. But it's also important to keep in mind that all SNF recycling efforts are subject to immense scrutiny by the International Atomic Energy Agency (IAEA) and several U.S. agencies (e.g. NRC; DOE; EPA; DOT; DOI; etc.).

Internationally, countries are deploying solutions to manage their nuclear "waste," but American nuclear "waste" management efforts are falling behind. From a global nuclear leadership perspective, this is troubling and insufficient—full stop. For example, France, the United Kingdom, India, Japan, Russia, and China have all developed the potential to reprocess their nuclear waste. Additionally, countries like Finland and Sweden have jointly developed a geologic repository system for SNF storage. Also concerning is the fact that our two greatest adversaries—Russia and China—are the world's only supplier of many critical isotopes. Thus, establishing domestic recycling capabilities could bolster American global nuclear leadership while simultaneously reducing adversarial reliance.

All in all, addressing our country's **nuclear** waste challenges will ultimately assist with shifting the negative stigma associated with nuclear energy. Recent bipartisan interest in addressing America's nuclear waste predicament is intriguing, and the time is now for Congress to come together to find bipartisan solutions.

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