Linda Intro: Sustainable Idaho is brought to you by the Portneuf Resource Council.

Madison Long Intro: Welcome to Sustainable Idaho. I'm your host, Madison Long, and this is the first episode in a two-part series discussing recent changes in spent nuclear waste transport coming to Idaho.

On the whole, nuclear energy generates nearly a fifth of America's electricity and clean energy. With increasing demands for electricity, the INL is now tasked with conducting more research on spent nuclear fuel, which is the used uranium fuel that once powered an energy reactor. However, this spent fuel must be contained, transported, or stored as it can remain radioactive for thousands of years.

In late April 2025, the State of Idaho, the U.S. Department of Energy, and the Trump Administration agreed to a targeted waiver of the 1995 Idaho Settlement Agreement. Targeted in this sense means that the waiver will allow for research and cask developments at the INL while still adhering to the safety provisions outlined in the agreement.

Today, I talked with Christian Natoni, the Deputy Manager for Facilities, Programs and Partnerships with the Department of Energy Idaho Operations Office. Natoni works at the Idaho National Lab, or INL, as one of the 6,400 researchers and support staff.

Can you tell us why the Idaho Settlement Agreement was originally put in place?

CN: The 1995 Idaho Settlement Agreement, it used to be called the Idaho Settlement Agreement and Consent Order. It's a legally binding agreement between the state of Idaho, U.S. Department of Energy, and the U.S. Navy, and it was established back in the mid-90s to address the management disposal of nuclear waste at what is now the Idaho National Lab. Some of the key points in that agreement is to remove various forms of nuclear waste from Idaho, preventing shipments from spent fuel to Idaho for permanent storage, cleaning up and remediating the contaminated sites at the Idaho National Lab, removing certain high-level waste streams from the state, and then transferring spent fuel from wet storage into dry storage. And really, the overall goal for the agreement was to ensure the safe and environmentally responsible management of the materials we have on site, and making sure that's protective of the workers and the state of Idaho's constituents and environment.

ML: Was there any public engagement before the waiver came into effect?

CN: This is a legal agreement, so, because of that, there were restrictions on our ability to provide any information publicly as we were working through the process. Right now, they're working through trying to determine what the exact route for the high burnup demonstration cask will be, and as they're going through that process, there'll be opportunities through our other Office of Nuclear Energy organizations for potential public engagement.

ML: Presently, the INL is expected to receive a high burnup research cask from the North Anna Nuclear Power Generating Station in Virginia, tentatively around 2027.

As an aside, nuclear fuel is traditionally stored in either wet storage or dry storage, both with the ultimate goal of acting as a coolant and as a radioactive shield. Wet storage involves submersion of the spent nuclear fuel cask to use water as a shield. While dry storage relies on standing or laying the cask down on concrete, utilizing the natural air.

So, how does this single cask research improve the INL's mission to support licensing and long-term dry storage solutions?

CN: What's important about the high burn-up demonstration cask and the research that will be conducted on its contents is that it will be supporting the 53 nuclear plants across the United States. These are relying on the information that the INL will be collecting because they will need that information to support their individual license renewals for the independent fuel storage installations. These are what are currently storing their spent fuel, and as they go for the license renewals, they want to show that it's continued safe storage. The high burn-up demonstration cask, and the data we'll get off that, really keep those nuclear plants continuing, those provide roughly 19 to 20 percent of the total electricity generated in the United States. So, we need to keep those online and we need to demonstrate that they're continuing to store their spent fuel safely.

ML: Once the North Anna cask arrives, what research goals will be focused on?

CN: We'll be collecting data on the condition of higher burn-up spent nuclear fuel. What that means is that higher burn-up spent fuel is nuclear fuel that has stayed in the reactor longer to extract more energy out of it. The INL will be conducting research and development to see how it performed, comparing its performance against lower burn-up fuels that have been in the reactor for a shorter period of time. That will help inform the regulatory agencies such as the Nuclear Regulatory Commission on the performance of that fuel in storage.

ML: After the interview, Natoni and Kaitlin Steiger-Meister, the Senior Public Affairs Specialists for the U.S. Department of Energy, shared that the high burnup demonstration cask research is anticipated to take up to 10 years to complete.

There have been some publicized concerns from activist groups like Idaho’s Snake River Alliance about the dangers of spent nuclear waste transport. What are your thoughts on that?

CN: I think that the way to look at it is that there are a lot of dangerous things in our lives, and when things are not managed appropriately, they can be dangerous. Spent nuclear fuel is managed very carefully here at the Idaho National Lab. We've got facilities that are designed to house and manage it. We have highly trained staff who are qualified to deal with it. So, in and of itself, it can be dangerous, but the INL has taken great strides to make sure that we've got the framework, not only in our requirements, but in the training for the individuals who are working

with it to make sure it's managed safely, not only for workers, but for human health and the environment.

ML: When dealing with spent nuclear fuel, there are a heavy set of requirements in business, project, and nuclear material management. For the rail route from the North Anna plant to INL to be approved, there will be testing for risk assessments. Later, rail carriers will determine the official route in accordance with the Department of Transportation regulations. Natoni shared that at the INL, there have been no recorded nuclear waste accidents during transport to their facilities. Accidents involving releases of radioactive material are rare, and the containers used are designed to withstand severe impacts and other hazards. As the transport is taking place, how does the INL coordinate with Idaho State or local authorities if there happened to be an accident?

CN: As we go through the planning for each of these shipments, whether it's by rail or through commercial license casks, we've got notifications that we need to provide regulatory agencies at the federal and state level to make sure that they're aware of the shipment and what's going on with those. They're in constant contact with the entities that are doing the shipment, and any kind of emergency response organizations are also aware. In the event that an emergency situation were to occur, those agencies have the information that they need to respond appropriately.

ML: Moving away from transportation concerns, activist groups like the Snake River Alliance have had history with the INL in stopping nuclear waste practices, like in 1987, when they successfully stopped the practice of injecting nuclear waste into the Snake River Aquifer.

Since then, how has the INL monitored for spent fuel leaks, especially hydrological monitoring linked to the Snake River Aquifer, during storage and examination?

CN: One of the things to think about spent fuel is the robustness of the fuel cladding. This is the layer that's around the nuclear material. In fact, that's part of what the high burn-up demonstration cask is looking at, is showing that the fuel can, in its integrity, remain very stable over a long period of time.

All of the fuel that we're receiving and currently storing is in dry storage, so there's no liquids to spill out. But overall, we've got environmental monitoring that's occurring around the INL facilities, which includes the Snake River aquifer, to ensure that we're not having any issue with the performance of the facility in storage of the material, because ultimately, our goal is to ensure the safety of the workers, the public, and the environment.

ML: Is there anything else that you'd like to add for our listeners to keep in mind as we're seeing spent nuclear fuel come through the news or as organizations are getting concerned about nuclear waste?

CN: I would say that as you see these things in the news, keep in mind that the INL is the lead lab for nuclear energy. There's been a lot of effort to ensure that nuclear energy, as well as the fuel that drives that, is very safe, and that everything from not only powering nuclear reactors, but the storage afterwards, can be done safely. We're continuing to do research to not only support a generation of electricity through the individual nuclear plants, but to demonstrate that we don't have any issues with continued storage.Those are some of the strong suits that the INL brings to the table, and just want people to realize that we've gone through a great effort through the research and development to ensure that it's safe.

ML: Thank you to Christian Natoni for discussing the importance of spent nuclear waste research and giving us a closer look at what the North Anna power station shipment might look like. If you're interested in learning more about INL's spent nuclear waste and nuclear energy research, visit inl.gov/nuclearenergy. Next week, I'll be speaking with Leigh Ford from the Snake River Alliance to hear the SRA's perspective on the dangers of spent nuclear waste shipments.

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