U.S. DEPARTMENT of ENERGY | Office of Nuclear Energy

Center for Used Fuel Research

Frequently Asked Questions on the Center for Used Fuel Research

1. **Are "used nuclear fuel" and "spent nuclear fuel" the same thing?**
   Answer: The term *used nuclear fuel* is synonymous with the term *spent nuclear fuel*, the term used in the 1995 Idaho Settlement Agreement. The word "used" highlights that about 95% of the energy remains in the fuel, making it a valuable resource for future reactors, while "spent" implies waste.

2. **Why does the U.S. Department of Energy (DOE) have a responsibility to manage spent/used nuclear fuel (especially commercial spent/used nuclear fuel)?**
   Answer: Under the Nuclear Waste Policy Act (NWPA) of 1982, as amended, DOE is legally required to develop a permanent geologic repository and ultimately take ownership and manage commercial spent/used nuclear fuel.

3. **How is commercial spent/used nuclear fuel currently stored?**
   Answer: Commercial spent/used nuclear fuel is primarily stored at the utility sites where it was used to generate electricity, which includes more than 70 sites across over 30 states. Initially, the spent/used nuclear fuel is stored in steel-lined concrete pools of water and later transferred to steel dry storage casks placed on regulated concrete pads at those sites. Each utility site typically stores its own spent/used nuclear fuel because there is currently no permanent national repository for spent/used nuclear fuel in the U.S. (Yucca Mountain was proposed but never completed). Under the Nuclear Waste Policy Act of 1982, as amended, the DOE will eventually take ownership of the spent/used nuclear fuel and dispose of it as required.

4. **How does the Center for Used Fuel Research fulfill the 1995 Idaho Settlement Agreement that designates INL as the lead laboratory for spent nuclear fuel?**
   Answer: The Center for Used Fuel Research (CUFR) directly supports the 1995 Idaho Settlement Agreement by reinforcing INL's role as the DOE's lead institution for research on spent/used nuclear fuel. The Agreement established INL as the national hub for spent/used nuclear fuel-related research and development, and the CUFR builds on that foundation by coordinating applied research in storage, transportation, and long-term management of spent/used nuclear fuel.

5. **Why was INL selected as the host of the Center for Used Fuel Research?**
   Answer: INL was chosen as the host for the Center for Used Fuel Research because it is DOE's lead laboratory for nuclear energy research and development, offering

unparalleled infrastructure, technical expertise, and decades of experience in fuel cycle science. INL houses specialized facilities such as the Hot Fuels Examination Facility (HFEF) and capabilities at the Idaho Nuclear Technology and Engineering Center (INTEC) that are essential for opening casks, examining fuel, and generating data to support licensing, innovation, and long-term storage and transportation decisions. These facilities, combined with INL's leadership in fuel cycle innovation, enable researchers to conduct evaluations that strengthen safety and performance. These exceptional capabilities make INL the ideal choice to lead research that ensures safe, long-term management of spent or used nuclear fuel while advancing technologies for future nuclear systems.

6. **Will designating INL as the location of the Center for Used Fuel Research increase the amount of spent/used nuclear fuel stored at INL?**
   Answer: Designating INL as the lead lab for the Center for Used Fuel Research (CUFR) does not alter or override the provisions of the 1995 Idaho Settlement Agreement or its subsequent amendments. Importantly, establishing the CUFR supports Idaho's interests by generating critical safety data, accelerating future removal timelines, and ensuring research meets the highest national standards for spent/used nuclear fuel management.

7. **Will this designation result in any increase in funding and/or employment at INL?**
   Answer: Yes, the designation of INL as the lead lab for the Center for Used Fuel Research will result in increased funding and staffing over time. The Center will serve as the research arm of DOE Office of Spent Fuel and High-Level Waste's sub-Office of Storage & Transportation, receiving both current and future funding streams. INL will hire a director and administrative support for the new Center for Used Fuel Research. Some INL employees could be reassigned to the center from current work, and it is possible that new employees could be added in the future, based on need.

8. **How will the Center for Used Fuel Research interact with industry, universities, and international partners?**
   Answer: The Center for Used Fuel Research (CUFR) will operate under a hub-and-spoke model, with INL serving as the central hub and other national laboratories, industry, universities, and international partners forming the spokes. This structure enables DOE to collaborate effectively with a broad range of stakeholders, including utilities that store commercial used nuclear fuel, fuel and cask vendors, research organizations such as the Electric Power Research Institute, and the Nuclear Energy Institute. Universities will

participate through programs like the Nuclear Energy University Program, contributing research expertise and workforce development. International partners will engage to share lessons learned, harmonize testing approaches, and avoid duplication of effort, ensuring mutual benefits and global alignment on best practices.

9. **Will the Center for Used Fuel Research conduct research on disposal of spent/used nuclear fuel?**
   Answer: No. The Center for Used Fuel Research (CUFR) is envisioned to focus exclusively on issues related to the safe storage and transportation of spent/used nuclear fuel, including aging management, canister integrity, and performance under extended storage conditions. However, research in these areas may also provide insights that indirectly contribute to disposal research.

10. **Will the Center for Used Fuel Research work on recycling/reprocessing technologies?**
    Answer: No. The Center for Used Fuel Research (CUFR) will focus exclusively on issues related to the safe storage and transportation of spent/used nuclear fuel, including aging management, canister integrity, and performance under extended storage conditions. While Idaho National Laboratory is recognized globally as a leader in recycling and reprocessing technologies, those activities fall outside the CUFR's scope. The CUFR's mission is to develop innovative technologies and solutions, conduct research that ensures regulatory compliance, and build public trust in the safe storage and transportation of commercial and DOE-managed spent/used nuclear fuel.

11. **How is spent/used nuclear fuel transported, and how frequently does transportation occur?**
    Answer: Spent/used nuclear fuel is transported in specialized shielded transport casks by rail, truck, or barge under strict regulations to ensure safety and security. Transportation of used nuclear fuel has been accomplished routinely and safely in many countries around the world, including the United States, for decades. For a historical review, please see:
    A Historical Review of the Safe Transport of Spent Nuclear Fuel.

12. **Idaho Gov. Brad Little recently approved a shipment of used nuclear fuel from the North Anna Power Station to INL for research purposes. When will that shipment take place and what kind of research will take place at INL using that spent/used nuclear fuel?**

Answer: This shipment from North Anna Power Station of 32 pressurized water reactor spent/used nuclear fuel assemblies contained in the High Burnup Research Cask is anticipated to occur in 2027. These assemblies represent “high burnup” spent/used nuclear fuel – which has been irradiated for extended periods to increase the energy output. Research will focus on ensuring the safe, long-term storage and subsequent transportation of high burnup spent/used nuclear fuel. This includes using INL facilities to generate empirical data on how these materials age over time. This data will fill a critical need for the U.S. nuclear power industry in the very near-term, and support future DOE disposition of spent/used nuclear fuel.

13. What is the High Burnup Research Cask?

Answer: The U.S. Department of Energy (DOE) and Electric Power Research Institute – which conducts research on behalf of U.S. electric utilities - started a research project in 2013 to collect data on high burnup spent/used nuclear fuel needed for storage, that resulted in the loading of 32 high burnup spent/used nuclear fuel assemblies into a dry storage system (cask), the High Burnup Research Cask (HBURC), and placing it on a storage pad at the North Anna Power Station in 2017. The cask is equipped with instrumentation to monitor internal temperatures and other parameters throughout its storage life. In 2027, the cask will be transported to INL for further testing, including opening the cask to remove some of the spent/used nuclear fuel and analyze it in INL’s hot cells. This data will support long-term storage safety evaluations for spent/used nuclear fuel storage for the nuclear industry and DOE. The following link provides more information on the High Burnup Research Cask.
https://www.energy.gov/ne/articles/inside-one-nations-biggest-research-projects-spent-nuclear-fuel

14. What is the difference in storage challenges between high burnup and low burnup spent/used nuclear fuel?

Answer: High burnup spent/used nuclear fuel can behave differently from low burnup spent/used nuclear fuel during long-term dry storage because of factors such as higher decay heat loads, increased internal gas pressure, and microstructural changes in the cladding. These differences arise from extended reactor exposure, which increases hydrogen uptake, corrosion, and residual stresses in the cladding. One of the primary goals of the Center for Used Fuel Research is to generate data-driven insights to resolve these uncertainties, strengthen the technical basis for licensing, and advance INL’s

technical leadership and impact for the entire fuel cycle. Importantly, for normal storage conditions that occur at INL, there are no performance concerns for either high burnup or low burnup spent/used nuclear fuel. The data collected from the High Burnup Research Cask project to date indicates that high burnup spent/used nuclear fuel behaves more similarly to low burnup spent/used nuclear fuel when placed in dry storage than initially expected.