SIERRA CLUB

August 7, 2018

Nigel Mote
Executive Director
U.S. Nuclear Waste Technical Review Board
2300 Clarendon Boulevard
Suite1300
Arlington, VA 22201

Dr. Jean Bahr
Chair
U.S. Nuclear Waste Technical Review Board
2300 Clarendon Boulevard
Suite1300
Arlington, VA 22201

Dear Mr. Mote and Dr. Bahr:

We very much appreciate the work of the Technical Review Board in addressing critical issues associated with nuclear waste. We are looking forward to your important report on High Burnup Fuel which is currently planned for the end of this year. We are writing today to bring your attention to several problematic issues that need resolution. Given national plans for transporting and storing Spent Nuclear Fuel at consolidated interim storage sites or a federal repository, we would appreciate your responses to our questions related to these issues.

1) **The Backup Safety Function of Fuel Pools.**
Our understanding is that fuel pools at nuclear reactors are to be utilized as a safety backup for the dry storage of spent nuclear fuel. If there are damaged fuel rods or concerns about the integrity of the storage container, the fuel can be returned to the pool for inspection and possible recontainerization. This provision is also part of the License for Independent Spent Fuel Storage Installations. We do know that NRC has allowed fuel pools to be dismantled as plants undergo decommissioning, which would eliminate this option.

Is the Backup Safety Function of Fuel Pools an essential one? Is there an alternative backup option? Are there special concerns related to the decay heat of high burnup fuel that would prevent the return of fuel assemblies to the fuel pool?

2) Current Plans for Transportation of Spent Nuclear Fuel to Interim Storage or a Repository raises concern about the impacts of long distance transportation on the fuel cladding and containment. What Safety Backup Facilities should be included in the Transportation Plans?

The 2010 NWTRB report expressed heightened concern about the transport of high burnup fuel and that a hot cell might be necessary to receive waste packages. We are only aware of two kinds of facilities where damaged casks or containers can be handled—in spent fuel pools or in hot cells. How many hot cells are available in the nation that could handle large transportation casks? Before launching a major transportation program for SNF, we think there needs to be a much more explicit plan of the necessary safety backup facilities, their distribution regionally around the nation and what the components of the safety plan would be.

In the case of the Holtec Consolidated Interim Storage proposal in New Mexico, there is currently no plan to deal with damaged fuel or containment at the facility. It will instead be sent back to the originating nuclear reactor, even if the distance is thousands of miles. How would the package be secured for the return trip to handle the risks? If the reactor has been closed and no fuel pool exists, what procedures would be employed to handle the rejected SNF package?

Transportation plans will also be impacted by existing degraded and long underfunded national infrastructure as identified by the American Society of Civil Engineers in their regular reports. The nation's overall grade was D+ in 2017. Significant investments are needed in rails to handle the heaviest Class I rail car loads (SNF requires the heaviest Class 1 load and specially designed 12 axle cars) as well as bridge repair. Freight receipts are not adequate to fund all infrastructure improvements needed. The state report cards for the three states with proposed facilities for consolidated interim storage or a permanent repository are also not reassuring: New Mexico scored D+, Texas C-, and Nevada C-. These three states need large investments in roads and rails.

At the June 13th NWTRB Meeting, Ken Niles of the State of Oregon reported that DOE funding for transportation planning was recently cut from DOE's budget, and as a result a core planning meeting was cancelled. States will also need money for planning, oversight, inspections and emergency training and response. Despite commitments to funding states for their transportation efforts, Mr. Niles reports not receiving adequate funding for 30 years and he believed that a major increase in state funding would be necessary.

Given the current state of transportation infrastructure, transportation planning is far more complicated. It requires detailed understanding of the implementation of multimillion dollar projects, their completion dates and coordination with multiple planning entities that address safety and emergency response training. We would appreciate hearing the Board's responses to all of these transportation issues.

3) **A Research Plan to fulfill the 2010 NWTRB Research Recommendations for High Burnup Fuel is an urgent need.**

The 2010 Report provided extensive coverage of many issues associated with extended long term management of spent nuclear fuel in dry storage. A key finding of the Board in the report was the lack of an empirical knowledge base for high burnup fuel. It also called into question attempts to model the behavior of high burnup fuel using data available on only low burnup fuel. The Board report was very pointed in calling for research on high burnup fuel – including opening up canisters to directly observe the state of high burnup fuel, and the cladding and any

signs of degradation. The Board stressed the need for more monitoring of temperature, the continued presence of helium, and a better understanding of the performance of new metal alloys used for cladding. The Board noted the fact that much of the research was being conducted by industry and therefore proprietary. We are aware of only one EPRI- DOE joint study related to high burnup fuel recently launched by the government. Those results will not be available until 2026.

There is some urgency to completing the recommended research as the nation's nuclear agencies are moving forward with interim storage, repository and transportation plans for SNF. The Board is in a unique position to inform us regarding what has been learned about aging processes, management and transportation of high burnup spent nuclear fuel since the 2010 NWTRB Report.

All sources of information should be explored, including information collected in other countries. The Board regularly invites speakers from other countries. Mark Whitehall, an industry representative from Switzerland reported at the June 13th meeting that they do Post Irradiation Exams of Spent Fuel (PIE). This information could help identify differences in degradation between low and high burnup fuel. He also mentioned that they are considering encapsulating damaged fuel. Such information collection by other countries should be explored by the Board.

At the same time we should have a better understanding of what information is generated by industry and whether it answers key questions.

Government-led research is particularly important to address the questions identified by the NWTRB. There are definitely opportunities to address many of the research needs related to high burnup fuel. One possible opportunity would be to launch a project to learn more about high burnup fuel in coordination with what DOE is doing to evaluate closed nuclear reactors, and the packaging needs and logistics for moving SNF offsite in the future. At the June 13th NWTRB Meeting Erica Bickford, PhD, Transportation Manager with DOE, presented on this project. The detailed reports also identify High Burnup Fuel at some of the sites that were studied. We believe this is an opportunity to select a representative sample of High Burnup Fuel from the sites being studied and plan an appropriate research study to answer many of the questions the Board expressed in 2010. The link to the 6 DOE contractor-prepared reports prepared so far is: https://www.energy.gov/ne/downloads/initial-site-specific-de-inventory-reports These studies are ongoing so there will likely be more high burnup fuel available for study. It is important to have more data on high burnup fuel and the required cooling periods before transport and prior to mixing high burnup fuels in the same canister with low burnup fuels. This is just one example of a research opportunity.

Canister expected lifetime has recently become an important question. What is the state of knowledge on thin-walled, welded stainless steel canister integrity over time, related to the welds and thru wall cracks? What is a reasonable containment life expectancy for high burnup fuel? What is the state of our knowledge of the relative merits and negatives of thin-wall (1/2 inch) stainless steel canisters versus thick walled ductile steel canisters? And in relation to high burnup fuel?

Are there comparative studies on canister design that are available to the public? If so, we would appreciate a list of resources for these studies.

We look forward to the Board's Research Plan for High Burnup Fuel and to your replies to our questions. Thank you for your consideration of these matters. For questions or further clarification, please contact John Coequyt at john.coequyt@sierraclub.org or (202) 675-7916.

Respectfully,

John Coequyt
Director Federal and International Climate Campaign

Robin Mann
Sierra Club Board of Directors