

**Subcommittee on Environment and Climate Change  
Hearing on  
“Cleaning Up Communities: Options for the Storage and Disposal of Spent Nuclear Fuel”  
June 13, 2019**

**Mr. Lake Barrett  
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**The Honorable David B. McKinley (R-WV)**

1. I would like to ask about the transportation of spent fuel and radioactive waste. Can you speak to the Department of Energy’s experience with Transportation?

**RESPONSE:**

- a. How safe are the casks for shipment?

**RESPONSE: Very safe.**

**Spent fuel and high radioactivity wastes are transported under very strict international and United States Nuclear Regulatory Commission safety and security standards. These very robust transportation casks are designed to keep the shipments safe under extreme accident conditions involving collisions (drops and punctures), fires, and submergence in water. They are generally made of very strong steel layers from 5 to 12 inches thick. They are independently analyzed by multiple organizations with confirmatory component scale testing performed as necessary. In the United Kingdom a full-scale cask was tested to confirm its performance by being struck by a train locomotive traveling at 100 miles per hour. Similar confirmatory safety testing was previously performed here in the USA with a locomotive striking an outdated cask at a 75 miles per hour speed and a cask on a truck being driven into a bridge abutment type structure at 80 miles per hour.**

**These are some of the strongest containers every constructed.**

**The US Nuclear Regulatory Commission is responsible for transportation safety standards and they constantly review safety information and periodically produce risk reports based on the most recent information available. For example, NUREG 2125 (<https://www.nrc.gov/docs/ML1403/ML14031A323.pdf>) concluded in 2014 that there is very low risk from spent fuel transportation during all modes of operation, including severe accidents.**

**The National Academies of Sciences and Engineering National Research Council performed an in-depth review of spent fuel transportation in a 2006**

**report entitled, "Going the Distance- The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States". This comprehensive report confirmed that the risks are very low and acceptable.**

- b. What is the Department's experience with shipment?

**RESPONSE: Excellent.**

**The DOE and its predecessors, over the last 50 years, have safely transported over three thousand spent fuel shipments in the USA without an accident that released any radioactivity harmful to the public or environment. The USA, as all other countries, utilize the same international safety standards and globally there have been over 25,000 successful safe spent fuel shipments.**

- c. My understanding, to take one example, is that the Department has overseen 12,000 shipments of radiological waste to the WIPP facility in New Mexico. What is the safety record of that?

**RESPONSE: Excellent.**

**The Waste Isolation Pilot Plant transuranic waste disposal site has safely transported by truck more than 12,500 shipments which traveled approximately 15 million miles without any significant problems.**

- d. And what is the safety record of the shipment of spent navy nuclear fuel?

**RESPONSE: Excellent.**

**Over the past 50 years the Naval Nuclear Propulsion Program has successfully transported over 850 spent fuel cask shipments by rail to Idaho which have traveled approximately 2 million miles safely,**

**The Honorable Markwayne Mullin (R-OK)**

1. As our country focuses more on carbon neutral energy, which nuclear power is the leader in, what does the uncertainty of a finalized disposal location mean for new innovations like advanced nuclear reactors?

**RESPONSE: All nuclear energy facilities, even advanced ones, will produce either spent nuclear fuel or some high-level wastes from fuel recycling (if implemented). Therefore, a disposal facility, such as a Yucca Mountain, will eventually be necessary to support either advanced or current reactor types. Having a realistic disposal program capable of safely handling and disposing of all current and future nuclear wastes is an important public trust and confidence factor to support the development and siting of these new advanced nuclear systems to provide the clean**

**air, carbon-free electrical energy that our nation needs.**

- a. Navy has 99 nuclear reactors that power almost all aircraft carriers and submarines. What benefits do the military gain from using advanced nuclear reactors?

**RESPONSE: The US Navy has always been a technological leader in developing advanced nuclear technologies that could be useful for Naval missions. The Naval Nuclear Propulsion Program continually maintains close contact with advancing technologies and adopts aspects as appropriate. However, in my current retired situation, I am not able to provide further information in this area.**

- b. What are the benefits to our national security for having a permanent storage facility, like Yucca Mountain?

**RESPONSE: Nuclear technologies, for the past 75 years, have always been an important aspect of our national defense programs. Former and current DOE defense production facilities and Nuclear Navy facilities have produced and continue to produce nuclear wastes that need a permanent geologic repository disposal endpoint. Although all these wastes are being stored safely in existing facilities, these current facilities were never planned to be indefinite storage sites. These materials need to be placed, in a timely manner, into a permanent disposal facility, such as Yucca Mountain, to allow current defense related facilities to perform their current important national security or cleanup missions without interruption.**

**A current example is the Naval Reactors Propulsion Program's Naval Reactor Facility at the DOE Idaho National Engineering Laboratory (INEL). This facility receives all spent nuclear fuel from naval reactors for research and development purposes and final preparation for disposal in a permanent disposal geologic repository. Due to the concerns of the State of Idaho about indefinite storage of used or spent nuclear fuels in Idaho, the DOE and Naval Reactors Propulsion Program signed a settlement agreement in 1995 with the State of Idaho that would allow continued limited Naval fuel shipments to Idaho and that current stored spent fuel there would be removed before 2035. The only potential repository site available to remove this Idaho fuel, within this agreement time frame, would be Yucca Mountain.**

**Compliance with this agreement is important to continue the successful long-standing history for Idaho to receive nuclear navy spent fuel and any significant interruptions in these fuel receipts could impact fleet readiness, thus becoming a national security concern.**

- c. How is the military's nuclear waste currently transported to its temporary storage facility in Idaho?

**RESPONSE: Navy spent nuclear fuels are transported to Idaho by rail in specially designed transportation casks.**

- d. Has there ever been any issue transporting this waste?

**RESPONSE: There has never been any public health or safety problems with the shipments. Over the past 60 years, there have been over 850 shipments that have safely traveled approximately 2 million miles from east coast and west coast naval facilities to Idaho.**

**There has been an Idaho social/political concern that DOE has not been able to meet the expectations of the State of Idaho to remove stored navy and commercial spent fuels from the INEL after research and development activities have been completed. This general concern had manifested into some jurisdictional concerns with nuclear transportation access into the INEL site. These have all been successfully resolved with the 1995 agreement and other agreements. However, if there are significant future DOE delays in meeting the 1995 agreement to remove spent fuels from Idaho by 2035, such complications may possibly arise in the future.**

- e. Why is there an issue transporting this waste from its temporary waste in Idaho to a permanent site in Nevada?

**RESPONSE: There is no transportation problem preventing the movement of Idaho fuels or wastes to a geologic repository site, other than there is no repository site to go to.**

**The problem is that Congress is not funding the DOE and NRC to allow completion of the NRC licensing process that is necessary to be able to start construction of the Yucca Mountain permanent repository. If the DOE 2008 Yucca Mountain repository site construction authorization application is approved by the NRC for construction, and Congress supports construction with funding, then transportation details can be successfully developed under existing laws, regulations and procedures to allow transportation from Idaho to Yucca Mountain.**

**If Yucca Mountain funding is reestablished soon, fuel could be removed from Idaho by the 2035 agreement date thus resolving this national security concern.**

**The Honorable Bill Johnson (R-OH)**

1. Mr. Barrett, you expressed confidence in the scientific and technical merits of the Yucca application. Politically, it is challenging. Many of the actions that led to Yucca took place in the late 1970s and 80s. There was considerable work performed then and

experience about what is necessary for developing a durable program. Can you elaborate on that experience?

**RESPONSE:** Our nation has studied geologic formations for many potential repository sites across the country for nuclear waste disposal for over 50 years with the best scientists available. For example, detailed studies started at Yucca Mountain in 1978 as well as at dozens of other sites and regions across the country. In the mid-1980s the DOE studied in detail nine sites in five states and published thousands of pages of scientific information in draft form for public comment before nominating five sites and finally recommending three sites (Yucca Mountain NV, Hanford WA, and Deaf Smith TX) for detailed site characterization. These were all scientifically “good” sites, with each of course having greater and lesser attributes. However, Congress in 1987, after reviewing the scientific work on all the sites, stated by statute, that only the Yucca Mountain site would be further studied.

From 1988 until the 2002 Presidential Site Recommendation, the DOE team, following the law, performed extensive scientific exploration and testing deep inside of Yucca Mountain to analyze the technical aspects of the site and its repository design to be able to demonstrate that it could meet the very protective EPA and NRC regulatory safety and environmental protection standards. The conclusion of the DOE science team, as confirmed by international peer review, was that the site was acceptable, and it was recommended to Congress for designation under law by President Bush.

From 2002 until 2008 the DOE prepared an extensive formal license application to submit to the Nuclear Regulatory Commission that provided much more scientific justification that the site would meet all safety and environmental protection requirements.

Even after the DOE submitted the Yucca Mountain license application in 2008, confirmatory scientific work continued that has indicated that there was considerable conservatism in the DOE work, meaning that the site would perform even better than predicted. For example, a detailed US Geologic Survey report on earthquake risks in the Yucca mountain area (<https://pubs.usgs.gov/of/2013/1245/pdf/of2013-1245.pdf>) confirmed that Yucca Mountain was well protected from any potential earthquake that could happen in the area or beyond. In fact, the recent July 2019 California earthquakes that that were felt in Nevada were not unexpected and would likely have no impact on a Yucca Mountain repository. Based on all the scientific studies, Yucca Mountain would meet all seismic public protection standards for any long-term projected earthquake event.

From a scientific earthquake protection point of view, a passive deep underground repository is one of the lowest risk places if there is a large earthquake. Even assuming if some magical scientifically unsupported

earthquake were to happen in the future, an underground Yucca Mountain repository would be much less impacted than other structures in the Las Vegas area. For example, if such an unscientific earthquake occurred, most structures in Las Vegas, including most high-rise buildings and residential homes, would be far more likely to sustain major structural damage than would a repository at Yucca Mountain, which would likely survive with minimal impact.

From 2008 to 2012, when the Yucca program was stopped, there was an intensive independent Nuclear Regulatory Commission staff safety review of the DOE Yucca Mountain license application. The conclusion of this detailed scientific review was that Yucca Mountain met the regulatory standards necessary to ensure public health and safety and environmental protection.

All the above extensive scientific work is why I have confidence in the scientific merits of the Yucca Mountain site and why I believe the final stage of the licensing process should be finished.

It is my view that if the nation were to technically develop a new different site somewhere else in this country, that the technical effort would be similar if not greater. New standards would be required, and detailed underground work would be just as complex, if not more so.

If there is a future repository siting program, more attention will likely be needed to maintain social/political support, especially in the area of federal-state level relationships. It is difficult to project, but these will likely be a substantial added cost which will be in addition to extensive technical-scientific safety and environmental protection work that is always necessary.

2. I question how we could possibly do any type of siting work if we started over and began again today. Mr. Barrett, in this age of 24/7 social media, aren't there a whole new set of challenges to ensure people have full and accurate information about siting and technical determination of repository.

**RESPONSE:** Yes, it is much more challenging these days to communicate useful information to the public in a meaningful way when there is so much willful interference by those with strong disruptive social-political agendas being so active in today's many media platforms. Modern internet and social media communication modes allow special interests to quickly spread inaccurate and misleading sensational negative information that erodes public confidence in any complex governmental or establishment program they wish to attack. It is much more difficult today for responsible implementing organizations to effectively communicate complex safety and environmental protection scientific information when detractors can post distorted and often false information without any repercussions. Although the implementing organization can now promptly put all

**their factual scientific information online, it is very complex and not easily understood by the general public. Detractors can easily undermine good products by posting inaccurate partial truth “sound bites” that have little basis but can stir strong emotions that are very detrimental to the public trust and confidence in implementing organizations.**

- a. Would information challenges like this be addressed by completing the NRC licensing process?

**RESPONSE: Yes. So much has already been done and everything is already in the public record with Yucca Mountain. It is time to complete the licensing process to conclude, through independent judges, if the site meets the regulatory requirements or not. And if it does, as I expect, then move on to the next national decision point of Congress deciding whether to provide the funding necessary to build the repository to receive spent fuel from the reactor and waste sites spread across the country there or not.**

**The issues with Yucca Mountain are well known and well-studied, so now is the time to just finish the legal process and then politically decide what the next steps should be. Starting over will take many decades and will cost many tens of billions of dollars in developing a new site and paying for continued storage at stranded sites across the nation. This challenge does not get easier with time.**

- b. Does it make any sense to stop short now?

**RESPONSE: No. As a nation, we need a solution to our fast-growing nuclear waste challenge. There is no better realistic option that can replace Yucca Mountain in a reasonable timeframe. Other options, such as trying to develop a different consent-based repository site, can be added in parallel, which I support, but that should not just replace Yucca Mountain.**

- c. What would be lost to the public, ratepayers, taxpayers if we turn away from the \$15 billion-dollar investment in Yucca without completing the licensing?

**RESPONSE: All the Yucca Mountain site work value would be lost and the costs to our taxpayers will increase by tens of billions of dollars more to maintain spent fuel and wastes at isolated storage sites spread across the country on our seacoasts, rivers, and lakes for our lifetimes or more. We would be consigning a major debt and significant burden upon our grandchildren and great grandchildren for no real reason.**

**Another factor is that it could be very difficult to attract future scientists to work on such a politically sensitive program as nuclear fuel and high-level radioactive waste disposal in the future. Thousands of excellent scientists have worked very hard on the Yucca Mountain program and have been**

**unfairly maligned from a social/political perspective. Seeing good scientific work dismissed by often emotional political outbreaks is difficult to endure and, in the future, will make it challenging to assemble a new team to achieve what the nation needs to have done.**

**Congress should stand up to allow the final judgment process for Yucca Mountain to finish in respect for the scientists that worked very hard for decades. It is demoralizing to work so hard to see everything lost, without scientific reason, due to relatively short-term political driven Not-in-My-Backyard emotions.**

- d. What would that mean for future efforts to site a repository?

**RESPONSE: In my view, if Yucca Mountain cannot be completed, I doubt that any other site in the nation can be realistically developed due to state level social/political resistance. Yucca is an excellent isolated technical site that has been well studied for over four decades. There may be other scientifically potentially good geologic sites across the nation, however there is no reason to believe that the same state level Not-In-My Backyard social/political resistance would not be met there as well.**

**The 1982 Nuclear Waste Policy Act established a statutory process for the balance between state level rights and federal level needs for establishing a necessary repository somewhere in the nation. This balance required DOE to fund potential state level involvement and also allowed the potential host state to statutorily “disapprove” the site, for any reason, and that the site was to be abandoned unless both US Senate and House of Representatives voted to override the state disapproval. In 2002, Nevada disapproved the Yucca Mountain site and Congress overrode the disapproval, however the State of Nevada has never agreed and has been able to Congressionally prevent funding to complete the Yucca Mountain process, thus blocking a national need solution. This has happened even though the local governments, nearest the Yucca site, support continuing work on the project. I do not see how this would be different with any other potential host state in this country in the future.**