

U.S. Senate Committee on Energy and Natural Resources
November 15, 2018 Hearing: Pending Nominations
Questions for the Record Submitted to Dr. Rita Baranwal

Questions from Ranking Member Maria Cantwell

Questions: The Pacific Northwest National Laboratory is one of the Department of Energy's lead laboratories for the Office of Nuclear Energy's Material Recovery and Waste Form Development program. The purpose of this program is to develop advanced fuel cycle separation and waste management technologies that will improve fuel cycle performance and lead to a more sustainable fuel cycle, with less processing, waste generation, and potential for diversion. This work is crucial not only to improve our understanding of closed nuclear fuel cycles for advanced reactor designs but also to enhance our waste characterization and processing capabilities at Hanford. Unfortunately, funding for this program was cut by about a third in fiscal year 2019.

- Do you think that the Material Recovery and Waste Form Development program should remain a priority?

Answer: Yes, the Material Recovery and Waste Form Development program should remain a priority for the Office of Nuclear Energy.

- If confirmed, will you work with me to ensure that it remains a priority?

Answer: Yes, if I am confirmed, I will work to ensure that the Material Recovery and Waste Form Development program remains a priority for the Office of Nuclear Energy.

Question from Senator Bernard Sanders

Question: Will you commit to opposing any nuclear power technologies research that could lead to an increase in nuclear fuel waste, yes or no?

Answer: If I am confirmed, I will commit to understanding new nuclear power technology research and what, if any, reasons that could lead to an increase in nuclear fuel waste.

Questions from Senator Martin Heinrich

Question 1: I understand the domestic nuclear power industry may require a source of high-assay low-enriched uranium (HALEU) to support existing research reactors and development of advanced commercial reactors. As you may know, the URENCO USA plant in Eunice, New Mexico, currently provides commercial enrichment capabilities within the U.S. If you are confirmed, will you assure that the Office of Nuclear Energy fully considers URENCO USA as an option for providing HALEU for the commercial nuclear power industry?

Answer: I am aware of the interest in supporting advanced reactor development and of the need for high-assay low enriched uranium (HALEU) for many of these reactor designs. Yes, if I am confirmed, the Office of Nuclear Energy will fully consider URENCO USA as an option when the Department considers policies related to HALEU supply for the commercial nuclear power industry.

Question 2: In a recent GAO study of the Department's capacity to enrich uranium, including HALEU, there were a number of recommendations that centered on the lack of understanding of the real costs of a government-deployed or supported enrichment capacity. If you are confirmed, will you commit to assuring the GAO's recommendations are fully being addressed before the Department provides additional federal funding for development of any new enrichment capacity?

Answer: If confirmed, I will review the GAO report, *NNSA Should Clarify Long-Term Uranium Enrichment Mission Needs and Improve Technology Cost Estimates* (GAO-18-126), to understand and consider the recommendations that were presented to the Department as it relates to development of any new enrichment capability.

Question 3: I am concerned the Department may be planning to provide additional funding to Centrus for HALEU development on a sole-source basis without any consideration of allowing the existing domestic commercial enrichment industry an opportunity to meet industry's need for HALEU. Do you agree DOE should consider the risk and cost to the taxpayer of producing HALEU from existing domestic sources, such as URENCO USA, before awarding a sole-source contract to Centrus?

Answer: I agree that risks and costs to the taxpayer should be considered for all contracts awarded by the Office of Nuclear Energy.

Questions from Senator Mazie Hirono

Questions: As part of my responsibility as a member of the Senate Committee on Energy and Natural Resources and to ensure the fitness of nominees for an appointed position, I am asking nominees to answer the following two questions:

- a. Since you became a legal adult, have you ever made unwanted requests for sexual favors, or committed any verbal or physical harassment or assault of a sexual nature?

Answer: No.

- b. Have you ever faced discipline, or entered into a settlement related to this kind of conduct?

Answer: No.

Question from Senator Lamar Alexander

Question: China is investing heavily in nuclear power, including advanced reactors. Most nuclear reactor construction is happening in China – China is currently building about 15 nuclear reactors while here in the United States we only have two nuclear reactors under construction.

If we do not cooperate with China on civilian advanced nuclear reactors, how will it impact the future of advanced nuclear reactors in the United States?

Answer: It is my understanding that through the new licensing policy framework, the United States took a balanced view of protecting national security and the economic viability of the U.S. commercial nuclear enterprise, while recognizing the potential short-term impacts to the United States nuclear industry and other areas of nuclear cooperation.

If confirmed, I will utilize the full resources of the Office of Nuclear Energy to learn more about this issue and understand what, if any, impacts are posed to the domestic advanced reactor community.

Question from Senator Angus S. King, Jr.

Question: Two proposed private consolidated interim storage facilities in the Southeast are now in the NRC license review process and according to both could be approved and ready to receive spent nuclear fuel in the early 2020's. What is your view of the role of consolidated interim storage in an integrated waste management program, especially as it relates to spent fuel stored at shutdown reactor sites such as Maine Yankee?

Answer: My experience is with new types of nuclear fuel and advanced reactor designs. My research has not focused on the back end of the fuel cycle, which includes disposal of spent nuclear fuel (SNF). However, I am aware that SNF is stored by many utilities at shutdown reactor sites all over the country, such as Maine Yankee. If confirmed, I would utilize the resources of the Office of Nuclear Energy to study all of the options for the disposal of SNF.

Questions from Senator Catherine Cortez Masto

Question 1: When President Trump visited my home state of Nevada on October 20, he indicated a shift in his Administration's policy pertaining to the storage of nuclear waste at Southern Nevada's Yucca Mountain. Specifically, President Trump said, "I think you should do things where people want them, so I would be very inclined to be against it. We will be looking at it very seriously over the next few weeks, and I agree with the people of Nevada." However, Secretary Perry said a few days later that the White House still supports Yucca Mountain's construction.

- A. Now that President Trump says that he agrees with the majority of Nevadans on Yucca Mountain, what specifically is DOE now doing in regards to this matter?

Answer: As you know, I am a scientist at the Idaho National Laboratory (INL), and in this capacity I am cognizant of research and development (R&D) in advanced nuclear technology. Since I am not yet a part of the Department of Energy, I have no detailed knowledge of the Department's plans regarding Yucca Mountain. If confirmed, I would have the resources of the DOE to gain in depth knowledge on the issue.

- B. Does the Department have plans to revisit this issue?

Answer: I am not aware of the Department's plans on this issue.

- C. What will you do, if confirmed, in your capacity as the head of the Office of Nuclear Energy to reassess this issue?

Answer: My expertise is on researching new types of nuclear fuel. My research has not focused on the back end of the fuel cycle which includes disposal of used nuclear fuel and high-level radioactive waste (HLW). However, if confirmed, I would utilize the resources of the Office of Nuclear Energy to study all of the options for the disposal of used nuclear fuel and HLW.

Question 2: In your role as the Secretary of Energy's primary nuclear policy advisor, would you recommend that the Secretary accept the framework established by the Blue Ribbon Commission?

Answer: I have not studied the recommendations of the Blue Ribbon Commission (BRC) report, but it is my understanding that the BRC report focused on the back end of the fuel cycle, and not on new types of nuclear energy research and development. If confirmed, I would study the BRC report and provide advice to the Secretary at that time.

Question 3: Would you oppose any proposals for consideration of an interim storage facility for Spent Nuclear Fuel or High Level Waste in Nevada, at Yucca Mountain, the NNSS, or any other site in the state?

Answer: I am not an expert on spent fuel storage or disposal. I have not studied the Nuclear Waste Policy Act, which I understand provides the framework for the storage and disposal of spent nuclear fuel and high-level radioactive waste. If confirmed, I would utilize the resources of the Department of Energy to determine which options are available and which are precluded.

Question 4: Would you oppose any proposals for defense waste-only storage or disposal in Nevada, at Yucca Mountain, NNSS, or any other site in the state?

Answer: I am not an expert on used fuel storage or disposal, regardless of whether the waste is of commercial or defense origin. Again, I have not studied the Nuclear Waste Policy Act which I understand provides the framework for the storage and disposal of used nuclear fuel and high-level radioactive waste. If confirmed, I would utilize the resources of the Department of Energy to determine which options are available and which are precluded.

Questions from Senator Rob Portman

Question 1: Dr. Baranwal, do you agree that having a domestic capability to enrich uranium should be a priority for the United States, and is a national security concern?

Answer: I fully agree that we should have a U.S. capability to enrich uranium.

Question 2: If confirmed, will you commit to being personally involved and engaged in the Department's re-evaluation of the previous Administration's decision to end domestic enrichment capabilities?

The workforce at Piketon is highly skilled and the site is equipped with top notch infrastructure. DOE, and in particular the Office of Nuclear Energy, should be very well aware of these special characteristics because the office held – and currently still holds – the lease on the ACP building. These things together make the site well positioned to meet the critical need of domestic enrichment capability.

Answer: If confirmed, I commit to being personally involved and engaged in discussions related to U.S. uranium enrichment policies.

Question 3: If confirmed, will you commit to visiting the Piketon site to see firsthand the top notch infrastructure and potential to restart enrichment capabilities?

Answer: If confirmed, I will commit to visiting the Piketon site.

Questions from Senator Tina Smith

Question 1: In your testimony, you mentioned the importance of nuclear power as a clean source of energy. In the United States, nuclear power is currently the largest provider of low-carbon electricity. The Union of Concerned Scientists recently released a report that highlights the problem of early retirement of unprofitable nuclear plants being replaced by natural gas or coal plants, leading to an increase in emissions. We need to drastically reduce overall greenhouse gas emissions if we are to avoid the most devastating effects of climate change. It is clear that we need to increase our sources of low-carbon electricity, not abandon them.

What role do you think the existing nuclear fleet has to play in the clean energy transition? Do policy solutions need to be explored to prevent early retirement of nuclear plants? If so, what specifically?

What role do advanced nuclear reactors have to play in reducing emissions? What challenges need to be addressed to ensure success in this sector?

Answer: The U.S. is the world's leader in emissions reductions. Our existing fleet of nuclear power plants, which accounts for almost 60% of our nation's emissions-free electricity, plays a crucial role in ensuring this positive trend continues. If our nation wants to continue reducing emissions, our existing nuclear power fleet must continue operating, while we work to increase nuclear power's overall contribution with increased generation coming from advanced nuclear reactors.

The Department is currently researching technical solutions to improve the economics of nuclear power plants, but it will take several years before we realize the benefits of these solutions. Many utilities do not have the luxury of waiting for these solutions. Therefore, we have seen successful policy solutions take place at the state level to value the clean energy benefits of nuclear energy. Federal solutions have also been discussed to ensure that critical attributes are valued, ensuring that critical electricity generators are properly compensated for the benefits they provide. While I cannot provide specific solutions, I will say that the benefits provided by nuclear power justify actions taken to ensure the fleet remains operational, not only for the clean energy benefits, but also for our national security, energy security, and economic prosperity.

Advanced nuclear reactor technologies hold great promise for the future. Many advanced reactor concepts will be able to produce emissions-free electricity around the clock and can also be utilized to produce energy for non-electric applications, including industrial and chemical processes, desalination, and hydrogen production. Integrated nuclear-renewable energy systems will effectively provide emissions-free electricity to the grid, while also increasing the flexibility of nuclear energy to provide energy for non-electric applications. These hybrid systems will play a major role in addressing our clean energy needs by: 1) further decarbonizing our electricity sector, 2) providing the emissions-free energy to decarbonize the industrial sector and 3) providing the clean baseload electricity or hydrogen needed to decarbonize the transportation sector. However, to realize this potential future, we need to develop and demonstrate cost-competitive nuclear technologies and also have policies and markets that appropriately value the many benefits provided by nuclear energy.

If confirmed, I will do everything in my power to support the continued operation of our existing fleet and accelerate the development and deployment of advanced reactor technologies.

Question 2: Sixty-five of the 99 current US nuclear reactors—including both reactors in Minnesota—are pressurized nuclear reactors (PNRs) that rely on Lithium-7 to control the pH level in the coolant water. If the pH level is too high or too low, significant risks arise, including cracking of the reactor and higher radiation dose rates for workers. The only suppliers of Lithium-7 to the US nuclear energy sector are Russia and China, creating a risk for domestic energy producers in the events of a Lithium-7 supply shortage or international disputes with one or both of these countries.

Considering the risks associated with shortages that could arise from an overreliance on Lithium-7 from Russia and China, is the Department of Energy concerned about the future availability of Lithium-7 for US nuclear energy suppliers? If so, how would you, as the Assistant Secretary for Nuclear Energy, explore options for mitigating these potential risks?

Answer: Lithium-7 (${}^7\text{Li}$) plays an important part of the safe, economical operation of the United States fleet of commercial nuclear reactors, and also that of many of our nation's allies. It is important that a reliable supply of ${}^7\text{Li}$ remains available for commercial nuclear utilities. I understand that this issue has been recognized by the Department of Energy and activities in this area are underway. If confirmed, I will work with Department staff to continue this important area of work.