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# UPDATING AMERICA'S NUCLEAR WASTE MANAGEMENT POLICY

## HEARING

BEFORE THE

## COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

## UNITED STATES SENATE

ONE HUNDRED NINETEENTH CONGRESS

SECOND SESSION

SEPTEMBER 23, 2026

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COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED NINETEENTH CONGRESS

SECOND SESSION

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# UPDATING AMERICA'S NUCLEAR WASTE MANAGEMENT POLICY

**WEDNESDAY, SEPTEMBER 23, 2026**

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
*Washington, DC.*

The committee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Shelley Moore Capito (chairman of the committee) presiding.

Present: Senators Capito, Alsobrooks, Lummis, Curtis, Husted, Markey, Blunt Rochester.

## OPENING STATEMENT OF HON. SHELLEY MOORE CAPITO, U.S. SENATOR FROM THE STATE OF WEST VIRGINIA

Senator CAPITO. Good morning, everybody. Good morning to my Ranking Member, Senator Alsobrooks. Thank you. She remarked, as we both know, that we are both Blue Devils, both graduates of Duke University. If we start slipping into basketball talk, you will understand that.

Welcome to today's hearing, to everybody. This morning, we will discuss the status of and the need to update our Nation's nuclear waste management policy. Nuclear energy is a foundational part of America's energy systems that provides reliable, clean power to our electric grid. This committee has done quite a bit in this area in terms of nuclear.

However, nuclear power generation produces spent nuclear fuel as a byproduct, which then must be safely managed and disposed of. Who manages and disposes of this material and how and where they do it has been a subject of national policy discussions for 60 years. More than four decades ago, Congress passed the Nuclear Waste Pokily Act, formalizing a national framework to address the challenging issue.

While much progress has been made over multiple administrations of both political parties, the Obama administration illegally halted the program in 2010. Since then, the Obama, Trump, and Biden administrations have all considered different formulations and structures to a nuclear waste program.

To work with States on nuclear waste disposal, the current administration proposes to create Nuclear Lifecycle Innovation campuses, or NLICs. This concept would co-locate nuclear facilities that play a role in the entire nuclear supply chain, as well as potentially other industrial facilities in interested States. In return for the economic benefits associated with these facilities, the host State would

agree to be the permanent disposal site for a portion of our Nation's nuclear waste inventory.

To date, the Department of Energy has signed memorandums of understanding with six States, including my State of West Virginia, to further talks on the NLICs. This initial step is a good conversation starter, and I appreciate the leadership of the Department of Energy's Office of Nuclear Energy for this effort.

Importantly, any new approach, including the NLIC initiative, requires Congress to update the law. Today, we will explore key principles that must be considered in future legislation. First and foremost, history has shown that nuclear waste management is a multi-generational infrastructure project. A successful policy must be built for the long term, and durable, with strong bipartisan buy-in from Congress.

Should West Virginia or any other State proceed forward and sign an NLIC agreement, the full terms of the deal must be clearly understood and legally enforceable. My constituents need to know the answers to such question as, what is the Federal Government's long-term commitment to the State. What is the State's long-term commitment to the Federal Government? What mechanisms are available to all parties to enforce an agreement?

What are the forms and characteristics of the nuclear waste that will be disposed in the State? What storage and disposal facilities will be developed and how will these be safely regulated? Last, how will the different provisions of the agreement be funded?

Second, it is imperative that each potential host State has confidence that nuclear waste will be safely managed, managed alongside the numerous nuclear facilities that could compose their innovation campus. For example, in moving away from a single national nuclear waste repository, it must be clear what disposal options are available to the many forms of radioactive material.

New disposal technologies will also require clear regulatory standards that can be relied upon to protect health and safety for generations to come. The Nuclear Regulatory Commission will be integral to this conversation.

For private entities that sign up to join an innovation campus, the NRC will be responsible for licensing and regulating these facilities, and must continue to prioritize nuclear safety.

Finally, for potential host States, the private sector, and the Federal Government, we must address the challenge of properly funding a nuclear waste disposal program. Ratepayers have paid the Federal Government to dispose of the spent nuclear fuel generated at nuclear power plants. That fee was collected and is accounted for, over $50 billion to date.

However, Congress did not appropriate sufficient funding and the license, regulatory and program costs were never fully covered. Ultimately, this lack of appropriated funding was the reason that the Nuclear Waste Policy Act failed to achieve its goals, and why we are here today.

We must ensure that there is a funding structure that gives a new policy the best chance for success.

I look forward to exploring these issues today so I can better understand how to deliver an effective, durable update to our nuclear waste policy.

I will now recognize Senator Alsobrooks for her opening statement.

**OPENING STATEMENT OF HON. ANGELA ALSOBROOKS, U.S. SENATOR FROM THE STATE OF MARYLAND**

Senator ALSBROOKS. Thank you so much, Madam Chair, and thank you as well to all of our witnesses for joining us today.

Given the prevalence of nuclear in Maryland and the role that it can play in lowering energy costs for consumers, I am pleased to be standing in for our Ranking Member this morning.

The past 2 years have seen a major uptick in nuclear activity from the passage of the ADVANCE Act to new NRC licenses issued for advanced reactors and fuel facilities, to dozens of projects and investment announcements from American nuclear developers.

It is an exciting moment for American nuclear leadership, and a new deployment. Let me say, not a moment too soon as the Nation and world face a duel energy crunch and a worsening climate crisis.

As we enter an age of new nuclear opportunity, we have yet to address an old nuclear liability: the permanent disposal of nuclear waste. Spent nuclear fuel from today's commercial reactors can continue to be stored safely for decades. A permanent solution is crucial if nuclear deployment is to continue with credibility.

New coolants and fired-fuel types used in advanced nuclear reactors will require new waste management approaches and technical reviews to ensure safe disposal. Nuclear fuel reprocessing can help reduce our waste problem by recovering about 90 percent of the energy still contained in spent nuclear fuel, reducing the amount and radioactivity of the waste left.

Reprocessing cannot fully eliminate the need for waste disposal. Responsible development of nuclear power requires durable solutions for waste management that have support from all stakeholders. Current U.S. law under the Nuclear Waste Policy Act, currently allows only Yucca Mountain to be considered as the site of a repository, is not sufficient to address the long-term challenges of nuclear waste disposal.

Updating our nuclear waste policy to incorporate the technologies of the future and finally addressing the waste of the past and present will be a major undertaking. Such an effort can only succeed with technical rigor, meaningful community engagement and durable regulation.

Short-term political decisions or shortcuts cannot drive a process for developing disposal solutions that must last for millennia. DOE can play an important role in spurring private sector investment, but it cannot alone ensure the storage or disposal of commercial nuclear waste. Long-term durability and technical credibility in the licensing of waste storage and disposal facilities can only be possible with an NRC license.

The legitimacy of any nuclear waste strategy and the legitimacy of America's nuclear industry as a whole requires NRC independence. I have raised concerns about efforts that could undermine the NRC's independence as well as the need to protect jobs and retain the experienced staff needed for the agency to carry out its mission.

As the committee of jurisdiction, it is our responsibility to exercise continual oversight to ensure that the strength of NRC independence and its expert staff endures. I appreciate the expertise of today's witnesses in providing insight and clarity on the complex problem of nuclear waste, and look forward to their testimony.

At this moment, Madam Chair, I would like to also ask unanimous consent to insert a letter from the Nevada Resort Association into the record.

Senator CAPITO. Without objection, so ordered.

[The referenced information follows:]




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September 22, 2026

The Honorable Shelley Moore Capito
Chairman
U.S. Senate Committee on Environment and Public Works
410 Dirksen Senate Office Building
Washington, D.C. 20510

The Honorable Sheldon Whitehouse
Ranking Member
U.S. Senate Committee on Environment and Public Works
410 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Chairman Capito and Ranking Member Whitehouse:

As leaders in Nevada's entertainment, gaming, and resort industries, we noted with interest the Trump Administration proposal entitled the Nuclear Reindustrialization Act of 2026. We have been proud to stand together in the past in vehement opposition to the Yucca Mountain project and will continue to oppose any attempt to resurrect a project that would so directly imperil the health, safety, and economic future of our great state.

Our collective interest in this topic is grounded in the fact that this failed project severely threatens Nevada's future and economic growth as well as our visitors and our employees. Section 11 of the proposed Nuclear Reindustrialization Act of 2026 represents an important step towards recognizing this reality as it includes many of the necessary repeals needed to formally end the failed Yucca Mountain project.

The tourism and hospitality industry is the cornerstone of Nevada's economy and integral to the livelihood of many Nevadans. In 2025, Las Vegas alone welcomed 38.5 million visitors[1]. Together, the tourism industry generates nearly $100 billion in economic impact, totaling 37

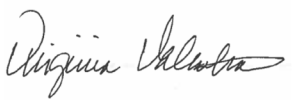
[1] *LVCVA Research Center*. Las Vegas Convention and Visitors Authority. (n.d.). https://www.lvcva.com/research/

percent of Nevada's GDP, and the tourism industry supports 436,600 jobs, roughly 28 percent of Nevada's total employment[2].

As you consider the proposed Nuclear Reindustrialization Act of 2026, we urge you to engage constructively with Senator Cortez Masto, Senator Rosen, and Governor Lombardo to fully repeal this failed effort and ensure nuclear waste is never stored anywhere near the world's entertainment capital and Nevada's treasured public lands. Six states have already signed memoranda of understanding with the Department of Energy to explore hosting Nuclear Lifecycle Innovation Campuses, including the storage, recycling, and disposal of nuclear waste. These MOUs help demonstrate that multiple States could become viable partners, supporting the view that the time is now to end Nevada's inclusion in this longstanding national policy challenge.

Thank you for your consideration of our perspectives and for your continued service to our country. Please do not hesitate to contact me if I can be of assistance to you in these matters.

Sincerely,



Virginia Valentine
President
Nevada Resort Association

[2] Nevada Resort Association. (n.d.). 2025 Nevada Gaming Fact Book. https://nevadaresorts.org/factbook/NRA-2025-FactBook.pdf

Senator ALSOBROOKS. Thank you.

Senator CAPITO. Okay, I thank our witnesses for being here, I really do. I would like to welcome our first presenter, Lake Barrett, who is Chair of the American Nuclear Society's Nuclear Waste Policy Task Force.

Mr. Barrett has been involved in numerous major nuclear projects, including serving as site director for the cleanup of the Three Mile Island reactor, running the Department of Energy's nuclear waste program, and now as an advisor to the Japanese Government on recovering from Fukushima.

Welcome, Mr. Barrett. You are now recognized for your opening statement.

## STATEMENT OF LAKE BARRETT, CHAIR, AMERICAN NUCLEAR SOCIETY NUCLEAR WASTE POLICY TASK FORCE

Mr. BARRETT. Thank you, Madam Chairwoman, Ranking Member Alsobrooks, and members of the committee. I appreciate the opportunity to testify before you today on behalf of the American Nuclear Society about the opportunity that our Nation has to update our nuclear waste management policies. Our organization represents over 12,000 nuclear energy professionals who have delivered safe, dependable and life-saving nuclear technologies for over 70 years to the benefit of our Nation and the world.

All energy-producing technologies generate waste that we must manage responsibly for ourselves and future generations. The good news is that used nuclear fuel from electricity generation is a robust, compact and stable form that the nuclear energy has a strong record of storing and transporting very safely.

High level radioactive waste from reprocessing of spent nuclear fuel can also be mobilized in robust, stable forms suitable for geologic disposal. However, these materials do remain highly radioactive for many years and must be isolated from the environment for millennia.

The longstanding international consensus is that such materials should ultimately be disposed of in stable geologic formations and several countries are making very good progress toward siting and actually constructing their repositories. We in America have sadly fallen well behind and have accomplished little for the past 16 years. We must now engage our great American capabilities to revitalize and adapt to meet our longstanding legal and moral obligations to the American people.

Today, our U.S. electricity demand is rapidly rising, and this makes sustaining nuclear energy expansion more important than ever. This growth creates opportunity to break America's longstanding stalemate over the permanent disposal of our used nuclear fuel.

Growing State interest in an integrated nuclear fuel cycle and disposal projects offers Congress an opportunity that can advance our nuclear waste management disposal policy, help fuel our next generation of nuclear reactors, and strengthen the U.S. nuclear industrial base all at the same time.

The American Nuclear Society supports DOE's Nuclear Lifecycle Innovation Campus initiative. This effort has helped bring signifi-

cant economic opportunities of the nuclear fuel cycle into broad focus.

Potential host States and creative private industries are now exploring the campuses that combine the nuclear fuel cycle, recycling and disposal activities that are needed to support our critically needed nuclear expansion and being able to find actual geologic disposal sites.

Congress can assist in this work with a step-wise approach that sustains willing State participation, begins to fulfill Federal obligations for used nuclear fuel, and supports fuel cycle innovation and protects affordability while maintaining geologic disposal as an essential part of this effort as recycling technologies and markets develop.

As this committee considers its near-term nuclear policy agenda, the American Nuclear Society recommends a bipartisan focus on these six priorities.

Enabling DOE to develop durable campus partnerships with willing host States and private partners through business agreements that define activities, milestones, benefits, responsibilities and ultimate disposal pathways in a long-lasting, durable manner.

Authorizing the investigation of permanent disposal pathways beyond Yucca Mountain and advance the regulatory framework needed to support different sites.

We have learned a lot from the Yucca Mountain and international experiences, and this knowledge can improve our regulatory framework for new potential geologic disposal sites moving forward.

Enabling DOE to begin accepting and removing nuclear fuel, especially that is stranded at permanently shut-down reactors, through existing authorities and new authorities and resources necessary to take title to that fuel, transport it, and store it, including for potential recycling, within a program for permanent, passive geologic disposal.

We should continue supporting recycling research and development and early commercial deployment as these technologies and markets mature.

We should also approach providing adequate resources for DOE to carry out its statutory disposal mission, while relying on private investment and other Federal and State support for broader campus activities. This should include near-term robust appropriations for DOE to start this process immediately.

Establishing clear organizational guidance for contractual performance steps and sustainable durable partnership business-like arrangements for the host States and their private industry partners and local communities as well, utilizing our Nation's exceptional commercial market, free market capabilities.

In closing, our Society believes our Nation is now at a point to be able to finally break out of a 16-year doldrum and move forward with willing State and private industry partners to work together to create a revised, integrated, innovative nuclear waste management policy that can serve Americans now and for hundreds of generations into the future. We can do this as a nation if we have your support.

Thank you, and I look forward to your questions.

[The prepared statement of Mr. Barrett follows:]

Lake Barrett
Chair, Nuclear Waste Policy Task Force
American Nuclear Society

Written Testimony to the U.S. Senate Committee on Environment and Public Works
September 23, 2026

Chairwoman Capito, Ranking Member Whitehouse, and esteemed members of the Committee, I appreciate the opportunity to testify today on behalf of the American Nuclear Society (ANS). ANS represents over 12,000 nuclear technology professionals who enable clean, reliable electricity generation, cancer detection and treatment through nuclear medicine, power systems for deep-space exploration and many other civil applications of nuclear technology. America's nuclear professionals also possess the skills and expertise to manage the nation's used nuclear fuel through the safe and secure storage, transportation and, ultimately, geologic disposal.

Currently, I chair the ANS Nuclear Waste Policy Task Force, but I have worked in the nuclear field for six decades and remain active as an independent consultant. I also serve as a special advisor to Japan on the Fukushima Daiichi recovery, and I recently served terms on the U.S. Nuclear Waste Technical Review Board and the Secretary of Energy's Nuclear Energy Advisory Committee.

Before retiring from federal service, I led the U.S. Department of Energy's (DOE's) Office of Civilian Nuclear Waste Management and the Yucca Mountain repository program through presidential designation and congressional approval. Earlier in my career, I was at the Nuclear Regulatory Commission (NRC), where I served as site director during the cleanup of Three-Mile Island, and I've also worked in engineering and management at DOE Defense Programs, Bechtel Power, and General Dynamics' Electric Boat division. I hold degrees in mechanical and nuclear engineering and I'm a Fellow of the American Nuclear Society.

All energy-producing technologies generate waste we must manage responsibly. The good news is that used nuclear fuel from electricity generation is a robust, compact and stable form that the nuclear industry has a strong record of storing and transporting safely. High-level radioactive waste from the reprocessing of spent nuclear fuel can also be immobilized in robust and stable forms suitable for disposal. However, these materials remain highly radioactive for many years and must be isolated from the environment for millennia. The long-standing international consensus is that such materials should

ultimately be disposed of in stable geologic formations, and several countries are making good progress toward siting and constructing repositories.

Today, U.S. electricity demand is rising rapidly, making nuclear energy more important than ever. The U.S. nuclear enterprise is responding: pursuing license renewals and uprates for existing plants, restarting shut down reactors, building new advanced reactors, and expanding domestic fuel-cycle capabilities.

This growth creates an opportunity to break America's longstanding stalemate over permanent disposal of the nation's used nuclear fuel. Growing state interest in integrated nuclear fuel-cycle and disposal projects offers Congress an opportunity to advance U.S. disposal policy, help fuel the next generation of nuclear reactors, and strengthen the U.S. nuclear industrial base, all at the same time.

ANS supports DOE's Nuclear Lifecycle Innovation Campus (NLIC) initiative. This effort has helped bring the significant economic opportunities of the full nuclear fuel cycle into focus. NLIC states are now exploring campuses that combine fuel-cycle, recycling, and disposal activities needed to support nuclear expansion, while creating high paying jobs in a growing industry sector.

Congress can assist this work through a stepwise approach that sustains willing-state participation, begins to fulfill federal obligations for used nuclear fuel, supports fuel-cycle innovation, and protects affordability, while maintaining geologic disposal as an essential part of this effort as recycling technologies and markets develop.

So as this Committee and the rest of Congress considers its near-term nuclear policy agenda: ANS recommends focusing on six priorities:

**1. Enabling DOE to develop durable campus partnerships** with willing host states and private partners through agreements that define activities, milestones, benefits, responsibilities and ultimate disposal pathways.
**2. Authorizing the investigation of permanent-disposal pathways** beyond Yucca Mountain and advance the regulatory framework needed to support them. We have learned much from Yucca Mountain and international regulatory experiences, and this knowledge can be applied to improve evaluation and regulatory processes for new potential geologic disposal sites moving forward.
**3. Enabling DOE to begin accepting and removing used nuclear fuel**, including fuel remaining at permanently shut-down reactor sites, through the authorities and resources

needed to take title to, transport, and store it, including for potential recycling, within a program to permanent passive geologic disposal.

**4. Supporting recycling research, demonstration, and early commercial deployment** as technologies and markets mature, including approaches that improve management of waste requiring geologic disposal.

**5. Providing adequate resources for DOE to carry out its statutory disposal mission**, while relying on private investment and other federal and state support for broader campus activities. This should include near term robust appropriations.

**6. Establishing clear organizational guidance for contractual performance steps** and sustainable durable partnership arrangements for host states and private industry partners utilizing our nation's exceptional commercial free market capabilities. Congress should support a dedicated office within the DOE, led by a senior official with clear authority and accountability, to develop and negotiate long-term NLIC partnership agreements with willing host states, communities, and private businesses. This organization should have the staff and resources needed to coordinate federal participation and negotiate agreements that define each party's responsibilities, obligations, milestones, and deliverables. Establishing this capacity now would help provide the continuity and predictability needed for durable partnerships, private investment, and commercially viable NLIC operations.

A key aspect for a forthcoming fruitful DOE host state and community dialogue will be that there is a clear publicly understandable appropriate regulatory framework of safety and environmental standards that can be used for the evaluation and licensing of any potential geologic disposal site that a host state may suggest for consideration. The only U.S. modern national regulatory framework that exists today is only applicable for the Yucca Mountain tuff geology and would be inappropriate for use in other geologic settings that may need to be evaluated in NLIC states.

Our existing generic EPA and NRC regulatory geologic disposal framework for used nuclear fuels and high-level radioactive wastes from recycling is over 40 years old and inconsistent with international norms, such as those being used at all other countries that are making geologic disposal progress. Thus, to support the forthcoming NLIC process disposal site evaluations, our country needs to update our standards and regulations for a clear public understanding of the substantial safety and environmental precautions that will be in place for any type of disposal facility site in any geologic setting.

Here in the U.S., we have learned much from the evaluation and licensing process of Yucca Mountain and other recent international experiences as well. These experiences need to

be applied to improve past regulatory processes for efficiency and public understanding of the extensive safety and environmental protections being applied to all nuclear disposal facilities that may be evaluated, selected, licensed, constructed, operated, and decommissioned in any state in any geologic media setting.

Historically, many organizations and studies have highlighted the need for updated U.S. generic repository standards. To address the need for modern scientifically based geologic disposal standards for spent nuclear fuel and high-level wastes from possible recycling, the American Nuclear Society in 2022 established a Special Committee on Generic Standards for Disposal of High-Level Radioactive Waste to produce a scientific report to serve a catalyst for EPA and NRC to update their geologic disposal standards and regulations which would be applicable for any type of design or geologic media setting. I had the personal honor of serving on that special committee and our comprehensive report was published in 2023, which is available here: https://www.ans.org/policy/repositorystandard/.

We recommend that Congress work with DOE, EPA and NRC to support the development of a final safety and environmental regulatory framework that can be used by the DOE, states, communities, and the public at large, as they work together to establish safe and environmentally protective operational geologic disposal facilities in appropriate locations.

We strongly urge timely action because development of such a regulatory framework is a time-consuming process. EPA took more than a decade to put the previous generic repository standard in place and more than a decade and a half to promulgate a Yucca Mountain-specific standard. Because developing new standards can take many years, EPA and NRC should begin this effort now.

In closing, our Society believes tangible near term progress on these six key priorities is within Congress's near-term reach. Action now can help accelerate the safe and effective expansion of nuclear energy. Our nation is now at a point to be able to finally break out of our 16-year doldrum and move forward with willing state and private industry partners to create a revised integrated innovative nuclear waste management policy that can serve all American's now and for hundreds of generations into the future. Together, we can do this.

Thank you for the opportunity to testify. I look forward to your questions.

Lake Barrett Responses to Questions for the Record from Senate Environment and Public Works
September 23, 2026, Nuclear Waste Hearing-Submitted 26-10-28

These responses are Lake Barrett's personal views and not those of American Nuclear Society nor any other organization such as the Nuclear Waste Technical Review Board.

**Senator Kelly:**

1. Congress created the Nuclear Waste Technical Review Board to provide independent scientific and technical review of the Department of Energy's activities related to managing and disposing of spent nuclear fuel and high-level radioactive waste. The administration's draft nuclear waste legislation would eliminate the Board. In this Committee, we understand the importance of maintaining strong, independent oversight of our nuclear industry. I've worked with my Republican colleagues on several bills to speed up nuclear energy deployment, such the MORE American Fuel Act. However, each one preserves independent regulatory oversight because moving faster only works if the public trusts the process. That same principle should apply to nuclear waste. Spent fuel from Palo Verde remains stored on site, with no permanent solution despite Arizona ratepayers paying into the Nuclear Waste Fund for decades. I'm concerned about eliminating the one body charged with providing Congress independent technical judgment on the process that would resolve this issue.

   You have served on the Nuclear Waste Technical Review Board and previously led the Department of Energy's Yucca Mountain program. What unique role does the Board play in providing independent technical oversight of the federal nuclear waste program?

   a. Are there functions currently performed by the Nuclear Waste Technical Review Board that are not otherwise performed by the Nuclear Regulatory Commission, the Department of Energy, or another federal entity?

      ANSWER:
      The fundamental duty of the Nuclear Regulatory Commission is to ensure public health and safety of all operational commercial used nuclear fuel facilities including geologic disposal, storage, and recycling facilities. The Nuclear Waste Technical Review Board duties are broader with authority to evaluate the technical and scientific validity of activities undertaken by the DOE under the Nuclear Waste Policy Act, including those undertaken before DOE enters into a licensing process with the NRC. Thus, the Board has a greater review scope, including access to draft DOE documents, which goes beyond just the technical safety and environmental protection areas that are performed under the rules and procedures of the Nuclear Regulatory Commission.

      The DOE has complete responsibility to do everything well with or without external review, so in principle the NWTRB's separate congressional and public

reports of the validity of DOE's technical and scientific activities are redundant to what DOE already does in reporting to Congress. If and when the DOE applies to the NRC for licenses to construct and operate nuclear facilities, much of what the NWTRB does becomes potentially redundant with the NRC's role as the regulating authority.

b. What would be the consequences for congressional oversight and public confidence if the Board were eliminated?

ANSWER:

Having congressional and public trust for the proper implementation of the national waste management is a very important necessity for program success. And the existence of the NWTRB does provide some degree of that even though it is mostly redundant to the independent Nuclear Regulatory Commission and there are likely better and more efficient ways to achieve this outcome.

The most important public assurance concern is safety and that is independently performed by the Nuclear Regulatory Commission. In addition, the implementing organization for these nuclear facilities, which is now the Department of Energy, is either an applicant or nuclear licensee under the Nuclear Regulatory Commission rules and as such are required to have a comprehensive Quality Assurance program that includes having independent management and technical audits and internal safety review panels. For example, the DOE Yucca Mountain scientific work had extensive international and national independent reviews performed which in many ways were redundant to duties that the NWTRB performed.

A better way for providing additional congressional and public assurance would be to incorporate this function not in an additional federal agency, like the NWTRB, but to have it under the jurisdiction of the host state in conjunction with the host communities. This would likely include the expertise of the host state university system which is closer to the host state public.

The existing Nuclear Waste Policy Act authorizes resources to host states and communities to be able to be engaged on various technical and regulatory issues. It would be expected that in any Nuclear Innovation Lifecycle Campus hosting agreement there would be an agreement for host state and local communities to be technically supported with technical advisors of their choice. And of course, Congress can at any time and for any reason request an independent Government Accounting Office audit as well as National Academies of Science and Engineering to perform any specific review or study.

If state and community partnership hosting agreements, such as described above can be developed, the consequences of eliminating the NWTRB would be minimal.

c. If Congress were to eliminate the Board, what mechanism would be necessary to preserve independent technical review of Department of Energy nuclear waste activities?

ANSWER:
The public confidence oversight function would be better performed under state and community partnership hosting agreements, than with an additional mostly redundant federal agency.

**Senator Alsobrooks:**

1. During the hearing, you agreed that the NRC should license any facility that stores or disposes of spent nuclear fuel from commercial reactors.

a. What specific safeguards are currently in place and are there additional safeguards needed to ensure that a repository licensing proceeding remains technically rigorous and credible, particularly when there are significant political and economic pressures surrounding the development of nuclear energy?

ANSWER:

Under U.S. law and tradition, the owner, either a private company or the DOE, of any commercial nuclear facility is responsible for safely constructing and operating under all appropriate regulations. This construct applies to reactors, used nuclear fuel storage or processing facilities, and any high-level waste geologic disposal repository. And all these facilities must be licensed and operated under the Nuclear Regulatory Commission's rules to assure public health and safety and environmental protection standards per the Environmental Protection Agency.

The Nuclear Regulatory Commission is a very technically rigorous and credible organization as it relates to nuclear safety and environmental protection. Every Commissioner is appropriately questioned during their Congressional nomination process about their commitment to scientific risk evaluations and overall public safety. And the NRC is continually working to improve their interactions with the public to obtain greater public understanding and confidence in their work. Thus, I do not feel that additional safeguards are needed beyond what already exists.

b. What role does the Nuclear Waste Technical Review Board play in this regard?

ANSWER:
As discussed above, rigorous public health and safety oversight of operating facilities is provided by the NRC. Additionally, the NWPA authorizes and the Nuclear Innovation Lifecycle Campus initiative includes a strong partnership agreement with informed host states and communities that would include the host's having the ability to have their own independent technical advisors to overview all related activities under their durable hosting agreements. Thus, unless a host state or host community desires an additional separate formal federal review board, I do not see a future role for the Nuclear Waste Technical Review Board.

However, state hosting agreement review bodies may only focus on regional and local issues and may not provide a national-level overview. This broader perspective could be provided by specialized congressional requests of organizations such as the National Academies or the DOE, when needed without having a separately standing federal agency like the NWTRB.

2. Other than Yucca Mountain, EPA's generic standards for geologic repositories have not been substantially updated in decades.

a. In your opinion, what specific shortcomings in the existing standards need to be addressed before the federal government can pursue a new repository?

ANSWER:
The existing repository performance standards and regulations for a repository other than Yucca Mountain are outdated, being over 40 years old, and inconsistent with current international practices that have been substantially updated with scientific and regulatory advancements since the 1980s. Specifically, shortcomings are that they do not appropriately consider new possible technologies such deep bore hole disposal, do not include modern risk analysis technological advancements, release limit criteria are antiquated, inconsistent with the most recent recommendations of the International Commission on Radiation Protection, and are difficult for the public to understand. As DOE enters into discussions with potential state and community hosting agreements, it will be important for there to be clear transparent safety and environmental protection standards and regulations that can be publicly discussed so that there are mutually clear expectations on what safeguards and protections are going to be required for all parties moving forward.

b. How should the EPA and NRC divide their responsibilities so that EPA establishes public health and environmental standards while NRC can effectively implement those standards in a licensing decision?

ANSWER:
The existing federal arrangement of EPA setting the national standard which are applicable for all new geologic repositories irrespective of being commercial or defense related, is appropriate. And for NRC regulated commercial facilities, for DOE or others, the NRC would incorporate the EPA standards into their operational licensing regulations. This has been a historically effective workable division of responsibilities approach.

c. What should updated standards take into account when it comes to long-term health and environmental risks, groundwater protection, and the performance of a repository over very long time periods?

ANSWER:
The American Nuclear Society published a special report with detailed recommendations for updated standards: https://www.ans.org/file/12339/1/ANS%20Disposal%20Standards%20Report%20final%20booklet-online.pdf. I was a member of this committee.

In general, generic repositories, regardless of their design or location, must protect future generations from the potential hazards posed by radioactive materials emplaced there. This includes extensive scientific analyses that project performance millenniums into the future which includes: the geologic stability of the site, water transport mechanisms, materials emplacement environment (chemistry), engineered barrier system performance, repository and waste package design, materials integrity, and performance under possible future inadvertent intrusion scenarios. These analyses must provide an expectation that radiologic impacts will be well below any risks encountered in everyday life. This is generally evaluated with an overall safety case backed up with an extensive scientific integrated detailed performance assessment analysis that predicts that any individual living in the future millenniums would not experience any additional exposures beyond a very small fraction of natural background radiation.

Our report recommends a quantitative criteria analysis out to 10,000 years and a qualitative analysis of repository functionality beyond 10,000 years up to 1,000,000 years into the future.

We did not recommend the addition of the EPA groundwater protection standard because it adds complexity without any additional protection to people or the environment. Its addition would also have the negative aspects of incentivizing the repository selection process toward a pristine groundwater site and disqualifying sites with high naturally occurring radionuclide concentrations in their groundwater.

Senator CAPITO. Thank you.

Next, we will hear from Katrina McMurrian, Executive Director of the Nuclear Waste Strategy Coalition, the NWSC. The NWSC represents a broad membership of entities that advocate for nuclear waste solutions, such as State utility regulators, tribal and local governments, and electric companies that host spent nuclear fuel onsite.

Ms. McMurrian, thank you for being here, and you are recognized for your opening statement.

**STATEMENT OF KATRINA McMURRIAN, EXECUTIVE DIRECTOR, NUCLEAR WASTE STRATEGY COALITION**

Ms. MCMURRIAN. Chairman Capito, Ranking Member Alsobrooks, and members of the Environment and Public Works Committee, thank you for this opportunity to testify on behalf of the Nuclear Waste Strategy Coalition. I am Katrina McMurrian, the Coalition's Executive Director.

The NWSC is an ad hoc organization formed in 1993 to represent the collective interests of public and private members on nuclear waste policy matters. Our work today remains focused on, one, holding the Federal Government accountable for its statutory and contractual obligations to secure a durable, integrated waste disposal program for commercial spent fuel; two, protecting electric utility customers; and three, securing the leadership and sustainable funding for a decades-long program to succeed.

We are member-led, bipartisan, purpose-driven, and will happily disband when our mission is complete.

After enduring years of Federal failure, we are encouraged by this hearing and by the administration's Nuclear Lifecycle Innovation Campus initiative that reportedly includes the critical waste disposal component. Having States as partners should increase the likelihood of success.

As Congress considers next steps on nuclear waste policy, the NWSC hopes the following will guide your work. First, Congress must re-establish a national integrated nuclear waste disposal program that includes four interconnected and necessary components: removal, transportation, storage, and essential permanent geologic disposal of spent nuclear fuel now stranded at numerous operating and shut-down commercial reactor sites in communities in 35 States. Yes, it is safely stored onsite, but taxpayers are being charged millions each day beyond the January 31st, 1998 checkout date established in Federal law.

Second, evidence points to the need to form an independent waste management organization outside of DOE. In the near term, Congress should urge DOE's immediate reestablishment of an internal office reporting directly to the Secretary that is dedicated to a successful disposal program.

Not only does this comply with the Nuclear Waste Policy Act, it prioritizes critical functions that have been neglected to the detriment of existing host communities, electric customers and all U.S. taxpayers.

Third, we call upon Congress to reform the Federal budgetary treatment of the Nuclear Waste Fund, such that sustainable access to the Fund is provided to support the development of this multi-

generational disposal program. Congress has figured it out for other trust funds, and there is no better time to restore the trust part for electric customers who thus far have got nothing in return for the fund part, meaning the part where they paid billions in fees until NARUC and others sued to stop it.

In the interim, Congress can and should appropriately fund DOE priorities that advance removal, transportation, storage and permanent disposal through annual appropriations. The Nuclear Waste Fund must only be used for its intended purpose, which is to pay for the Federal waste disposal program. The Nuclear Waste Fund's $51 billion balance, along with annual interest accruals, provides more than sufficient funding for virtually any program work for the foreseeable future.

Initiatives to restart the Nuclear Waste Fund fee should be considered only after verified Federal performance and a demonstration of need.

Finally, the NWSC recognizes that an integrated nuclear waste program could include reprocessing or recycling, which we view as complementary, not competing strategies with disposal. While recycling may reduce waste volume, questions remain about cost effectiveness and new waste streams. In any case, a repository remains necessary under every scenario with recycling or not.

In closing, permanent geologic disposal is foundational to all effective nuclear waste policy approaches. The consequences of prolonged Federal inaction to achieve disposal are significant, but avoidable with timely action.

It is often said that the first question in any forum about nuclear is, what about the waste? The experts have long had the technical answers, but we have allowed those to be sidelined.

Nuclear waste storage and disposal facilities are critical infrastructure that support an energy option that many of our States are considering in real time to meet growing electricity demand. Correctly and finally recognizing nuclear waste disposal as critical infrastructure moves it from the nice-to-have column to the must-have column.

We thank you for your leadership with respect to this call to action. Thank you.

[The prepared statement of Ms. McMurrian follows:]

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**Testimony on behalf of the**

**Nuclear Waste Strategy Coalition (NWSC)**

**by**

**Katrina McMurrian, NWSC Executive Director**

**before the**

**United States Senate Committee on Environment & Public Works**

**Hearing on**

# *Hearing to Examine Updating America's Nuclear Waste Management Policy*

**September 23, 2026**

NWSC
Nuclear Waste Strategy Coalition

http://www.theNWSC.org

## **Summary** of **Testimony** by **Katrina McMurrian**, **NWSC Executive Director**

- The mission of the Nuclear Waste Strategy Coalition (NWSC) is focused on:
  - **Holding the federal government accountable** for longstanding statutory and contractual obligations to execute a national integrated nuclear waste disposal program that includes the removal, transportation, storage, and essential **permanent geologic disposal of *all* spent nuclear fuel (SNF) and reactor-related wastes** now stranded at numerous operating and shutdown commercial reactor sites in communities across the U.S.;
  - **Protecting electric utility customers**, including those who have received nothing in return for the fees they paid into the federal Nuclear Waste Fund (NWF) *and* those who could be subject to reinstated fees without adequate action to establish a functioning federal repository; and
  - **Securing the necessary leadership and funding** for a successful multi-generational program.
- **Prolonged federal inaction has resulted in a *de facto* national nuclear waste policy of indefinitely stranding SNF** at sites in 35 states, with negative impacts on host communities to those sites, electric utility customers in 42 states who have paid for a disposal program to no avail, and all U.S. taxpayers.
- As Congress considers next steps on SNF policy, the NWSC **calls for action to:**
  - **Reestablish a national integrated nuclear waste disposal program;**
  - **Form a new, independent waste management organization to properly lead the program** (with an immediate interim action by DOE to reestablish an internal, dedicated office); and
  - **Provide sustainable access to the NWF to properly fund the program** (with an interim step of appropriate funding of DOE program priorities via annual appropriations).
- While reprocessing/recycling may reduce waste volume, a geologic repository remains necessary for effective nuclear waste management and facilitates new nuclear endeavors. In addition, questions remain about whether there are cost-effective pathways for reprocessing/recycling.
- We are encouraged about the six states that have signed Memoranda of Understanding with DOE regarding the Nuclear Lifecycle Innovation Campuses that reportedly address waste disposal.
- The NWSC stands ready to collaborate with Congress, the Administration, states, tribes, communities, and all other stakeholders interested in durable, effective solutions for SNF management and disposal.

## **Testimony** by **Katrina McMurrian**, **NWSC Executive Director**

Chairman Capito, Ranking Member Whitehouse, and Members of the Senate Environment and Public Works Committee, thank you for the opportunity to testify on behalf of the Nuclear Waste Strategy Coalition (NWSC or Coalition) at this important *Hearing to Examine Updating America's Nuclear Waste Management Policy*. My name is Katrina McMurrian, and I serve as the NWSC Executive Director.

The NWSC is an ad hoc organization representing the collective interests of member state utility regulators, consumer advocates, attorneys general, and other state officials; Tribal and local government officials; electric utilities with operating and/or shutdown nuclear reactors; and other experts on nuclear waste policy matters. It was formed in 1993 out of frustration with the federal government's lack of progress toward the removal of spent nuclear fuel (SNF)[1] from commercial reactor sites across the U.S. and today remains a member-led, bipartisan, geographically diverse, and purpose-driven organization.

NWSC's mission is focused on the following three areas:

- **Holding the federal government accountable for** the U.S. Department of Energy's (DOE) longstanding statutory and contractual obligations to execute a national integrated nuclear waste disposal program that includes the removal, transportation, storage, and essential **permanent geologic disposal of *all* spent nuclear fuel and reactor-related wastes** now stranded at numerous operating and shutdown commercial reactor sites in communities across the U.S.;
- **Protecting electric utility customers**, including those who have received nothing in return for the fees they paid into the federal Nuclear Waste Fund (NWF) between its inception and the 2014 court-ordered fee suspension *and* those who could be subject to reinstated fees without adequate action to establish a functioning federal repository; and
- **Securing the necessary leadership and funding** for a successful multi-generational disposal program by:

[1] The NWSC uses the terms "spent nuclear fuel" and "used nuclear fuel" interchangeably. While the former was traditionally used in nuclear regulations, "used nuclear fuel" has increasingly become preferred terminology in the nuclear and nuclear waste sectors.

- Reestablishing an internal office in DOE solely responsible for managing the back end of the fuel cycle (as an interim step) and forming a new, independent, single-purpose organization to manage the back end over the long term; and
- Reforming the federal budgetary treatment of the NWF to provide sustainable annual access to the NWF balance and accumulating interest for the intended purpose (waste disposal), with appropriations in the interim for such DOE actions necessary to support a viable waste disposal program.

More than four decades after enactment of the Nuclear Waste Policy Act of 1982 (NWPA), more than 25 years after DOE was required to begin accepting commercial SNF, and more than three decades after the NWSC's formation, the federal government still has not implemented the integrated nuclear waste disposal program envisioned by Congress and funded by electric utility customers. However, we are optimistic that Congress and DOE are presently engaging on these issues and presenting opportunities for meaningful action. Specifically, the NWSC is encouraged about this Committee's interest *and* about the six states that have signed Memoranda of Understanding (MOUs) with DOE regarding the Nuclear Lifecycle Innovation Campuses (NLICs or Campuses) that reportedly address waste disposal in some manner. The potential for additional permanent geologic disposal options through development of sustainable partnerships between the federal government and host states and communities is monumental, and we look forward to supporting state and community plans that facilitate NWSC mission and goals.

**Call to Action**

The NWSC acknowledges that, by all credible accounts, SNF is safely stored at nuclear plant sites in the U.S. today. However, indefinite on-site storage was never intended to be the end goal of national policy. Congress enacted a disposal program. DOE signed contracts promising disposal services. Electric utility customers paid fees into the NWF for removal, transportation, storage (i.e., monitored retrievable storage or consolidated interim storage), and disposal for commercial SNF and other reactor-related wastes. Because these materials remain stranded at both operating and shutdown reactor sites throughout the country at a tremendous and avoidable cost, we renew our Call to Action[2] herein.

[2] Please refer to the attached NWSC Call to Action for associated facts and statistics with respect to negative impacts resulting from the federal government's *de facto* national policy of inaction.

The consequences of prolonged federal inaction are significant. Host communities continue to bear responsibilities they expected to be temporary. Shutdown reactor sites remain responsible for storing fuel long after electricity generation has ceased. Electric utility customers have paid billions of dollars for federal disposal services that never materialized. Finally, U.S. taxpayers—who already paid billions of dollars via the federal Judgment Fund for damages payments to electric utilities for the federal government's "partial breach" of contract—continue to absorb costs of approximately $2 million per day.

Thus, as Congress considers next steps on SNF policy, the NWSC **calls for action to:**

- **Reestablish a national integrated nuclear waste disposal program that includes the removal, transportation, storage, and <u>essential permanent geologic disposal</u> of SNF and other reactor-related wastes;**
- **Form a new, independent waste management organization to properly lead the program** (with an immediate interim action by the Department of Energy (DOE) to reestablish an internal, dedicated office); and
- **Provide sustainable access to the Nuclear Waste Fund (NWF) to properly fund the program** (with an interim step of appropriate funding of DOE program priorities via annual appropriations).

The following sections expand upon these three key points.

**<u>Reestablishment of a National Integrated Nuclear Waste Disposal Program</u>**

The NWSC calls for the reestablishment of a national integrated nuclear waste disposal program that includes the removal, transportation, storage, and permanent geologic disposal of SNF and other reactor-related wastes. These are essential, interconnected components of a single federal responsibility, and no single element can succeed in isolation. SNF removal and transportation require destinations prepared to accept waste, whether on an interim or permanent basis. Permanent disposal plans have seemingly proven to be a prerequisite for proposed storage facilities, and transportation is also necessary. Disposal requires extensive infrastructure related to both transportation and some form of interim storage.

Congress and DOE should consider the following about the key components of an integrated waste disposal program (removal, transportation, storage, and disposal)—and about the potential role for reprocessing/recycling—to develop a coherent and successful national strategy:

Removal & Transportation of SNF & Other Reactor-Related Wastes

Almost 28 years beyond the date that DOE was to begin accepting waste, the NWSC reminds the federal government of its longstanding obligation to remove and take title to SNF and other reactor-related wastes from reactor sites. We acknowledge that recent actions—the President's May 2025 Executive Order on *Reinvigorating the Nuclear Industrial Base,*[3] bipartisan Congressional legislation and funding, and the NLIC initiative for which DOE is prioritizing waste disposal—have created momentum that hopefully leads to more timely removal of SNF from both operating and shutdown plant sites across the U.S. To best prepare for removal, DOE needs sufficient and sustained funding to assemble a team with the requisite expertise. When DOE is ready to begin SNF acceptance, the NWSC recommends that DOE use the authority provided by the Standard Contract[4] to prioritize SNF from shutdown sites with no operating reactors.

Transportation is another integral component of a successful integrated waste disposal program that accompanies the removal component. To facilitate transportation readiness, the NWSC supports the following DOE actions, which require continued support and funding by Congress:

- Continuation and expansion of DOE's constructive transportation work, including the assessment of infrastructure needs at shutdown sites; the high burnup spent fuel research cask project; and the testing, certification, and procurement of railcars, licensed transportation containers, and components;
- Increased financial and technical assistance to tribal, state, and local governments for transportation-related emergency preparedness training and activities;
- Continued collaboration and stakeholder engagement by DOE on transportation matters with tribal, state, and local governments; and

[3] Executive Order 14302, *Reinvigorating the Nuclear Industrial Base* (May 23, 2025), https://www.whitehouse.gov/presidential-actions/2025/05/reinvigorating-the-nuclear-industrial-base/.
[4] 10 C.F.R. § 961.11, Art. VI.B.2(a), *Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste,* 48 Fed. Reg. 16,599 (April 18, 1983).

- Coordination by DOE's Offices of Nuclear Energy and Environmental Management with the Navy, the Nuclear Regulatory Commission (NRC), and the Environmental Protection Agency (EPA) to ensure that disposal plans and applicable regulations and standards address *all* waste forms that require disposal.

Storage of SNF & Other Reactor-Related Wastes

Particularly for communities hosting shutdown sites, consolidated storage offers potential benefits as part of an integrated waste disposal program, such as:

- Demonstration of progress in SNF management by beginning to fulfill the federal government's obligation to remove SNF from nuclear power reactor sites;
- Reduction of federal government liabilities to utilities for extended SNF storage;
- Elimination of SNF at shutdown sites, allowing complete decommissioning & land reuse;
- Development and exercise of the national SNF transportation infrastructure;
- Preclusion or minimization of the need to begin or expand SNF storage at reactor sites; and
- Provision of a buffer and staging area for other facilities, such as a geologic repository.

While beneficial, storage is not a substitute for necessary permanent disposal. Multiple private efforts to advance storage without a meaningful, concomitant federal effort on a repository have proven ineffective. Thus, storage should support an integrated waste disposal program as a valuable component, rather than as a replacement destination with an "interim" label.

Permanent Geologic Disposal

Permanent disposal in a deep geologic repository, which is recommended by international experts, was established as the national solution for SNF and other reactor-related wastes under the NWPA. Despite challenges to proposed repository sites or suggestions that storage facilities or reprocessing/recycling technologies serve as viable substitutes, permanent geologic disposal is an essential component of an integrated nuclear waste disposal program. Without it, progress on other

components is inhibited. Permanent geologic disposal is foundational to effective federal nuclear waste policy approaches.

The NWSC has long supported the national nuclear waste management program established by the NWPA in 1982 and amended in 1987 to designate the nation's first repository, but that federal program was terminated in 2010 by executive branch action following extensive opposition by the State of Nevada and its Congressional leaders. This resulted in a *de facto* policy of stranding SNF at sites in 35 states indefinitely. We remain supportive of NWPA provisions pertaining to the first and second repositories but recognize ongoing political challenges with the first. Thus, DOE should immediately advance a second repository in accordance with existing law and in coordination with its voluntary NLIC process for which six states have recently signed MOUs. That presents an opportunity for near-term progress on a repository with a willing state host (a key missing element in the past) and without violating Congressional intent for the first repository.

Given the importance of a repository for a successful waste disposal program and historical challenges in getting nuclear-related sites across the finish line, the NWSC supports increasing the range of potential pathways and locations for siting deep geologic disposal. Such flexibility should increase the likelihood that technically sound and publicly acceptable solutions can emerge, providing the best opportunity for accomplishing the NWSC's important mission. Accordingly, the NWSC commends DOE and the Administration for pursuing engagement with interested states through the NLIC initiative and generally supports such mechanisms for willing states—along with Tribal nations and local communities—to explore participation in future waste management solutions.

Another federal action that would support an integrated permanent disposal program is the development of *generic* repository standards, and it should be initiated immediately. The process is in existing law and calls for coordinated effort by the EPA and the NRC to develop the necessary standards, which need to be updated. Updated generic standards would create greater regulatory certainty, facilitate future siting efforts, improve transparency for states, tribes, communities, regulators, and policymakers; and hopefully bolster public confidence. In 2023, an American Nuclear

Society (ANS) Special Committee proposed peer-reviewed generic repository standards to facilitate the necessary next steps by the EPA and NRC.[5]

Finally, while new nuclear investment is not part of the NWSC mission, it is worth noting that a geologic repository also facilitates such nuclear endeavors to include advanced reactors and reprocessing/recycling. An integrated waste disposal program that includes a repository is the best answer to persistent "what about the waste" questions and aligns with enduring scientific guidance.

Potential for Reprocessing/Recycling

In recent years, reprocessing and/or recycling of SNF have re-emerged as part of the national dialogue about the nuclear fuel cycle and nuclear waste management. Both executive and legislative branches in Washington, D.C. and many state capitals appear interested in reprocessing/recycling to support innovation, grow the nuclear sector, and reduce waste volumes. We understand that many of the NLIC applications and the recently signed MOUs reflect a similar interest.

Especially given these developments, the NWSC recognizes that a national integrated nuclear waste disposal program may include a role for reprocessing/recycling in the future and notes:

- Reprocessing/recycling of SNF may reduce the volume of waste but will not eliminate *all* waste or the associated need for one or more permanent geologic repositories.
- Not all SNF and high-level radioactive waste are suitable candidates for reprocessing/recycling.
- Existing SNF inventories are substantial. Transportation requirements, infrastructure limitations, and economics suggest that significant quantities of material are likely to remain outside any future recycling system.
- Reprocessing/recycling create additional waste streams that may not have an established disposal path.
- France has an established commercial SNF recycling program, and it has not eliminated the need for permanent disposal. France is developing the Cigéo deep

[5] American Nuclear Society (ANS) Special Committee on Generic Standards for Disposal of High-Level Radioactive Waste: *Recommendations on Postclosure Aspects of Generic Standards for the Permanent Disposal of Spent Nuclear Fuel and High-Level and Transuranic Radioactive Wastes in the United States*, August 2023, https://www.ans.org/file/12339/ANS+Disposal+Standards+Report+final+booklet-online.pdf.

geologic repository for vitrified high-level waste and other long-lived radioactive wastes, including wastes resulting from reprocessing.[6] Additionally, other countries that are working on reprocessing/recycling are also working on repositories.

- Questions remain about whether there are pathways for reprocessing/recycling—at least with respect to SNF from the current generation of nuclear reactors—to prove more cost-effective than direct disposal in a geologic repository.

Recycling and disposal are complementary, not competing, strategies. If recycling succeeds, a repository remains necessary. If it only partially succeeds, a repository remains necessary. If it never materializes, a repository remains necessary. Thus, Congress should ensure that repository development advances in parallel with any effort to evaluate, or to proceed with, reprocessing/recycling options.

To facilitate a comprehensive strategy that connects the core functions (removal, transportation, storage, and disposal), Congress should require DOE to develop and publish an Integrated Nuclear Waste Disposal Program Plan. The plan should clearly identify short-term and long-term milestones, actions that can be undertaken under existing authority, actions requiring Congressional authorization, expected funding needs, and a roadmap for the timely removal of all commercial SNF and reactor-related wastes from all operating and shutdown reactor sites.

**Governance: Independent Waste Management Organization & Separate DOE Office**

The NWSC urges the immediate reestablishment of a dedicated DOE office reporting directly to the Secretary of Energy and responsible exclusively for the management and disposal of SNF and other reactor-related wastes. Such an office would provide accountability, continuity, and a clear organizational focal point for states, tribes, communities, utilities, and other stakeholders. This would be the first critical step to facilitate the orderly transition of responsibilities outside the agency.

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[6] Andra: *Cigéo Update: An Overview of France's Deep Geological Repository*, February 2026, https://international.andra.fr/cigeo-update-overview-frances-deep-geological-repository; and IAEA Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: *National Report of France for the 8th Review Meeting*, August 2024, https://www.iaea.org/sites/default/files/2025-08/france-national-report-8rm-english.pdf.

Over the longer term, the NWSC supports creation of a new independent, single-purpose waste management organization, as recommended by the Blue Ribbon Commission on America's Nuclear Future.[7] A multi-generational mission requires a multi-generational institution with governance structures designed for long-term continuity. Based on lessons learned from repeated program disruptions, changing priorities, and organizational changes, we urge consideration of the government-owned corporation model[8] or models that offer greater independence[9] instead of government agencies with politically appointed leadership and oversight boards that lack the long-term continuity across administrations that is needed to make progress.

**Funding: Sustainable NWF Access, Appropriations, and No Need for Fee Restart**

The NWSC calls upon Congress to reform the federal budgetary treatment of the NWF such that sustainable annual access is provided to the funds—initially to the annual interest—to support the development and management of a multi-generational, national integrated nuclear waste disposal program. Congress can and should access the $51 billion NWF balance for a waste disposal program in the same manner it has navigated around budgetary complexities to access similar trust funds (e.g., Land and Water Conservation Fund, Harbor Maintenance Trust Fund) in the past. Additionally, Congress should ensure the NWF balance and rapidly accumulating interest are used as intended to provide for disposal of all the nation's nuclear waste. Simply, NWF resources must remain dedicated to activities directly related to fulfillment of federal obligations concerning SNF, other reactor-related wastes, and other high-level radioactive waste.

Appropriations

We also note that Congress has appropriated relatively small amounts from the NWF in the past several years. With a willingness to support meaningful progress and a DOE Integrated Nuclear Waste Disposal Program Plan in hand (as recommended herein), Congress should be able to access larger NWF amounts to fund necessary multi-generational disposal program expenses over the program's decades-long duration. We are ready to work with the Committee and Congressional appropriators on such an effort.

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[7] Blue Ribbon Commission on America's Nuclear Future. *Report to the Secretary of Energy*. Washington, DC: U.S. Department of Energy, January 2012, https://www.energy.gov/ne/downloads/blue-ribbon-commission-americas-nuclear-future-report-secretary-energy.

[8] *U.S. Nuclear Fuel Management Corporation Establishment Act of 2010*, S. 3322/ H.R. 5979, 111th Cong. (2010), https://www.congress.gov/111/bills/s3322/BILLS-111s3322is.pdf.

[9] Barrett, Lake, et al. *The Path Forward for Nuclear Waste in the U.S.: A Bipartisan Solution to the Nuclear Waste Problem,* January 2026, https://sppga.ubc.ca/wp-content/uploads/sites/5/2026/01/Path-Forward.2026.pdf.

No Need for Fee Restart

The NWSC opposes any proposals to restart collection of NWF fees at this time. Existing balances in the NWF and accumulating interest provide substantial resources. Absent federal performance and demonstration of the need for additional fees, no new nuclear waste fee collection is necessary.

Specifically, the following two steps must precede any consideration of renewed fees:

- Meaningful federal government performance to begin meeting its statutory and contractual obligations; *and*
- Production of a valid Total System Life Cycle Cost (TSLCC) estimate for DOE's integrated nuclear waste disposal program.

Finally, while other parts of the nuclear fuel cycle are important, the NWSC strongly recommends that electric utility customers not be considered as a source of funding to support any program elements that are not directly linked to achieving an integrated nuclear waste disposal program. The central challenge facing policymakers is not collection of additional money; instead, it is creating reliable access to resources already collected from electric utility customers for the purpose of implementing a disposal program.

**Conclusion**

More than 40 years after the NWPA's passage *and* more than 30 years after NWSC's formation, the basic facts remain unchanged. The waste is safely but indefinitely stored, and it should be removed per statutory and contractual obligations in return for electric utility customer payments. Although a portion of the fees were spent on the waste disposal program, no permanent repository exists, nor is one under development. Therefore, NWSC respectfully requests Congress and the Administration work together to establish the leadership, funding, and disposal pathways necessary to fulfill the federal government's obligations. While changes in law may ultimately be necessary, Congress can and should make sure that DOE receives sustained funding to support a meaningful integrated waste disposal program to support both existing and new nuclear.

The NWSC thanks the Committee for this opportunity and stands ready to collaborate with Congress, the Administration, states, tribes, communities, and all other stakeholders interested in durable and effective solutions for the management and ultimate disposal of the nation's SNF.

# NWSC Nuclear Waste Strategy Coalition CALL TO ACTION

**As Congress considers next steps on spent nuclear fuel (SNF)[i] policy, the Nuclear Waste Strategy Coalition (NWSC) calls for action to:**

- **Reestablish a national integrated nuclear waste disposal program that includes the removal, transportation, storage, and essential permanent geologic disposal of SNF and other reactor-related wastes;**
- **Form a new, independent waste management organization to properly lead the program** (with an immediate interim action by the Department of Energy (DOE) to reestablish an internal, dedicated office); and
- **Provide sustainable access to the Nuclear Waste Fund (NWF) to properly fund the program** (with an interim step of appropriate funding of DOE program priorities via annual appropriations); and

*While reprocessing/recycling may reduce waste volume, a repository remains necessary for effective nuclear waste management and facilitates new nuclear endeavors.*

## The Action

Congress must reestablish a national integrated nuclear waste management program by forming a new, single-purpose waste management organization independent of DOE and *simultaneously* reforming the NWF's federal budgetary treatment to provide sustainable annual access to the $51 billion balance and accumulating interest for program implementation.[ii] *No new nuclear waste fee collection is necessary at this time.*

Federal action—by Congress and DOE—is needed now to avoid permanently stranding this material in host states and communities; to address the negative economic impacts to states, communities, and taxpayers; and to enable the federal government to meet its statutory and contractual obligations to electric utility customers in accordance with the Nuclear Waste Policy Act of 1982. Further delay is unacceptable.

## The Facts

- The national nuclear waste management program established in 1982 was terminated more than a decade ago by executive action, resulting in a *de facto* policy of stranding SNF at sites in 35 states indefinitely.
- Subsequently, Congress has failed to provide meaningful direction or funding[iii] for *that* program or any national integrated nuclear waste management program for the removal, transportation, storage, and permanent disposal of SNF, other reactor-related wastes, and high-level radioactive waste (HLW).
- Since 1983, approximately $61 billion has been credited to the federal NWF (including nearly $22 billion collected from electric utility customers and more than $37 billion in interest that continues to accumulate at a rate of approximately $1.9 billion a year). The approximate $51 billion balance sits stranded in U.S. Treasury Securities and unappropriated for its intended purpose.[iv]
- Even with reprocessing/recycling, permanent disposal is still necessary for existing and future SNF, other reactor-related wastes, and HLW.[v] Reprocessing and recycling will not eliminate all nuclear waste.

## The Impacts

These facts have resulted in a ***de facto* national policy of inaction that negatively impacts the following:**

- **Communities** in **35 states**[vi] are hosting—indefinitely and without consent—more than 90,000 metric tons[vii] of commercial SNF, primarily at operating and decommissioned reactor sites, impeding potential economic development and other property reuse at shutdown sites.
- **U.S. Taxpayers** in **all 50 states** have paid more than $12.2 billion due to utility lawsuits against DOE for damages for partial breach of contract and are expected to pay an additional $38.6-44.3 billion in the future.[viii] (This taxpayer liability is growing by approximately $2 million per day, money that could be used for other purposes.)
- **Electric Utility Customers** in **42 states** paid billions of dollars into the federal NWF that is not being used for its intended purpose to support a national integrated nuclear waste management program including a federal repository.

[i] The NWSC uses the terms "spent nuclear fuel" and "used nuclear fuel" interchangeably. While the former was traditionally used in nuclear regulations, "used nuclear fuel" has increasingly become preferred terminology in the nuclear and nuclear waste sectors.

[ii] Multiple Congressional bills have proposed governance and funding reforms, notably including the *United States Nuclear Fuel Management Corporation Establishment Act of 2010*, S.3322 (May 2010) and H.R.5979 (July 2010), 111th Congress (https://www.congress.gov/111/bills/s3322/BILLS-111s3322is.pdf). Also, *The Path Forward for Nuclear Waste in the U.S.: A Bipartisan Solution to the Nuclear Waste Problem*, by Lake Barrett et al. in January 2026, proposed a governance model with greater independence from government.

[iii] With passage of the *Consolidated Appropriations Act for Fiscal Year 2021* (https://www.govinfo.gov/content/pkg/BILLS-116hr133enr/pdf/BILLS-116hr133enr.pdf), the 116th Congress appropriated $27.5 million to the U.S. Department of Energy (DOE) for "expenses necessary for nuclear waste disposal activities to carry out the purposes of the Nuclear Waste Policy Act of 1982, Public Law 97–425, as amended, including interim storage activities," in addition to continued funding for other relevant DOE programs (Integrated Waste Management Systems and Used Nuclear Fuel Disposition R&D). Similar appropriations have been made in the years following; however, the funding is not sufficient to reestablish a meaningful integrated nuclear waste management program.

[iv] U.S. Department of Energy: *Nuclear Waste Fund (NWF) Annual Financial Report Summary: FY2025 and Cumulative* (https://www.energy.gov/media/354057).

[v] France has an established commercial SNF recycling program, and it has *not* eliminated the need for permanent disposal. France is developing the Cigéo deep geologic repository for vitrified high-level waste and other long-lived radioactive wastes, including wastes resulting from reprocessing. See Andra: *Cigéo Update: An Overview of France's Deep Geological Repository*, February 2026 (https://international.andra.fr/cigeo-update-overview-frances-deep-geological-repository) and IAEA Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: *National Report of France for the 8th Review Meeting*, August 2024 (https://www.iaea.org/sites/default/files/2025-08/france-national-report-8rm-english.pdf).

[vi] U.S. Nuclear Regulatory Commission Map: *Licensed and Operating Independent Spent Fuel Storage Installations by State*, January 2025 (https://www.nrc.gov/images/reading-rm/doc-collections/maps/isfsi-facility-types.png). While the legend references 37 states with at least one ISFSI, the Private Fuel Storage facility in Utah and the Holtec Hi-Store facility in New Mexico were both licensed only and never built or operated to store SNF. Thus, we reference the 35 states that currently store SNF (or fuel debris).

[vii] U.S Department of Energy Office of Nuclear Energy: *5 Fast Facts about Spent Nuclear Fuel*, October 3, 2022 (https://www.energy.gov/ne/articles/5-fast-facts-about-spent-nuclear-fuel).

[viii] U.S. Department of Energy Office of Inspector General Audit Report: *Department of Energy Nuclear Waste Fund's Fiscal Year 2025 Financial Statement Audit*, November 2025 (https://www.energy.gov/sites/default/files/2025-11/DOE-OIG-26-02.pdf).

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**Senator Kelly:**

1. **When we talk about nuclear waste, the conversation usually focuses on spent nuclear fuel and finding a permanent disposal solution. In Arizona, particularly for Tribal communities, there is also a legacy of uranium mining that continues decades after mining ended. More than 500 abandoned uranium mines remain on or near the Navajo Nation. Last year, the Senate unanimously passed the Legacy Mine Cleanup Act, bipartisan legislation I introduced with Senator Lummis to strengthen federal accountability and coordination with state and Tribal governments in cleaning up abandoned mines. As Congress considers a new approach to spent nuclear fuel, what lessons should we take from existing nuclear legacy sites about building and maintaining community confidence in federal waste-management decisions?**

   While our organization focuses on commercial spent nuclear fuel (SNF) management, we expect that there are many lessons from existing nuclear legacy sites (uranium mining sites, defense waste sites, etc.) that are instructive for commercial SNF management and disposal. Chief among those should be lessons on how to avoid additional nuclear legacy sites. To that end, the NWSC seeks Congressional support of efforts to hold the federal government accountable for statutory and contractual commitments to remove, transport, store, and permanently dispose of commercial SNF at federal repositories.

   As an organization with tribal, state, and local government members, the NWSC appreciates the important role of host communities and is particularly cognizant of the impacts of prolonged federal government inaction. With respect to commercial SNF, host communities had no reasonable expectation of indefinite on-site storage and thus had no opportunity to provide consent or otherwise. The federal government was required to start accepting commercial SNF by January 31, 1998, but has taken none to date. There are quantifiable expenses and opportunity costs associated with continued storage beyond the term initially promised. In fact, communities in 35 states[1] are hosting—indefinitely and without consent—more than 90,000 metric tons[2] of commercial SNF, primarily at operating and decommissioned reactor sites, impeding potential economic development and other property reuse at shutdown sites.

   Despite Congressional appropriations and guidance, the Department of Energy (DOE) has not established the integrated waste management program that our nation has needed since executive action in 2010 effectively terminated the Nuclear Waste Policy Act (NWPA). Perpetual inaction continues to impact (1) host states and communities that never consented to indefinite onsite storage, (2) electric customers in more than 40 states who paid billions of dollars into the Nuclear

[1] U.S. Nuclear Regulatory Commission Map: *Licensed and Operating Independent Spent Fuel Storage Installations by State*, January 2025 (https://www.nrc.gov/images/reading-rm/doc-collections/maps/isfsi-facility-types.png). While the legend references 37 states with at least one ISFSI, the Private Fuel Storage facility in Utah and the Holtec Hi-Store facility in New Mexico were both licensed only and never built or operated to store SNF. Thus, we reference the 35 states that currently store SNF (or fuel debris).

[2] U.S Department of Energy Office of Nuclear Energy: *5 Fast Facts about Spent Nuclear Fuel*, October 3, 2022 (https://www.energy.gov/ne/articles/5-fast-facts-about-spent-nuclear-fuel).

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Waste Fund (NWF), and (3) all U.S. taxpayers currently paying approximately $3 million per day for the government's liability for not meeting SNF commitments.

**a. What roles should states, Tribes, and local communities have in selecting, negotiating, and overseeing a site for spent nuclear fuel storage or permanent disposal?**

To facilitate sustainable siting decisions, directly impacted states, tribes, and local communities should have a clear role in the selection, negotiation, and oversight of a federal site(s) for SNF storage or permanent disposal. Sustainable siting decisions are more likely to lead to the necessary removal and ultimate disposal of commercial SNF from existing sites. The NWSC is encouraged about the states that have signed Memoranda of Understanding (MOUs) with DOE regarding the Nuclear Lifecycle Innovation Campuses (NLICs or Campuses) and indicated willingness to consider accepting waste from other states. The potential for additional permanent geologic disposal options through development of sustainable partnerships between the federal government and host states and communities (tribal and/or local) is monumental, and we look forward to supporting state and community plans that facilitate federal action on longstanding obligations.

**b. What commitments should Congress require within agreements with host communities to ensure those the agreements remain enforceable over the life of a facility and across changes in administrations?**

This is an important area that we hope to continue working with Congress to address. Host agreements should provide certainty to the hosts as well as to those of us relying on the federal government for waste disposal solutions (current host states, tribes, and local communities; electric utility customers; nuclear power generators; shutdown plant owners; all U.S. taxpayers; etc.). Congress has a critical role with respect to waste management, and as it considers next steps on SNF policy, the NWSC calls for action to:

- Reestablish a national integrated nuclear waste disposal program that includes the removal, transportation, storage, and essential permanent geologic disposal of SNF and other reactor-related wastes; and
- Form a new, independent waste management organization to properly lead the program (with an immediate interim action by the DOE to reestablish an internal, dedicated office); and
- Provide sustainable access to the NWF to properly fund the program (with an interim step of appropriate funding of DOE program priorities via annual appropriations).

We note that while reprocessing/recycling may reduce waste volume, federal repositories remain necessary for effective nuclear waste management, and they facilitate new nuclear endeavors.

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**Senator Alsobrooks:**

1. **During the hearing, you agreed that the NRC should license any facility that stores or disposes of spent nuclear fuel from commercial reactors.**

   The NRC's longstanding role in protecting public health and safety regarding SNF management and disposal remains critical.

   a. **What specific safeguards are currently in place and are there additional safeguards needed to ensure that a repository licensing proceeding remains technically rigorous and credible, particularly when there are significant political and economic pressures surrounding the development of nuclear energy?**

      There are a host of relevant regulations and existing safeguards in place at the NRC, but as an organization that includes several independent state regulators as members, we want to highlight the importance of the adjudicatory process. The Atomic Safety and Licensing Board (ASLB) serves as the independent adjudicatory arm of the NRC, conducts hearings, and resolves legal and technical disputes involving NRC licensing and regulatory actions. As such, it offers an opportunity for proposed hosts and other stakeholders to raise contentions that are litigated before independent experts.

      Regarding additional safeguards needed to ensure that a repository licensing proceeding remains technically rigorous and credible, the NWSC supports the immediate development of generic repository standards. Existing law calls for coordinated effort by the EPA and the NRC to develop the necessary standards, which need to be updated. Updated generic standards would create greater regulatory certainty, facilitate future siting efforts, improve transparency for states, tribes, communities, regulators, and policymakers; and hopefully bolster public confidence. In 2023, an American Nuclear Society (ANS) Special Committee proposed peer-reviewed generic repository standards to facilitate the necessary next steps by the EPA and NRC.[3]

   b. **What role does the Nuclear Waste Technical Review Board play in this regard?**

      The Nuclear Waste Technical Review Board (NWTRB) was established by Congress as an independent federal oversight body composed of experts in fields such as geology, hydrology, nuclear engineering, materials science, and risk assessment. Because it is separate from both repository developers and regulators, it can evaluate technical work without being responsible for either promoting or approving the project. While it does not license facilities, the NWTRB helps ensure technical rigor and credibility through independent scientific review; scrutiny of key technical assumptions; public transparency; identifying research gaps and uncertainties; and maintaining credibility during political and economic pressures. Thus, its function can be considered an important safeguard for both

[3] American Nuclear Society (ANS) Special Committee on Generic Standards for Disposal of High-Level Radioactive Waste: *Recommendations on Postclosure Aspects of Generic Standards for the Permanent Disposal of Spent Nuclear Fuel and High-Level and Transuranic Radioactive Wastes in the United States*, August 2023, https://www.ans.org/file/12339/ANS+Disposal+Standards+Report+final+booklet-online.pdf.

regulatory credibility and public trust with respect to its specialized mission concerning independent scientific and technical review of DOE activities related to the management and disposal of SNF and high-level radioactive waste (HLW).

2. **DOE's recent approach to identifying potential locations for nuclear waste facilities has emphasized working with state governments and developing partnerships with states interested in hosting nuclear facilities. Previous efforts were centered on obtaining consent and participation of local communities, tribes, and stakeholders.**

   States in this country have significant authority and multiple opportunities to delay, if not completely halt, proposed critical infrastructure projects, including nuclear waste storage and/or disposal facilities, with or without the represented consent of a tribal and/or local community. In fact, there have been multiple examples involving proposed facilities in several states in the last decade. Thus, the NWSC is encouraged by the Administration's current initiative for Nuclear Lifecycle Innovation Campuses (NLICs) and other approaches that aim to secure sustainable partnerships with states. Additionally, we expect that host communities (tribal and/or local) within an NLIC state will be consulted, meaningfully informed on the issues, and ultimately included as an integral part of NLIC hosting agreements between the state and the federal government for SNF storage and/or disposal within that state. The potential for additional permanent geologic disposal options through development of sustainable partnerships between the federal government and host states and communities is monumental, and we look forward to supporting state and community plans that facilitate NWSC mission and goals.

   a. **What should meaningful informed consent look like for a community being considered for a nuclear waste storage facility?**

      The NWSC is encouraged by the potential for additional permanent geologic disposal options to those provided in the Nuclear Waste Policy Act (NWPA) and by state interest in development of sustainable partnerships with the federal government that address waste management. Achieving meaningful, informed, *and sustainable* support by states and communities considering SNF storage and/or disposal facilities will take time and resources, but it is a worthwhile endeavor. In addition to commercial nuclear plant owners, many communities, states, and tribes across the country have already "hosted" SNF and HLW well beyond the timeframe promised by the federal government and without their consent. Every additional year of federal government delay in rectifying that is both costly and unjust.

      The federal government (or a future independent waste management entity) must inform potential host states, tribes, and communities about expected and potential impacts on public health and safety, the environment, and the economy. Transparency is paramount in developing trust, and trust will be critical in sustaining such partnerships that keep states, tribes, and communities at the table and willing to consider supporting nuclear waste storage and/or disposal facilities within its borders.

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**b. What role should states, local governments, tribal governments, and residents each have in deciding whether a site moves forward?**

States, local governments, tribal governments, and residents should each have opportunities to be informed, and to provide input, regarding potential nuclear waste storage and/or disposal sites in their jurisdiction/community. Tribal, state, and local officials serve an important leadership role in obtaining and relaying relevant information to and from DOE, project developers, and residents before and throughout a siting process. Officials within the jurisdiction of the proposed site(s) may have a more direct role in negotiations with the federal government and potentially some oversight that does not conflict with NRC authority.

The NWSC continues to stress that any processes designed to support the federal government's fulfillment of its longstanding obligations on SNF management and disposal should be solutions-oriented. Specifically, the federal government should unequivocally communicate to all stakeholders that a national integrated nuclear waste disposal program is necessary and is in the public interest. Meaningful, informed, and sustainable support by states, tribes, and communities is ideal, but a solutions-oriented process to yield one or more sites should recognize the following:

- Current host communities did not consent to *indefinite* storage of commercial SNF (primarily at operating and decommissioned reactor sites), which impedes potential economic development and other property reuse.
- U.S. taxpayers have paid more than $12.2 billion due to lawsuits against DOE for damages for partial breach of contract and are expected to pay an additional $38.6-44.3 billion in the future. In fact, taxpayers paid $1.1 billion in the last reported fiscal year that ended September 30, 2025 (approximately $3 million per day).[4]
- Electric utility customers in 42 states paid billions of dollars into the federal Nuclear Waste Fund (NWF) between its inception and a 2014 court-ordered fee suspension.
    - There should be no restarting of nuclear waste fees unless the federal government demonstrates (i) progress on an integrated nuclear waste disposal program and (ii) a need for additional fees.
    - Any appropriation from the NWF must be directly linked to achieving an integrated nuclear waste disposal program.
- A federal repository is required. Reprocessing/recycling may reduce waste volume and provide other benefits to states and communities, but it will not solve the existing challenge.

[4] U.S. Department of Energy Office of Inspector General Audit Report: *Department of Energy Nuclear Waste Fund's Fiscal Year 2025 Financial Statement Audit*, November 2025 (https://www.energy.gov/sites/default/files/2025-11/DOE-OIG-26-02.pdf); and U.S. Department of Energy Office of Inspector General Audit Report: *Department of Energy Nuclear Waste Fund's Fiscal Year 2024 Financial Statement Audit*, November 2024 (https://www.energy.gov/sites/default/files/2024-11/DOE-OIG-25-03.pdf).

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- Nuclear waste storage and disposal facilities are critical infrastructure that support an energy option that many states are considering to help meet growing electricity demand.
- One-size-fits-all definitions or approaches for achieving public support, including calls for unanimity or other unattainable standards for construction and operation of critical infrastructure projects (like geologic repositories), should be rejected.
- Transparency builds trust that can lead to sustainable support.
- Jurisdictions willing to site facilities that contribute to resolution of the national nuclear waste problem should be considered for potential incentives and economic benefits.
- DOE needs sustained funding from Congress for a national integrated nuclear waste disposal program and consistent engagement with states, local governments, tribal governments, and the public to establish and maintain support.

Senator CAPITO. Thank you very much.

Our final witness is Dr. Kathryn Huff. She is a professor and department chair for the Department of Nuclear Engineering and Engineering Physics at the University of Wisconsin-Madison. Dr. Huff served as the Assistant Secretary for Nuclear Energy at the DOE under President Biden, where she oversaw department activity related to nuclear energy advancement, research and development.

Welcome, Dr. Huff. Please proceed with your opening statement.

**STATEMENT OF KATHRYN HUFF, PH.D., PROFESSOR AND DEPARTMENT CHAIR, DEPARTMENT OF NUCLEAR ENGINEERING AND ENGINEERING PHYSICS, UNIVERSITY OF WISCONSIN-MADISON**

Ms. HUFF. Chair Capito, Ranking Member Alsobrooks, and members of the committee, it is an honor to be with you today.

The United States safely manages over 90,000 metric tons of used nuclear fuel in about 70 locations across the country. For decades, electric consumers paid into the nuclear waste fee in exchange for the Federal Government's acceptance and disposal of that fuel. DOE was obligated to begin accepting it in 1998, the year I turned 12, and has still not done so.

Consequently, taxpayers remain liable for continuing cost of storage. Federal consolidated interim storage would begin to solve both issues. During my time at DOE, Congress funded a consent-based siting program that allowed us to begin conversations with communities about hosting such a facility. Those conversations confirmed that communities see greater value in interim storage when it is connected to research, laboratories, technology and sustained economic activity.

A campus that includes those advanced reactors and fuel cycle research centers and recycling facilities would offer a prospective host more than storage alone. DOE's vision of these nuclear lifecycle innovation campuses has therefore inspired productive engagement with States.

However, turning these conversations into operating facilities will require authorization and appropriated funding from Congress.

Sustaining public support will also require transparency regarding ownership, costs, hazards and long-term responsibilities, as well as accountability in case a contractor withdraws or fails.

Recycling provides one productive purpose for these campuses. We should recycle nuclear fuel for the same sustainability reasons that we recycle aluminum and paper at home. Used fuel contains recoverable energy and useful isotopes.

Furthermore, recycling long-lived radionuclides can allow radioactivity of the remaining waste to fall below that of natural uranium ore in hundreds of years, rather than thousands, simplifying the final repository.

Those benefits do not guarantee favorable economics. Commercial scale civilian reprocessing has not developed anywhere as a purely private market financed enterprise. La Hague in France is operated by Orano, which is approximately 90 percent owned by the French government. Meanwhile, Rokkasho is privately held but operates within a Japanese national framework for consistent financing and regulation and waste management more broadly.

Having visited both, I have seen the scale of the infrastructure and management and government integration involved. I would say that proposals of the U.S. facility that can rely on market revenues alone for recycling should be evaluated rigorously.

All that said, realizing the promise of these innovation campuses will demand some clear division of institutional responsibility. Research, development and demonstration may appropriately proceed under DOE authorization, but facilities intended to serve commercial purposes should follow NRC licensing pathways from the beginning.

Independent regulation supports safety and public confidence and continuity across administrations. Congress separated nuclear promotion from nuclear regulation in 1974, assigning DOE responsibility for authorized Federal missions and NRC exclusive responsibility for commercial nuclear facilities.

The credibility of both the licensing process and the broader waste management program are strengthened when that separation is preserved.

Finally, recycling can reduce the material requiring disposal, but as has been said already, it cannot eliminate it. With Yucca Mountain off the table, the Federal Government does need a mission-focused organization to develop a consent-based storage and disposal facility system, to transport the fuel, to sustain that work across administrations. They will require predictable access to the Nuclear Waste Fund.

Electricity consumers have already contributed more than $51 billion to that Nuclear Waste Fund, and it could give the organization the resources it needs to deliver a final repository.

The United States knows how to store and transport used nuclear fuel safely. We also know that this fuel contains resources worth recovering for the public good. Congress, along with DOE and NRC, has the opportunity to establish a coherent program that can accept the fuel, support willing host communities, recover valuable materials, provide permanent disposal and preserve independent regulation.

Thank you. I look forward to your questions.

[The prepared statement of Ms. Huff follows:]

**Written Testimony of Kathryn D Huff**

**Professor and Department Chair**
**Nuclear Engineering and Engineering Physics**
**University of Wisconsin Madison**

**Before the**
**United States Senate Committee on Environment and Public Works**
**September 23, 2026**

Chair Capito, Ranking Member Whitehouse, and members of the Committee, thank you for the opportunity to testify about spent nuclear fuel management and nuclear fuel recycling.

I am appearing today in my individual capacity as a nuclear engineer and former federal official. I am a professor and chair of the Department of Nuclear Engineering and Engineering Physics at the University of Wisconsin-Madison. However, my testimony does not represent the official position of the University of Wisconsin. From 2021 through 2024, I led the Office of Nuclear Energy at the U.S. Department of Energy, first as Principal Deputy Assistant Secretary and Acting Assistant Secretary and then as the Senate-confirmed Assistant Secretary for Nuclear Energy. My research has addressed nuclear fuel cycles, advanced reactor systems, radioactive waste management, and nuclear nonproliferation.

A durable U.S. spent fuel management program will require federal leadership. Private companies are prepared to develop equipment, establish processes, and operate some of these complex facilities. Meanwhile, the federal government is equipped to provide reliable economic incentives, maintain responsibility for materials that require management over generations, and ensure independent regulatory oversight.

**Permanent Disposal and the Nuclear Waste Fund**

After several years of operation, the enriched uranium fuel rods that power nuclear reactors deplete and must be removed. The heat and radioactivity associated with spent nuclear fuel must be managed by reactor operators and stored safely. The existing U.S. reactor fleet generates about 2,000 metric tons of spent fuel each year. More than 90,000 metric tons are stored at more than 70 reactor and storage sites across the country [1]. Over the last 55 years, more than 2,500 cask shipments of spent fuel have been transported across the United States without any radiological releases to the environment or harm to the public [2].

The promise of new reactors can most responsibly be realized in conjunction with progress on the management of their spent nuclear fuel. The United States will need permanent disposal capacity under every plausible fuel cycle strategy. Permanent disposal will be required for fuel that is not recycled and for wastes produced during recycling.

Yucca Mountain is off the table. Nevadans have consistently opposed the repository, and their position is understandable. Nevada did not host commercial nuclear power reactors or receive the electricity and economic benefits associated with the fuel Congress directed there. DOE's investigation and development of alternatives acknowledges that. The most resilient approach will be through a consent-based process involving affected communities, states, and Tribal Nations.

Consolidated interim storage is needed to reduce taxpayer liabilities, remove fuel from shutdown reactor sites, reduce the number of storage locations, and establish transportation capability. In order for consolidated

interim storage to proceed with the confidence of a host community, the agreement must define the operating term, capacity, renewal conditions, benefits, monitoring requirements, and connection to permanent disposal. Additional congressional authorization would be required before DOE can construct and operate a federal consolidated interim storage facility and begin removing commercial spent fuel from reactor sites.

The latest DOE financial statement reports a Nuclear Waste Fund balance of over $51 billion [11]. But it is inaccessible. Congress should change the budgetary treatment of the Fund so that money collected for nuclear waste management can be used predictably for its original purpose.

A mission-focused federal corporation, similar to Canada's Nuclear Waste Management Organization, could be well suited to manage commercial spent fuel transportation, storage, and disposal. It would require reliable access to the Nuclear Waste Fund, authority to negotiate host agreements and long-term contracts, technical capacity, and governance that can continue across presidential administrations [12].

**Elements of Sustainable Nuclear Spent Fuel Management**

1. **A national recycling program.** A coherent program requires clear objectives, consistent measures for evaluating technologies, and federal cost sharing for first-of-a-kind projects.

2. **Federal responsibility.** A commercial scale recycling facility requires durable federal responsibility for spent fuel and residual waste. A government-owned, contractor-operated model would combine that responsibility with private-sector expertise.

3. **Statutory authority.** DOE acceptance of fuel at any site other than Yucca Mountain requires statutory clarity on activities, ownership, funding, liability, licensing, community participation, Tribal consultation, and long-term stewardship.

4. **Independent regulation.** Commercial demonstrations require NRC involvement from design through operation and all applicable NRC licenses. Ultimately, storage and disposition will require NRC licensing as directed under the NWPA.

5. **A waste management organization.** Effective transportation, storage, and disposal require a dedicated mission-focused federal corporation with predictable access to the Nuclear Waste Fund and authority to develop consent-based alternatives to Yucca Mountain.

**Spent Nuclear Fuel and Recycling**

We should recycle spent nuclear fuel for the same reasons we recycle aluminum, paper, and other valuable materials. Recycling uses resources efficiently and preserves resources for future generations. Certainly, the technical and institutional demands of recycling used nuclear fuel are much greater than those associated with household materials. However, responsibility to use valuable material conscientiously is the same.

Most of the material in spent light-water-reactor fuel is uranium. The remainder includes plutonium, other actinides, and fission products. Recycling can recover uranium and transuranic elements for additional energy production and can recover selected isotopes for medical, industrial, research, or space applications. Depending on the process and the reactors using the recovered material, recycling can also simplify the heat load, radionuclide inventory, physical form, and volume of material requiring permanent disposal.

Those outcomes depend on the technology. Aqueous and electrochemical processes produce different recovered materials and different waste streams. Light-water-reactor oxide fuel, metallic fast-reactor fuel, TRISO fuel, sodium-bonded fuel, and irradiated fuel salts also require different approaches to handling, processing, transportation, and disposal. A credible demonstration must identify the intended use of each recovered product and the management and disposition route for each residual waste stream.

Every fuel cycle strategy requires permanent disposal. Some spent fuel will be technically or economically unsuitable for recycling, and every recycling process produces wastes. Recycling can improve repository performance or capacity by changing the heat load and composition of those wastes. Demonstrating those benefits requires calculations based on a defined fuel cycle and repository design.

First-of-a-kind recycling facilities will require substantial capital investment, licensing work, fuel qualification, specialized supply chains, and trained workers. The market price of recovered fuel will not compensate a private developer for every national benefit. Improved energy security, reduced dependence on foreign fuel cycle services, domestic technical capacity, and the preservation of resources for future generations benefit the public. Federal cost sharing is appropriate when a project can demonstrate those benefits and meet defined technical, cost, schedule, safeguards, and waste-management milestones.

**Institutional Responsibility for Reprocessing**

Commercial-scale civilian reprocessing has not developed anywhere as a purely private, market-financed enterprise. France's La Hague facility is operated by Orano. The French government owns approximately 90 percent of Orano, and reprocessing is part of a national nuclear fuel cycle policy [3]. Japan's Rokkasho Reprocessing Plant is owned by Japan Nuclear Fuel Limited, whose shareholders include the ten domestic electric power companies and 74 other domestic companies [4]. Rokkasho operates within a national policy and statutory system for reprocessing, financing, regulation, safeguards, and the management of recovered plutonium and radioactive waste [5].

I have visited both La Hague and Rokkasho. These are serious industrial facilities which require extensive infrastructure and government integration. They rely on heavily shielded process buildings, remote operations and maintenance, nuclear material accountancy, physical security, waste treatment and vitrification, transportation systems, financial consistency, and a workforce capable of sustaining these functions for decades. The operator must also manage recovered nuclear material and multiple radioactive waste streams whose disposition extends beyond the commercial life of the plant.

The institutional model for a first commercial-scale recycling facility warrants careful evaluation. A government-owned, contractor-operated structure could preserve federal responsibility while drawing on private expertise. The cost and schedule failures of DOE's MOX Fuel Fabrication Facility at Savannah River demonstrated that this model offers no guarantee of success. Under any ownership model, responsibility for the facility, nuclear materials, and residual waste would need to be clear.

**Nuclear Lifecycle Innovation Campuses**

In July 2026, DOE announced memoranda of understanding with Utah, Tennessee, Oklahoma, Louisiana, and Idaho to explore Nuclear Lifecycle Innovation Campuses [6]. DOE has described possible campus activities that include conversion, enrichment, deconversion, fuel fabrication, recycling, storage, and disposition, potentially alongside reactors and industrial users.

Such a campus would involve several facilities with different purposes and different licensing requirements. Interim storage, repackaging, recycling, fuel fabrication, low-level waste disposal, greater-than-Class-C waste disposal, deep boreholes, and a geologic repository each present distinct technical and regulatory questions. Under 10 CFR 61.55, greater-than-Class-C waste is not generally acceptable for near-surface disposal unless the Commission approves a proposal for such disposal [7]. Deep boreholes may be appropriate for some small-volume conditioned waste forms. However, most intact commercial fuel assemblies and loaded storage systems would require handling, disassembly, conditioning, and repackaging before borehole disposal could be considered.

Establishing an Innovation Campus that accepts commercial spent fuel will require statutory authority and appropriated funding. To allow states and communities to evaluate the proposal, the statutory framework would need to clarify ownership, costs, and long-term responsibilities. It would also need to preserve accountability if a contractor withdraws or fails.

The memoranda with five governors are a useful beginning. A credible host state agreement must also identify the affected communities and Tribal Nations, provide resources for independent technical advice, establish the decisions requiring their agreement, and define withdrawal rights before major commitments are made. The hazards, benefits, ownership, and long-term responsibilities must be described before a community can evaluate whether it wishes to host them.

**DOE Authorization and NRC Licensing**

Congress separated nuclear promotion from independent nuclear regulation in the Energy Reorganization Act of 1974 [8]. In this framework, DOE has authority to conduct nuclear research and development and to build and operate facilities for authorized federal missions. Meanwhile, NRC retains exclusive authority to license commercial nuclear facilities.

And, although DOE Authorization may promise speed, stretching its applicability is likely to be counterproductive and weaken the independence of the licensing process. A project authorized by DOE with the expectation of later NRC licensing may not withstand a change in administration and could undermine public trust. Once the government has selected, funded, and allowed construction of a facility, sunk costs could place practical and political pressure on NRC review, undermining the very independence that is necessary to ensure nuclear safety and avoid conflicts of interest. For that review to remain credibly independent, NRC involvement must begin before those commitments are made.

Public opinion research supports independent NRC oversight. In a 2023 survey of 1,000 U.S. adults, NRC ranked slightly higher than DOE as a credible source of nuclear energy information, while university professors and national laboratory scientists ranked higher than both [9]. In a 2026 survey of 1,000 registered voters, 72 percent favored maintaining strict safety regulations even if they slow new projects [10]. Involvement by NRC, university researchers, and national laboratory scientists from the beginning can accordingly provide essential rigor and public credibility.

Any facility intended for commercial deployment should engage NRC from the beginning. Its design, quality assurance, safety analysis, material accountancy, waste forms, and operating records should support eventual NRC licensing. Early engagement allows technical issues to be resolved before the design is fixed and gives prospective host communities a clear view of the regulatory process.

**Conclusion**

The United States has safely stored and transported spent nuclear fuel for decades. However, it has not yet established a durable system for recycling valuable used nuclear fuel, removing spent fuel from reactor sites, or disposing of the material that remains. Congress now has an opportunity to establish that system with clear federal responsibility, independent regulation, meaningful participation by prospective host communities, and access to the funds collected for this purpose.

Thank you for the opportunity to appear before the Committee today. I look forward to your questions.

**References**

[1] U.S. Department of Energy, Office of Nuclear Energy, 5 Fast Facts about Spent Nuclear Fuel, October 3, 2022.

[2] U.S. Nuclear Regulatory Commission, Backgrounder on Transportation of Spent Nuclear Fuel and Radioactive Materials.

[3] Orano, Annual Activity Report 2025. The French state owns approximately 90 percent of Orano.

[4] Japan Nuclear Fuel Limited, Corporate Profile. JNFL identifies its stockholders as ten domestic electric power companies and 74 other domestic companies.

[5] Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry of Japan, The Current Status of the Nuclear Fuel Cycle to Efficiently Utilize Spent Fuel, 2023; Japan Nuclear Fuel Limited, Provisional Operation Plans for Rokkasho Reprocessing Plant and MOX Fuel Fabrication Plant, January 28, 2026.

[6] U.S. Department of Energy, Nuclear Lifecycle Innovation Campuses Contenders Announced, July 28, 2026; Theodore J. Garrish, written testimony before the House Committee on Energy and Commerce, Subcommittee on Energy, September 15, 2026.

[7] 10 CFR 61.55(a)(2)(iv); U.S. Nuclear Regulatory Commission, Greater-Than-Class-C and Transuranic Waste Disposal.

[8] Energy Reorganization Act of 1974, Pub. L. No. 93-438, 88 Stat. 1233.

[9] Bisconti Research, Inc., Who Does the Public Trust on Nuclear Energy, May 31, 2023. The survey included 1,000 nationally representative U.S. adults selected from the Quest Mindshare Panel.

[10] FGS Global, "Nuclear Energy, Public Trust, and the Case for Both Speed and Rigor," September 16, 2026.

[11] U.S. Department of Energy, Nuclear Waste Fund Annual Financial Report Summary, FY2025 and Cumulative.

[12] Blue Ribbon Commission on America's Nuclear Future, Report to the Secretary of Energy, January 2012.

Responses of Kathryn D. Huff to Questions for the Record
Following the September 23, 2026 Hearing
Updating America's Nuclear Waste Management Policy
United States Senate
Committee on Environment and Public Works

**Questions from Senator Whitehouse**

**1. The Nuclear Waste Policy Act established the Nuclear Waste Fund and permitted DOE to make expenditures from this Fund only for activities related to long-term disposal, including identification and development of a repository, administering a waste disposal program, and other relevant costs. These costs will be incurred regardless of what site is selected for waste disposal in the future. In your testimony, you recommend that "Congress should change the budgetary treatment of the Fund so that money collected for nuclear waste management can be used predictably for its original purpose." What budgetary issues currently prevent DOE from reliably accessing the Fund?**

Despite its substantial balance, access to the Nuclear Waste Fund is constrained by the Nuclear Waste Policy Act, which requires expenditures from the Fund to be authorized through the annual appropriations process. So, fees paid by nuclear electricity consumers are recorded as mandatory receipts, while expenditures from the Fund require annual discretionary appropriations via Congress. Consequently, appropriations for the waste program compete under discretionary spending limits even though consumers paid the fees for the specific purpose of used fuel management.

The Fund held approximately $51.4 billion at the end of fiscal year 2025, including accumulated interest [1]. That balance does not provide DOE with budget authority to obligate an equivalent amount. Congress appropriated only $11.7 million from the Fund in fiscal year 2025, principally for program support and the Nuclear Waste Technical Review Board [1]. The remaining balance continues to be held in Treasury accounts and securities until Congress provides budget authority for an eligible use [2,3].

This arrangement prevents the implementing organization from entering the long-term contracts needed to site, license, construct, and operate storage, transportation, and disposal facilities. Meanwhile, the Treasury's Judgment Fund pays damages because DOE did not begin accepting commercial used fuel in 1998 [2]. Those payments are mandatory spending, while investments that could reduce future liability remain discretionary. A more functional budget structure would allow the federal government to perform the service for which ratepayers paid and reduce the continuing liability borne by taxpayers.

**a. What Congressional actions do you recommend to ensure the predictable use of the Nuclear Waste Fund?**

Predictable use of the Fund requires a dedicated waste-management organization with reliable access to it for activities authorized by the Nuclear Waste Policy Act. A congressionally chartered federal corporation, governed by a qualified board and subject to federal audit, congressional oversight, independent technical review, and NRC regulation, could provide the focus and continuity required for work that will extend across many presidential administrations.

The organization would need multi-year or no-year budget authority tied to an approved lifecycle plan. This authority would support enforceable long-term agreements while preserving congressional control over the Fund's authorized purposes. Annual reporting, independent cost estimates, periodic fee-adequacy reviews, and review by the Government Accountability Office and the Inspector General would provide financial accountability.

The Blue Ribbon Commission on America's Nuclear Future recommended a single-purpose waste-management organization with assured access to the Fund, accompanied by rigorous financial, technical, and regulatory oversight [4].

The Fund's principal purpose is used fuel disposal, for which electricity consumers paid fees. Recycling work that produces a quantified benefit to the disposal system, such as reducing repository cost by reducing heat load, may warrant support from the Fund to the extent of that benefit. However, quantifying

the extent of such benefits will depend on repository design and licensed constraints. Separate appropriations may be needed to capture broader national benefits, including energy security, isotope production, and resource conservation.

**2. In your testimony, you state that a national recycling program is a key element of sustainable nuclear spent fuel management to complement permanent disposal. You also caution that "commercial-scale civilian reprocessing has not developed anywhere as a purely private, market-financed enterprise," and that "the institutional model for a first commercial-scale recycling facility warrants careful evaluation." What should be the core elements of a successful national recycling program in the United States?**

Most of the potential energy in used nuclear fuel remains available after its first use in a light water reactor. Recycling can recover uranium and transuranic elements for additional energy production, provide useful isotopes, and change the heat load and radionuclide inventory of material requiring permanent disposal.

For the United States to capture these benefits for the public good, a national program requires strong technical capacity within the federal government, national laboratories, and universities. With federal investment, these institutions can establish common data, models, experimental capabilities, and economic assumptions. Such capacity is necessary to optimize the fuel cycle as an integrated system and evaluate competing technologies critically. Such independent technical participation is particularly important when private developers have commercial interests in the technologies being evaluated.

Private companies can contribute technology, engineering, and operating expertise within this framework. The federal program would retain responsibility for defining national objectives, evaluating technical claims, preserving data, and managing federal used fuel and residual waste. Competitive demonstrations should inform national decisions without allowing an individual vendor or project to define the national strategy.

Each technology should be evaluated according to its feed material, recovered products, recovery efficiency, cost, energy use, readiness for scale-up, and effects on storage, transportation, and repository performance. The evaluation should identify plausible uses for recovered products and disposition pathways for every residual waste stream.

Safety, security, and nonproliferation need to be incorporated from the beginning through NRC involvement, nuclear material control and accountancy, physical protection, and process designs that limit the accessibility and attractiveness of separated material. Federal technical leadership and sustained national laboratory and university expertise would provide continuity across changes in vendors, markets, and administrations.

**a. In what ways are current private sector or federal action on fuel recycling effectively achieving these elements, and what are the key challenges they will face?**

The United States has made meaningful progress. In February 2026, DOE awarded $19.3 million to Alpha Nur, Curio Solutions, Flibe Energy, Oklo, and SHINE Technologies for work on several aqueous and electrochemical recycling approaches, with a minimum 20 percent recipient cost share [5]. Oklo and SHINE have also engaged NRC in pre-application discussions [8,9]. DOE's Advanced Nuclear Fuel Recycling Program has invited industry proposals for recycling, reprocessing, and fuel-fabrication facilities, while the Office of Environmental Management has sought proposals for a commercial-scale facility at Idaho National Laboratory using a defined inventory of Advanced Test Reactor fuel [6,7]. These efforts can develop process data, cost information, regulatory experience, supply chains, and a skilled workforce.

The next step is to connect these projects through national objectives and consistent measures of performance, including economics. First-of-a-kind facilities require substantial capital, long term financing, specialized infrastructure, licensing, security, and workforce capacity. The market value of recovered fuel alone is unlikely to compensate a developer for every national benefit, including energy security, domestic technical capacity, and reduced repository burden.

Recycling facilities also depend on fuel-fabrication capacity and reactors able to use the recovered material. Coordinated planning can reduce the risk that one facility is completed without the feedstock, product qualification, or customer needed to operate it effectively.

DOE authorization is appropriate for research, development, and federal missions. A facility intended for commercial service needs to engage NRC before the federal government makes substantial financial or construction commitments. Early NRC involvement allows safety, safeguards, quality assurance, environmental, and waste-management requirements to shape the design and gives a successful demonstration a credible path to commercial licensing.

**b. What actions do you recommend Congress take to develop a successful American national recycling program?**

A national recycling program requires robust investment in a national research, development, and demonstration (RD&D) program led by universities and national laboratories as well as federal cost sharing for first-of-a-kind demonstrations. The RD&D program is necessary to maintain the technical capacity to compare competing processes, qualify recovered fuels and waste forms, and determine when a technology is ready for commercial-scale construction.

Milestone-based federal cost sharing for first-of-a-kind demonstrations can address national benefits that the market price of recovered fuel does not capture. To protect that investment, transparent lifecycle cost estimates, independent technical review, and appropriate private cost participation are necessary.

Congressional authorization may also need to define how DOE may accept and repurpose commercial used fuel outside the repository program. For a Nuclear Lifecycle Innovation Campus, that framework should address ownership of used fuel and recovered materials, liability, applicable licenses, transportation, responsibility for residual wastes, decommissioning, community participation, Tribal consultation, and responsibility if a contractor withdraws or fails.

**c. How should responsibilities for creating successful fuel recycling in the United States be divided among agencies, including DOE, NRC, EPA, and other relevant agencies?**

DOE is best positioned to lead federal research, development, and demonstration, inform a national fuel cycle strategy, fund a robust fuel cycle RD&D program, evaluate fuel cycle approaches, support first-of-a-kind projects when national benefits justify federal participation, and manage DOE-owned used fuel and waste. DOE can also coordinate demonstrations with fuel qualification, advanced-reactor deployment, domestic fuel supply, and the federal waste-management program.

NRC should remain the independent safety, security, safeguards, and environmental regulator for commercial recycling, fuel fabrication, storage, and transportation activities within its jurisdiction. For facilities intended to enter commercial service, NRC involvement needs to begin during design. The existing framework can support near-term licensing, while specific applications will help NRC identify any remaining regulatory gaps [10,11].

EPA establishes environmental protection standards within its statutory jurisdiction, including standards for radioactive waste disposal, and regulates hazardous constituents under environmental laws that may apply to mixed waste and facility releases. Coordination between EPA and NRC can avoid conflicting requirements while preserving their distinct responsibilities.

In the context of transportation, NRC certifies package designs and the Department of Transportation regulates carriers and transportation operations.

The Department of State, DOE's National Nuclear Security Administration, NRC, and other agencies with nonproliferation responsibilities coordinate controls, physical protection, and engagement with the International Atomic Energy Agency.

State regulators and Agreement States retain important environmental, emergency-planning, transportation, and public-participation roles under applicable law.

The Nuclear Waste Technical Review Board provides independent scientific and technical review of DOE's waste-management activities.

Universities, national laboratories, and other qualified institutions can provide additional review and public credibility without displacing NRC's licensing authority.

**Questions from Senator Kelly**

**1. I'm interested in recycling because I've spent a lot of time on the front end of the fuel cycle. My MORE American Fuel Act speeds up licensing for new enrichment facilities while making clear that developers proceed at their own financial risk. The same principle should apply here: if taxpayers are sharing the risk, Congress needs clear standards for when that's justified.**
**Palo Verde shows what happens when we don't plan ahead. Arizona has spent fuel sitting on site with no permanent solution, despite ratepayers paying into the Nuclear Waste Fund for decades. Recycling may be part of the answer, but it cannot substitute for a permanent solution for the waste that remains. What criteria should Congress use to determine when federal support for spent nuclear fuel recycling is justified?**

Federal support for recycling is justified when a project produces public benefits that are not captured in the market value of recovered fuel. Most recycling approaches offer benefits that include reduced uranium mining, greater energy recovery from existing material, reduced repository burdens, stronger domestic fuel-cycle capacity, and preservation of resources for future generations.

Before commercial-scale construction, a project should demonstrate its public benefits, the intended use of recovered materials, credible disposition pathways for residual wastes, and compliance with safety, security, material-accountancy, and nonproliferation requirements. With a robust program to support their research and development, universities and national laboratories can maintain the technical capacity to compare processes, verify performance, optimize the fuel cycle, and qualify recovered fuels and waste forms.

Used fuel and recycling wastes require management over periods that may exceed the life of a company or contract. A government-owned, contractor-operated facility may need to be established to preserve federal responsibility for the facility, nuclear materials, and residual wastes while drawing on private technology and operating expertise. Federal support should develop national technical capacity and infrastructure necessary to ensure recycling is conducted in concert with a permanent final disposal pathway.

**d. Should potential recycling projection [sic] that would receive federal support be required to identify a clear disposition pathway for the radioactive waste streams they will generate prior to receiving that support?**

Research and development involving universities and national laboratories is needed to qualify candidate waste forms and evaluate disposal pathways. Before a project receives major demonstration or construction funding, however, it would identify every significant waste stream, estimate its volume and radionuclide inventory, describe the proposed treatment and waste form, identify the applicable regulatory classification, and establish at least one technically and legally credible storage and disposition pathway.

A repository does not need to be operating before a recycling demonstration begins. However, the project does need to demonstrate that its waste products can be managed safely and remain compatible with a plausible disposal system.

**e. With how capital, resource, and regulatory intensive both a permanent disposal and recycling facility would be, what actions do you recommend Congress takes ensure that efforts to develop recycling technologies proceed alongside, rather than delay, development of permanent disposal capacity?**

Parallel progress requires separate missions, funding streams, schedules, and measures of performance for recycling and permanent disposal. The Nuclear Waste Fund should remain principally dedicated to the latter, the disposal for which ratepayers paid. Separate appropriations can support recycling activities that expand technical capacity, inform national strategy, advance energy security, or enable resource conservation. While it may be appropriate for the Fund to support a recycling activity to the extent that it produces a quantified cost benefit to the disposal system, quantifying that benefit may require a well-defined disposal system design.

A dedicated federal waste management organization can proceed with consent-based siting, transportation planning, consolidated interim storage, and one or more repositories while recycling technologies develop. Repository planning can accommodate a range of waste forms and inventories without assuming that all existing or future used fuel will be recycled.

At the same time, recycling projects must include residual waste disposition in their cost, schedule, and design basis. Coordinated planning will be necessary for information from recycling demonstrations to improve repository design without making disposal contingent on the commercial success of recycling.

**f. What are some positive stories to be emulated, and also cautionary tales that should be avoided that the United States can look at in the international community in order to maximize the success of our domestic recycling and permanent disposal projects?**

Finland and Sweden provide valuable examples for permanent disposal. Both established dedicated implementing organizations, stable financing, independent regulatory review, and sustained engagement with potential host communities. In Finland, the host municipality approved the project before the national government issued its decision in principle, and a state-managed fund is adjusted as future cost estimates change [12,13]. Sweden combined municipal approval with review by its independent radiation-safety regulator and its Land and Environment Court [14,15]. These programs show that technical rigor, stable institutions, and local participation can support steady progress over decades.

France demonstrates that recycling can operate at industrial scale as part of a national fuel-cycle policy. I have visited La Hague and have seen the infrastructure and expertise required to handle used fuel, recover useful material, vitrify high-level waste, and manage nuclear materials securely. Orano is approximately 90 percent owned by the French government, and the enterprise operates within national policies for reactor fuel, recovered materials, financing, and radioactive waste [16]. France also continues to pursue the Cigéo repository for high-level and long-lived intermediate-level waste [17].

I have also visited Japan's Rokkasho facility. It is an extraordinary technical achievement and a tangible expression of Japan's long-term commitment to closing the nuclear fuel cycle. Japan Nuclear Fuel Limited has assembled the infrastructure, workforce, regulatory foundation, and facilities needed to sustain that mission. Construction began in 1993, and, like many mega-projects, is over budget and behind schedule. As the facility nears commissioning, its technical significance and scale underscore the value of the capability Japan is building and demonstrates that a national recycling program requires sustained coordination [18,19].

The U.S. Mixed Oxide Fuel Fabrication Facility at Savannah River offers a more directly relevant caution for an American recycling program. DOE began construction in 2007 with an approved cost of $4.8 billion and planned completion in 2016. By 2016, DOE estimated that completion could cost $17.2 billion and extend to 2048. NNSA terminated the project in 2018 after nearly $6 billion had been spent. Federal reviews identified an incomplete design, unreliable cost and schedule information, and weaknesses in project management and oversight [20,21]. Government ownership alone does not assure success. A project of this scale also requires a mature design, credible cost estimates, stable policy and funding, capable management, and sustained technical involvement from national laboratories, universities, industry, and independent reviewers.

**Questions from Senator Alsobrooks**

**1. During the hearing, you agreed that the NRC should license any facility that stores or disposes of spent nuclear fuel from commercial reactors.**

**a. What specific safeguards are currently in place and are there additional safeguards needed to ensure that a repository licensing proceeding remains technically rigorous and credible, particularly when there are significant political and economic pressures surrounding the development of nuclear energy?**

Existing law separates repository development from regulation. DOE develops the repository, EPA establishes radiation-protection standards, and NRC independently determines whether the facility satisfies those standards. NRC's public licensing process includes technical and environmental review, adjudication before Atomic Safety and Licensing Board judges, opportunities for qualified parties to submit evidence, and judicial review [22,23].

A credible proceeding also requires stable funding for NRC and the Nuclear Waste Technical Review Board, traceable data and models, independent confirmatory analysis, and meaningful participation by affected states, Tribes, and communities. These engagements are underpinned by an independent community of experts at universities and national laboratories bolstered by federal support to conduct independent research, test performance models, preserve technical expertise, and help communities evaluate the evidence. These institutions provide technical capacity outside both the project developer and the regulator, strengthening the scientific basis and public credibility of the licensing decision.

**b. What role does the Nuclear Waste Technical Review Board play in this regard?**

The Nuclear Waste Technical Review Board independently reviews the scientific and technical validity of DOE activities under the Nuclear Waste Policy Act. Its members are appointed by the President from candidates nominated by the National Academy of Sciences, and it reports its findings and recommendations to Congress and the Secretary of Energy. Its work can address site characterization, engineered barriers, transportation, storage, waste packaging, repository performance assessment, and the integration of these activities into a waste-management system [24,25].

The Board reviews DOE's technical work before and alongside a licensing proceeding, identifies unresolved questions, and makes its analysis available to Congress, agencies, and the public. NRC determines whether an application meets regulatory requirements while the Board improves the quality and transparency of the technical basis DOE presents for review.

**2. DOE's recent approach to identifying potential locations for nuclear waste facilities has emphasized working with state governments and developing partnerships with states interested in hosting nuclear facilities. Previous efforts were centered on obtaining consent and participation of local communities, tribes, and stakeholders.**

**a. What should meaningful informed consent look like for a community being considered for a nuclear waste storage facility?**

Prospective hosts need clear information about a facility's purpose, inventory, capacity, operating term, hazards, transportation routes, monitoring, security, emergency planning, ownership, financing, decommissioning, and relationship to permanent disposal. That information will evolve as the design and site characterization develop.

Communities also need the capacity to evaluate what they are being told. Federal funding should enable prospective hosts to obtain independent scientific, legal, and economic advice from experts they trust, such as researchers at universities. Those experts can translate technical information, evaluate competing claims, and identify questions that might otherwise go unanswered.

The process needs to identify which decisions require agreement from the host community, state, and affected Tribal governments. I tmust also identify how residents will be represented, what role transportation corridor communities will have, and when a participant may withdraw. Consent should be reaffirmed at defined milestones rather than inferred indefinitely from an early memorandum or expression of interest. A

final host agreement would address benefits, oversight, monitoring, dispute resolution, changed conditions, and long-term federal responsibility.

DOE's 2023 consent-based siting process provides a useful foundation. It recognizes informed participation, transparency, stepwise decision-making, the right to withdraw before a consent agreement, environmental justice, and the federal government's distinct obligations to Tribal Nations [26].

**b. What role should states, local governments, tribal governments, and residents each have in deciding whether a site moves forward?**

The host community will experience the most direct effects on land use, infrastructure, emergency planning, and economic development. The state has broader transportation, environmental, fiscal, and regulatory responsibilities. Both need defined roles in deciding whether a site proceeds.

Tribal Nations are sovereign governments. Early government-to-government consultation must address treaty rights, cultural resources, sacred sites, water, lands, and other protected interests, including those beyond reservation boundaries.

Residents need accessible information, open meetings, and opportunities to question project proponents and independent experts. Federal support should give communities access to trusted technical assistance, including university researchers. An early expression of interest cannot establish consent for every facility or every stage. The process needs defined decision points, opportunities to withdraw, and a method for demonstrating continued public support.

**3. A permanent repository would need to protect public health and the environment over extremely long periods of time, including from risks that may be difficult to predict today.**
**a. From a public health perspective, what are the most important risks that modern nuclear waste policy needs to account for over the extremely long lifetime of a repository?**

The principal long-term public-health consideration is whether radionuclides can leave the waste form and engineered barriers, move through the surrounding geology and groundwater, and expose people or ecosystems at harmful concentrations. Where applicable, licensing analysis therefore must address waste-form degradation, corrosion or failure of waste packages, groundwater flow and geochemistry, radionuclide solubility and transport, and potential releases to water supplies or the surface environment.

For the same reason, such repository assessment also examines heat generation, criticality, seismic and volcanic risks where relevant, erosion, flooding, climate change, and other processes that could alter the repository or its surroundings. Human intrusion, future drilling or mining, and loss of institutional knowledge require separate consideration because societies and land uses change over long periods.

Long-term confidence requires a safety case based on multiple barriers, protective site characteristics, appropriate assumptions where evidence is limited, sensitivity and uncertainty analysis, and comparison of alternative models. Evaluating these processes over very long periods requires expertise in nuclear engineering, geology, hydrology, materials science, public health, and risk analysis. Sustained federal support for university and national laboratory research can preserve that expertise, improve the underlying models and data, and provide independent analysis throughout repository development and licensing.

**b. How might NRC and DOE differ in their assessment of risks from radiation exposure, groundwater contamination, transportation, human intrusion, and potential changes in the repository environment over thousands of years?**

The same scientific evidence and applicable public-health standards are available to DOE and NRC but are assessed from different institutional positions. DOE, as the applicant and implementing organization, characterizes the site, designs the repository, develops the performance assessment, proposes transportation and operating systems, and presents the safety case. NRC independently tests whether that case complies with EPA standards and NRC regulations. Its review examines DOE's data, models, assumptions, treatment of uncertainty, quality assurance, and proposed controls and may include confirmatory analyses or requests for additional information.

Their technical judgments may differ because DOE selects and defends a design while NRC evaluates whether the evidence supports the required findings. For groundwater, DOE models the release and

movement of radionuclides through a particular repository and geologic setting; NRC evaluates the data, conceptual model, uncertainty, and compliance calculation. DOE proposes scenarios and design features for human intrusion and long-term environmental change; NRC evaluates whether they meet regulatory requirements. For transportation, DOE plans and conducts the shipping campaign, while NRC certifies package designs and oversees applicable safety and security requirements in coordination with the Department of Transportation.

This division of responsibility strengthens both safety and public confidence. Stable NRC authority, transparent records, public participation, and independent technical review provide the credibility required for a national waste program that can support the continued use and expansion of nuclear energy.

**References**

[1] U.S. Department of Energy. *Nuclear Waste Fund Annual Financial Report Summary, FY2025 and Cumulative*.
[2] Congressional Budget Office. *The Federal Government's Responsibilities and Liabilities Under the Nuclear Waste Policy Act*. Testimony before the House Committee on Energy and Commerce, December 3, 2015.
[3] U.S. Government Accountability Office. *Federal Trust and Other Earmarked Funds: Answers to Frequently Asked Questions*. GAO-01-199SP. January 2001.
[4] Blue Ribbon Commission on America's Nuclear Future. *Report to the Secretary of Energy*. January 2012, pp. 71–79.
[5] U.S. Department of Energy, Office of Nuclear Energy. "DOE's Office of Nuclear Energy Awards $19 Million to Advance Recycling of Used Nuclear Fuel." February 5, 2026.
[6] U.S. Department of Energy, Office of Nuclear Energy. "Advanced Nuclear Fuel Recycling Program."
[7] U.S. Department of Energy, Office of Environmental Management. "DOE Closes Application Window for Used Nuclear Fuel Recycling Partnership, Shifts to Selection Phase." July 7, 2026.
[8] U.S. Nuclear Regulatory Commission. "Oklo Pre-Licensing Engagement to Discuss Siting Requirements for a Reprocessing Facility." July 2026.
[9] U.S. Nuclear Regulatory Commission. "Pre-Application Engagements with SHINE Technologies, LLC for the Licensing of a Used Nuclear Fuel Recycling Pilot Facility." November 15, 2023.
[10] U.S. Nuclear Regulatory Commission. "Reprocessing."
[11] U.S. Nuclear Regulatory Commission. "Understanding the Licensing Process."
[12] Posiva Oy. "40 Years Today Since Decision-in-Principle on Final Disposal of Spent Nuclear Fuel in Finland." November 10, 2023.
[13] Posiva Oy. "Funds Ready for Final Disposal."
[14] Swedish Nuclear Fuel and Waste Management Company. "The Review Process."
[15] Swedish Nuclear Fuel and Waste Management Company. "SKB's Licensing Processes."
[16] Orano. *Annual Activity Report 2025*.
[17] French National Radioactive Waste Management Agency. *Update on Cigéo*. February 2026.
[18] Japan Nuclear Fuel Limited. "Corporate Profile." Updated February 2026.
[19] Japan Nuclear Fuel Limited. "Change in Schedule for Completion of Rokkasho Reprocessing Plant and MOX Fabrication Plant." August 29, 2024.
[20] U.S. Department of Energy, Office of Inspector General. *Cost and Schedule of the Mixed Oxide Fuel Fabrication Facility at the Savannah River Site*. DOE/IG-0911. May 2014.
[21] U.S. Government Accountability Office. *Project Management: DOE and NNSA Should Improve Their Lessons-Learned Process for Capital Asset Projects*. GAO-19-25. December 2018.
[22] U.S. Nuclear Regulatory Commission. "Licensing Process."
[23] U.S. Nuclear Regulatory Commission. "How We Regulate: High-Level Waste Disposal."
[24] Nuclear Waste Policy Amendments Act of 1987, Pub. L. No. 100-203, §§ 5011–5014.
[25] U.S. Nuclear Waste Technical Review Board. "Mission."
[26] U.S. Department of Energy. *Consent-Based Siting Process for Federal Consolidated Interim Storage of Spent Nuclear Fuel*. April 2023.

Senator CAPITO. Thank you. Thanks to all three of you. Great presentations. I am going to begin with the questions.

I will begin with you, Mr. Barrett. Our historic experience with managing nuclear waste policy shows how State, local, and Federal politics can change over time and undermine a multi-generational project. As the Department of Energy looks to enter into agreements with States, what are the key components that Congress should consider to ensure that those agreements can withstand that test of time and the political winds that flow from time to time in the States?

Mr. BARRETT. This would be a challenge for everyone to be able to put this together. I believe it can be done with hard work and good faith, to build the required trusted relationships to sustain this very complex arrangement in multi-states, dozens of billion-dollar facilities that have to work together as a team.

Our Nation, with our commercial abilities and our creativity and our free market fundamentals, we can pull this together. We have done this before; we have created projects, and we can do this now. It is going to have to work through a lot of delicate issues of technology development, continued safe performance under a rigorous safety and environmental protection regime, which we have, and we will continue to have.

We can do this if we work together. It is going to take teamwork, it is going to have to sustain itself past many administrations, Congresses, Governorships as we go forward. If we have a continued national vision that we have this accountability and responsibility for energy that we need now and also environmental protection for our great-great-grandchildren in the future, we can do this.

It is going to take a lot of work by everyone, States, the Federal Government, the Governors, to set that up to make this happen.

Senator CAPITO. Right. I think we know from the failed 60 years of stop-and-go that this will be difficult.

I want to ask Dr. Huff, you talked about this in your statement, the interplay between NRC and DOE. The Department of Energy envisions that the NLIC initiative to consist of multiple nuclear campuses with a range of privately owned facilities to support our national commercial interests.

Based on your experience at the Department of Energy, will you please describe the relevant licensing requirements that could be applicable on these campuses?

Ms. HUFF. Thank you, Senator. It is a critical question. If an NLIC contains a collection of facilities, it will probably fall under a number of different NRC requirements. Part 72 is for spent fuel storage, whereas Part 71 is for transportation of packages of spent fuel. Parts 50 or 52 are for reactors, et cetera.

NRC has a number of these. It is not just NRC. NRC would be the primary nuclear safety regulator, but not the only regulator. Agreements States, EPA, the Department of Transportation and other agencies also retain some responsibilities.

NRC oversight will guide that kind of public evaluation. Stable requirements and licensing of a variety of different facilities at one location will not fall under one particularly regulatory framework or even one particular regulatory agency.

Senator CAPITO. I think the Nuclear Regulatory Commission obviously is, its No. 1 priority is safety. I think as communities and States look to incorporate this as part of their interests, I think the safety aspect is going to be the most difficult one from a public perception.

That is where I see the value of the Nuclear Regulatory Commission being, because that is their goal, is safety. Would you agree with that statement?

Ms. HUFF. Yes, ma'am.

Senator CAPITO. Okay. Mr. Barrett, the Nuclear Waste Policy Act designated a sole location, as we know, Yucca Mountain. It was also expected to dispose of nuclear waste resulting from our national security programs, such as spent fuel from submarines and aircraft carriers, and other waste that is slightly less radioactive.

Based on your experience, can you describe what a system would look like with respect to a number of disposal sites, costs and regulations required to put this is leading on to the last question I asked—protect public health and the environment and to establish a suite of disposal options for a multitude of waste forms and disposal sites?

Mr. BARRETT. The NLIC approach would be much more complex than what was envisioned 40 years ago with the Nuclear Waste Policy Act. The Nuclear Waste Policy Act was one repository first, and a second one to follow, and it would basically contain all the high-level waste, all the spent fuels, and all highly radioactive long-lived material. It is generally called intermediate level waste or graded a Class C in other countries.

All would be deeply disposed of. That was a simpler system.

The NLIC system, well a simpler system then, but it is not working because of the socio-political situation that we are in now.

The NLIC system is a much more complicated system, multiple States, has the opportunity today to possibly include more advanced technologies, possible recycling if it can be demonstrated, and all that. It would be a much larger system, probably considerably more expensive, but also doable. We should go forward now and do what is plausible and achievable in the timeframe we have.

For the last 60 years, we have done nothing. We need to move forward now.

Senator CAPITO. All right, thank you. Senator Alsobrooks?

Senator ALSOBROOKS. Thank you. The Federal Government has contractual obligations, and this first question, by the way, is for Ms. McMurrian and Mr. Barrett. The Federal Government has contractual obligations to take spent nuclear fuel from utilities. However, Calvert Cliffs in my State, along with other facilities throughout the Country, continue to store spent fuel onsite.

My first question is, if Congress creates a pathway for moving spent fuel to consolidated interim storage, what factors do you believe the Department of Energy should consider when determining which facility's spent fuel is accepted first?

Mr. BARRETT. To achieve this, which is very important as to what will be the order, we first have to find a place to take it to. Assuming we have a place that is politically and socially acceptable to take it to, a receiving facility that can then start to process,

which may include recycling and eventual disposal, we have to have that place.

Now, the Secretary has the authority to move permanently shut-down reactors to the front. There are many details that are not yet worked out. For example, the Nuclear Waste Policy Act lays out the rights of utilities under contracts for basically the oldest fuel first. They have a slot in the acceptance rate.

We have not yet as a Nation worked out little details such as do they have to purchase these slots from one utility to another, does the Secretary give a free pass to permanently shut down reactors where the fuel is stranded there. Those details we have not worked out yet.

I believe they are certainly solvable in good faith between all the parties on how that would go.

Exactly the details of how you would compare a continuously operating plant, as Calvert Cliffs has been an excellent one, with a plant, say, the San Onofre Plant in California that is shut down, which has stranded fuel there, how we are going to balance that, and the quite order, we do not know that. I suspect that the shut-down plants will have an earlier acceptance rate than, say, an operating plant.

As we bring on new reactors, advanced reactors in this Country, there will be different type fuel forms. If we are successful with the recycling approaches, there is going to need to be a mix between old fuels and new fuels and different types of fuels to make them more economically viable going forward.

We will have to work together on the details of exactly who goes when and the campaigns, the shipping campaigns, and how that will all work.

Senator ALSOBROOKS. Thank you.

How do you believe that DOE should ensure that the system is fair to utilities and ratepayers, who have already paid into the Nuclear Waste Fund?

Ms. MCMURRIAN. Sure. I wanted to say with respect to the other question as well, and I think it relates to this one, that it is important we hit the start button. We can get wrapped around the axle with respect to trying to figure out who goes first, but we really need to make sure we start. We also are supportive of priority for shut-down reactor fuel.

It is important for Congress and the administration to all work together to try to make sure there is a transparent and respected process. I think that you all, of course, have a huge hand in that and can help make sure that customers are assured that this is going to be a transparent process, a process that they can ensure is going to be safe with respect to NRC regulations.

I think we have an opportunity to show the public that the DOE and the NRC and other agencies involved in this can get prepared to make sure that everything is in place when it is time to start moving. Again, it is time to do that today.

Senator ALSOBROOKS. Thank you.

Mr. BARRETT. I could add, the contract holders that have certain rights under their contracts for the money that they have paid for decades, there is an arrangement to do that, and I am very con-

fident that we as a Nation can solve these problems as we get on, once we start the process.

Senator ALSOBROOKS. Thank you.

Then for all of our witnesses, very quickly, the NRC is ultimately responsible for determining whether a proposed repository satisfies the applicable licensing requirements. The credibility of that process will depend on public confidence in the independence of the NRC.

To each of you, yes or no, do you agree that the NRC should license any facility that stores or deposits spent nuclear fuel from commercial reactors?

Mr. BARRETT. Yes.

Ms. MCMURRIAN. Yes.

Ms. HUFF. Yes.

Senator ALSOBROOKS. Thank you. Nothing further.

Senator CAPITO. Senator Curtis?

Senator CURTIS. Thank you, and thank you for this hearing. Thank you to our witnesses.

This is very important. I have heard a lot of estimates about how much energy we need. I do not think there is any plan out there that gets us there without a considerable amount of nuclear energy, far more than I think most people comprehend.

Utah wants to be a first mover in this field, and has worked hard to place themselves in that position. We need a clear regulatory path forward for us. As I think all of you know, Utah has been down-selected as one of the six sites for these Nuclear Lifecycle Innovation Campuses. A lot of my remarks will be through those lenses today.

I would also note that Utah's participation is exploratory. What I mean by that is there are some important questions that have to be answered. Dr. Huff, you talked about the other aspects of this.

The one thing that I would like to bring up that was not really mentioned is, does the State stay as a participant in decision-making, or does the State end up holding the bag for what started as a pilot program of storage and then nothing else comes along?

Also, does this keep pace with innovation? What we have talked about today is based on what we know about recycling today. I think we all know that we could get some innovation out there that would dramatically change this, and does this program keep pace with that or does it get locked in time.

You all have mentioned no matter what we do with recycling, we are still going to have waste that has to be dealt with. I would say, and I am speaking somewhat on behalf of Utah, realizing that this really rests on the shoulders of our State leaders, we are interested in this but we do not want to get in that position of looking around and saying, well now what? We did not quite have all these answers before we jumped into this.

I think that means clear regulatory pathways, safety standards, meaningful State participation, partnership, and a critical path for managing nuclear material from generation all the way through disposition of it.

Mr. Barrett, let me start with you. What does coordination between DOE and the NRC look like as these projects move forward?

Mr. BARRETT. As far as between DOE and NRC, DOE is the first mover. They are the promoters, as was mentioned by the Chairwoman. The NRC is an independent safety regulator that will oversee everything at the end, before it can go commercial. They are the safety assurers. DOE and its partners in industry and the State is a partner, too, propose it and the NRC assures the safety.

That is basically——

Senator CURTIS. Yes. What is your advice for what protection levels, what Federal commitments should a State look for as they consider these campuses?

Mr. BARRETT. Well, Governors today I think are quite savvy in this. Clearly, as I think the Governor from Wyoming said 30 some years ago, you are dancing with an 800-pound gorilla here, the Federal Government. You need to protect yourself going forward.

There are ways to do that through contractual relationships, that there must be a true partnership between the Federal Government, the host State and the private industry participants who are really going to be doing the work. They are probably going to be owning many of these facilities.

All of those, that work, will be under the safety umbrella to give assurance to the American people that whatever is being done is being done safely to protect the environment now and in the future as well.

The States need to be very wise about how they do this. These are not going to be Indian treaties from the 19th century. That we are not going to have. We have to prepare

Senator CURTIS. I am going to interrupt, because they give me 5 minutes and I am going to use all of it. I do think all of us here today can see a scenario much like Senator Alsobrooks explained, like, we did not sign up for this and States very likely could be saying, no, we did not sign up for a private program that permanently leaves this with no jobs, no economic development and everything else.

It is about accountability, I think, for the Federal Government.

Ms. McMurrian, your organization represents States that deal with these. This is a good opportunity for me to get some free advice for my State.

What would you advise States as they look at these opportunities?

Ms. MCMURRIAN. I think there is a lot that can be done short of legislation, actually. I think the Nuclear Waste Policy Act lays out a good framework and I think you can look at that. I think there are things that DOE could be doing in the short term, and you all can encourage them, or direct them to do some of these things.

I think that a program plan similar to how we think of it in the public utility space is almost like an integrated resource plan where you ask DOE to put together a plan for this multigenerational program, see how your Sates and other contender States fit into that, give input and hopefully have an engaging dialog with them.

Have them set up an independent office again that focuses strictly on these issues, so that you have a more direct line person to go to to have this engagement. You have great people at DOE now.

I think it would be nice to revert back to that plan that was set up in the Nuclear Waste Policy Act to have a dedicated office to this, again, that would facilitate States' engagement.

Then also, making sure that there is money for DOE to engage with you all properly and to make sure that we do not get down the road and there is not sufficient funding. Of course, fixing the Nuclear Waste Fund, getting access to that money for a disposal program would really facilitate all of these things.

Senator CURTIS. As you can see, I would love to monopolize this whole hearing, but I am out of time and I will yield.

Thank you, Chair, for this hearing and our witnesses for being here. You can see this is a clearly important topic for Utah.

Ms. MCMURRIAN. Thank you.

Senator CAPITO. Thank you.

Senator Blunt Rochester?

Senator BLUNT ROCHESTER. Thank you, Chair Capito. Thank you so much to the panel for this important hearing.

Delaware often ranks last among U.S. States in energy production, and produces only a fraction of the energy that we consume.

In response, our general assembly created a 25-member bipartisan task force to look at whether small, modular reactors could be developed in the State. One of the main concerns is the lack of a long-term solution for high-level nuclear waste. Despite the fact that there has been a law on the books for decades, that requires the Federal Government to take ownership over this kind of waste.

States like mine then have to weigh whether to invest in nuclear energy against doing it without a long-term solution. It is a real risk for our communities. This is an issue of public safety and public trust.

Dr. Huff, what can the Federal Government do to build trust in communities interested in pursuing nuclear energy?

Ms. HUFF. Thank you, Senator. I think a key component is an independent organization like the one that has been described. Another is to provide resources for independent technical oversight from those communities.

A part of the consent-based system that we put together in the previous administration and those that have succeeded in other nations, like Finland and Canada, includes providing resources directly to communities to help to evaluate those claims and safety assessments, and work together with the government as they plan and design those facilities.

Senator BLUNT ROCHESTER. As a followup, are there benefits to continuing to pursue new reactors while determining a long-term waste disposal solution?

Ms. HUFF. Thank you, Senator. Yes, there are absolutely are. As a carbon-free source of energy, we absolutely need more nuclear. Of course, it is reasonable for communities to want to see progress on the front of waste management before they do so.

Senator BLUNT ROCHESTER. Thank you.

I am going to ask a question of the entire panel. Many of you may know that Delaware is the lowest-lying State in the Country. Just a few days ago there was an article in the newspaper about California and just the waves and the impact of climate on particu-

larly creating more fears about this nuclear waste that is stored 100 feet below.

To the panel, what should coastal States like Delaware consider if storing spent nuclear fuel onsite?

Mr. BARRETT. I will start, quickly. I think the near-term safety, and when I say near-term, I mean up to 100 years, clearly, we have the engineering capability to handle that. That is not an immediate concern that people should, the public should worry about——

That does need to go in parallel with developing new reactors, small modular or not, that there is a long-term disposal project that will complement and support that in the long term and the short-term safety for climate change or whatever I think can be handled through engineering of whoever is running it.

Senator BLUNT ROCHESTER. Got it. Ms. McMurrian?

Ms. MCMURRIAN. Thank you, Senator. While not an engineer or a safety expert, we have been assured by those who are that this is safe where it is. It has proven to be safe where it is for a long time. We have experience with respect to, or at least through articles and such about the experience, even in Fukushima, that even in a tsunami that nothing was released with respect to the spent fuel that was there onsite.

We have tremendous assurance that it is safe where it is. I would also say that an important thing to keep an eye on would be to make sure that the administration and Congress, in facilitating these NLIC campuses, make sure that permanent disposal is a necessary part of that program, so that you keep your eye on the ball that there is going to be a place for this to go to long-term.

Senator BLUNT ROCHESTER. Thank you. Dr. Huff?

Ms. HUFF. From a practical perspective, I will add that maintenance of the rail spurs on the way to those storage facilities is one of the things that separates a facility ready to move that fuel in the event of changing climate and a facility that may not be ready.

Senator BLUNT ROCHESTER. I feel like you were thinking about my next question.

Although Delaware does not host any commercial nuclear reactors or high level waste storage repositories, it does serve as a vital transportation hub for the mid-Atlantic region. What measures must be considered regarding the transportation of spent fuel from its current site to a consolidated storage or permanent disposal facility? Are there transportation issues that can be addressed simultaneously to siting a storage or disposal facility?

Ms. HUFF. Thank you, Senator, yes. I will add there are certified packages that need to be certified for advanced transfer of fuels, if we move in that direction. Fuel characterization and route planning is always underway at DOE and does so in collaboration with TRMTC, a tribal coordination body that helps to make sure that tribal nations are involved in the transportation. Engagement with corridor communities as well is really pivotal to those processes.

Senator BLUNT ROCHESTER. Thank you.

Ms. MCMURRIAN. I would just ask that Congress continue to fund those key components that are necessary to ensure that transportation infrastructure is there and to support the States and tribes who also can add a lot of confidence, and do add confidence to this whole program.

Senator BLUNT ROCHESTER. Thank you.

Mr. BARRETT. Continuing the institutional informational aspects are very important, as my colleagues have mentioned. Also, we are building on a 50-plus year experience of safely transporting this globally, of tens of thousands of shipments, and they have all been done safely without any nuclear problems.

Senator BLUNT ROCHESTER. Okay, thank you so much, and thank you, Madam Chair, for indulging my time. I yield back.

Senator CAPITO. Senator Husted?

Senator HUSTED. Thank you, Chair Capito. I appreciate everybody being here. My question is going to go to all of you, so as you hear me talk about it, then I am going to ask each of you to respond to this.

America is going to need more baseload electricity. Every estimate says that is true for the foreseeable future.

There is a desire for that to be as low of a carbon footprint as possible. I think most people agree on that goal, too.

Nuclear, right now, with all of the existing technologies to be considered, is the best tool to do that. Recycling nuclear fuel is one of the great ways that we can both solve the problem that we are discussing today and meet our future energy needs. Based on the research I have done, there is 95,000 tons of spent nuclear fuel. We create about 2,000 more tons a year.

At current rates, if you recycled all of it, it would provide electricity sufficient to power America for 160 years. Quibble about my years, but you get the point. It is a lot.

I sponsored, and this committee passed, the Nuclear Fuel Act, which created a regulatory and licensing framework to help get that done. Hopefully we can get it passed through the entire Senate.

It would make recycling a viable option for spent nuclear fuel, and America, as they do, has been mentioned in other nations, I have every reason to believe if we get the regulatory component right that we will see private investment come off the sidelines to help make this all happen, and solve a great portion of the problem that we are discussing today.

I ask each of you, what additionally do you believe that we need to do to get this accomplished? I will start down there, and come this way.

Mr. BARRETT. Recycling holds great promise for a lot of things. There is a lot of work to do to assure that it is going to be commercially viable and support this.

With recycling, without recycling, there is still going to be high-level waste that needs to be disposed of.

Senator HUSTED. I recognize that.

Mr. BARRETT. That continues. There is value, and I think the Federal Government, through its development in R&D, can certainly help and assist that to hopefully bring forward the vision that people have that you just described very well, sir.

Yes, there is promise. We have a lot of details and work to do yet.

Senator HUSTED. No doubt. That is why we should not delay. Yes.

Go ahead.

Ms. MCMURRIAN. Being a non-expert, but I guess what I would say is maybe demonstrations and showing support and a commitment that we are going to take care of what is left after the recycling process is done. I think all those would support recycling endeavors.

Senator HUSTED. I know that there are plans to go with Tennessee and Ohio to get some of these things going in terms of the recycling, and then the new small scale nuclear reactors that can help and that can use the fuel.

Dr. Huff?

Ms. HUFF. I will just add that DOE has had a strong fuel cycle research and development program throughout the whole last many decades, even when we did not have a real policy toward recycling, boosting that program at the national labs and the universities. Public-private partnerships with companies can help make sure that all of the learning that we have been doing over these last many decades contributes to some of those innovations.

I would say, strengthen that research and development program, and we will be on our way.

Senator HUSTED. There is no doubt that this is a private-public partnership that is in great need. If you listen to what the others have had to say, how long has this been going on? It is stunning to me how slow this place operates. It really is. We have known that this has been a problem for decades, but everybody always had a reason about why they can not do this, can not do that. Even though they will disagree about a detail, but while the whole thing goes down. We do not move ahead on it.

This is a topic, the idea of recycling, most people probably do not know that you can do it, they think, well, this is spent nuclear fuel out there, but it is still 95 percent viable for what it can be reused to do to power our future. It is just sitting there, nothing is being done with it. We can do this, the technology is available. It has been well-documented. We need to go forward.

I thank you, Chair Capito, for hosting this hearing. America can not wait. We keep saying we want low-carbon options for electricity. We know that demand is going up. Yet we do nothing. Nothing to get that accomplished.

I hope that we can get the Nuclear Refuel Act through the Senate, through the Congress and on the President's desk so that we can begin this process of powering our Country and recycling the very waste product, as we call it, that we want to bury in the ground instead of using it to turn our lights on.

Thank you for being here today.

Senator CAPITO. Thank you, Senator Husted.

As you can see, it is just me and the Senator here.

Before I close, I do want to ask, I want to take license here and ask an additional question, because everybody has talked about this. This is the funding source.

We know there was a funding source set up 60 years ago. I like the way you put it, trust and fund. We have a Highway Trust Fund, we have a Harbor Trust Fund, we have experience with this.

I do not know, some of the estimates are $50 billion, $51 billion. Well, it tells me it is not just sitting there, I can tell you that. It

has probably already been spent in some form or fashion. It has not been spent where it is properly designated for.

How do we, do we continue with that system to be able to give predictable and adequate funding? Do we put more guardrails on it? How would you suggest that? I will just kind of go through the panel here.

Mr. Barrett, do you have any ideas on that?

Mr. BARRETT. The Federal IOUs are sitting there in the Treasury. Turning IOUs into cash is a challenge for the Congress and the administration. That has to go forward.

I think there are arrangements that can be done. One of the things that does not come into discussion that should is the taxpayer liability for paying judgment funds, which is off-budget, basically. The liability to the taxpayers is almost $60 billion, on a new report that will be coming out shortly.

That needs to come into it as well. We do need to get the funding to move to make this happen. It is a Federal, the government owes that money. We have to find a way to generate that. There are ways to do it.

Senator CAPITO. Ms. McMurrian?

Ms. MCMURRIAN. Thank you for this important question. I will say that we have been told over the years that if we fix your fund, or the Nuclear Waste Fund, we would have to fix others. This is a big problem for Congress. Then since then we have watched as Congress has addressed getting access to the Land and Conservation Fund and the Harbor Maintenance Trust Fund.

We know that Congress knows how to do it. We just need the leadership. You all are of course showing that here today. We are excited about the prospects of perhaps finding a way to return access to that money that is in the fund, that $51 billion with $1.7 billion and up billion accumulating every year, and allow DOE to use that to make progress and really build trust among the communities to make sure that as they look at new nuclear endeavors, that they have trust that this is going to be resolved and that the money will be there to do it.

Senator CAPITO. Dr. Huff?

Ms. HUFF. I would like to associate myself with all the comments of my colleagues here. They are completely right, and I would say furthermore, Congress has also in small amounts been able to begin funding things like the consent-based siting program out of that fund. That work can start off a little bit in the very near-term, even before we figure out how to make a sort of more permanent access to that fund possible.

Senator CAPITO. Okay. Let me ask a technical question. Mr. Barrett, in your opening statement, I wrote down something, just so I understand, I understand recycling, I understand reprocessing. Is all nuclear waste, it is not all the same.

I am thinking if you are a State such as mine, would you have, keep in mind we do not have any nuclear facilities, would you, if you are doing permanent disposal, do you have to have different facets to dispose of it or can you put it all in one singular disposable geologic formation?

I am kind of curious about that.

Mr. BARRETT. There is nominally three types of nuclear waste. There is low-level waste, which is currently disposed of in the United States and worldwide on surface facilities. Basically, it lasts 100 years or so, or 200 years, medical waste is a primary part of that.

Then there is high-level waste, that is the highly radioactive part, like spent fuel or the residue from recycling. That goes into a deep geologic repository worldwide.

There is potentially a third level that is known as intermediate level waste internationally which would be some of the less active residue from recycling primarily. Defense waste transuranics that are disposed of in New Mexico in a deep salt formation is an example of that sort of thing. We do not have that in the commercial world here of any significant amount.

You can always put them in, always can go into a very deep repository if you wish to do so. You do not necessarily economically need to do it.

Now, the countries that are doing this, like Sweden and Finland, and all, and the French, they are putting all their intermediate-level and high-level waste deep underground. You could put it less to the surface, which might be less expensive. You have to have the proper regulations for it——

The NRC is reviewing those, their current low-level waste, and looking at potentially having intermediate-level waste in a near-surface disposal, sort of in between. There are different types of waste. They all can be disposed of safely now, and have long-term performance to protect future generations according to the type of waste it is, and its toxicity and its character.

Senator CAPITO. Okay. Well, thank you for that. I am reflecting back to when I was a child and I would ask my dad for something, and he would say, "Well, I do not have to be a nuclear scientist to tell you this." I might have to be a nuclear scientist to understand all this, so I appreciate that clarification.

While we were chatting, Senator Lummis, whose State I believe is affected by this as well is here. As soon as she is ready, I will let her begin her questioning.

Senator LUMMIS. Chairman, thank you. I am so glad I get a chance to ask a couple of questions of our witnesses. Thank you for your patience.

The cost of spent fuel storage, as I understand it, is about $8 million per site per year for each year we do not have a permanent storage solution.

Ms. McMurrian, thanks for being here. Can you please speak to the significance of that number?

Ms. MCMURRIAN. Absolutely. As a former public utility commissioner, we have been focused on this for a long time, about the cost of this and trying to make sure that the government, of course we are excited about the leadership of this committee and others in working on this problem.

Yes, these costs continue to mount. Those have consequences not only on the electric customers who have paid in to make sure that there is a solution, but also on taxpayers who are paying for the liability that is accumulating and that is paid out of the judgment fund.

Also, of course, on the host communities who, we do believe that the spent fuel is safe where it is. They were promised that in return for payments and in return for their service in keeping this onsite that the government would start picking this up in 1998. Of course, that has not happened.

We are hoping that going forward, and with these NLIC States and other States who are interested in new nuclear endeavors, that we can get this right next time and ensure that we have the program in place to support all of these States and all of these new investments.

Senator LUMMIS. Thank you.

I understand that some of our European countries have geological repositories, France, Finland, Sweden. Finland has constructed something called a nuclear waste tomb, which passed safety tests last month.

Mr. Barrett and Dr. Huff, is there anything the U.S. can learn from these countries with regard to site selections and licensing processes? Are there technical or regulatory reasons those approaches could not be replicated here? Mr. Barrett?

Mr. BARRETT. We have worked with those countries for decades technically. That is not an issue. The issue here is one of our socio-political establishment versus theirs. Let us take Finland, which is the leader. They are actually building a new emplacement shortly. They have no states. It is basically the central government and local people.

If we had that situation here in America, this would have been done years ago. We are the United States of America. That is a big difference.

We have to adjust our policies to work in our culture. We have learned a lot, we know a lot, and many of the concepts of consent-based siting and collaboration work is exactly what they do in Finland and France and Canada as well.

We have learned that, we know that, and we now have to better balance our program. In the past, with Yucca Mountain, it was almost all technical and it was not enough socio-political side to it. Now we must have a balanced program that has both. Without the socio-political viability, we are not going anywhere.

Senator LUMMIS. Dr. Huff?

Ms. HUFF. I agree completely, and I would add that the example of Canada, which Mr. Barrett mentioned, is a good one in the context of this lack of states and other examples. The nuclear waste management organization there in Canada has successfully sort of down-selected to a final repository site.

I think it is a promising example. I am grateful DOE and NWMO have MOUs to work together and understand each other much like they do with Finland and other nations. There is great hope there.

Senator LUMMIS. Okay. My State of Wyoming is exploring, specifically Gilette, Wyoming, Campbell County, is exploring TRISO Fuel. It is my understanding that it takes the shape of poppyseed size particles or even some designs are using liquid fuel.

Mr. Barrett, can you elaborate on the technical considerations for including these fuel types in a nuclear waste disposal plan?

Mr. BARRETT. That is a very robust fuel form. It is probably the best we have. It was very compatible with geologic disposal, as

other forms as well. It does not really change much. It is a very good thing, it is very safe and has great economic promise as well. It is not a big issue as far as disposal. It goes very nicely into any type of disposal system.

Senator LUMMIS. Thank you.

Madam Chairman, may I ask one more question? Thank you.

DOE's Nuclear Lifecycle Innovation Campus program would put fuel fabrication and used fuel disposition on a single site. Ms. McMurrian and Dr. Huff, can you speak to the value of letting States decide for themselves which roles they can play in advanced nuclear energy and the fuel cycle? We already discussed the advantages of having not to deal with States, as is true in Finland and Canada.

What do we do, given the fact that we have a 10th Amendment, we have States, we have at least theoretically robust State rights. What role can they play in advanced nuclear energy and fuel cycle?

Ms. MCMURRIAN. I would say, we have definitely learned the value of having States as partners and working with the government hand-in-hand on these things. I would encourage any States looking at being a campus or moving forward with respect to new nuclear investment to really encourage the permanent disposal aspect that I think that having that solution for the Country is going to serve all the States interested in new nuclear endeavors as well. It will definitely address the trust issues that have been questioned.

Senator LUMMIS. Thank you.

Dr. Huff?

Ms. HUFF. One practical benefit of having States pretty integrally involved in defining their own rules is that States are often the centroid of State regulators and permitting, and that can help smooth the path to successful licensing of such facilities or hinder the path of successful such licensing.

Direct involvement with those States that have the power and engagement from their communities to see that path go smoothly is a real benefit.

Senator LUMMIS. Are you aware of some States that are interested in exploring this?

Ms. HUFF. My understanding is that there are six. Five were announced on July 1st and then West Virginia shortly thereafter.

Senator LUMMIS. It sounds like States that are accustomed to coal, oil, gas, uranium, nuclear culturally are adapted to those technologies are embracing it. I am grateful for that.

Mr. Barrett, if Nuclear Lifecycle Innovation Campuses are intended to support fabrication and other activities, what regulatory or statutory uncertainties need to be resolved before companies or the government can justify investments in these facilities?

Mr. BARRETT. I think the conventional fuel fabrication enrichment is pretty well established fact for decades. That I think can continue sort of in a normal way.

I think for the disposal aspect of things we do not have, we only have modern standards for Yucca Mountain, and Yucca Mountain is not being considered here. We need to establish a regulatory process from that for other sites. That can be done. We at American Nuclear Society proposed a report on how to do that.

If the regulatory, EPA and the NRC, need to pick that up to work with the States to assure that that will, the disposal part will be safe.

As far as recycling, the NRC I think has the capability to support that from a regulatory safety point of view, and the DOE has technologies with its national laboratories to assist applicants as they are working together to develop recycling technologies and others that will meet all the safety requirements.

I think there is a robust system there and I think it can serve our Nation well.

Senator LUMMIS. I thank our witnesses and Madam Chairman, I want to thank you for a little extra time. I get to tee up Mr. Markey, because I was taking too much time.

Senator CAPITO. Senator Markey?

Senator MARKEY. Thank you so much, Madam Chair, thank you, Senator Lummis.

Yucca Mountain was never going to be a permanent repository for nuclear waste, for many reasons. One major mistake was Congress' failure to ask for permission. Not only does proper nuclear waste management require a great deal of scientific and engineering prowess, which was missing, by the way, you should not be building a nuclear waste site on an earthquake vault next to a river. It also requires social buy-in and public consent. That can take a long time to build, but it can be lost in an instant.

If we are going to ask a community to host radioactive waste, they need and deserve to be informed of the risks and have a role in planning and decisionmaking, whether it is interim or permanent storage. The consequences of this misstep have been massive.

The current State of nuclear waste management is de facto onsite storage that has forced communities to host waste for longer than they planned for. Decades and decades longer than they planned for. It is endless and it is expensive.

We are spending $2 million every day of your taxpayer dollars for the government's failure to figure out an adequate solution. The Trump administration just proposed new interim storage facilities in five different States, although many details remain unresolved. The Department of Energy signed memoranda with five Governors. It has not clarified how its vision will be developed in tandem with affect communities.

Dr. Huff, do you think community level stakeholders will need to participate in the discussion around lifecycle campuses in addition to State governments, in order to avoid consent-based disagreements?

Ms. HUFF. Yes, I do, very much so.

Senator MARKEY. You do. What will happen if they do not get that social buy-in, Dr. Huff?

Ms. HUFF. Long term, there is no robustness to a system that has a lot of lack of local support or State support or Federal. You have to have all three, and you have to have tribal nations engaged in a government-to-government activity as well.

Senator MARKEY. These are, for all intents and purposes, going to be permanent interim storage. Once they are there, those sites are never going anywhere. The community has to understand that it is an interim permanent location in five places in our Country.

You will have that nuclear waste for the rest of that State's history.

Without radical transparency and public consent, we are bound to repeat the very same mistakes which we did 40 years ago. Americans can not keep paying for this mistake in their taxpayer dollars and in compromised safety.

This administration has fired members of the Nuclear Waste Technical Review Board, our independent scientific watchdog over DOE's waste management policy. It has infiltrated and undermined the independent Nuclear Regulatory Commission by firing the former chair, sending DOGE into the headquarters and issuing executive orders that have led to fast and furious deregulations that create new limitations on the commission's ability to ensure the safety and security of our reactor fleet.

The Department of Energy is asking communities to trust it on storing nuclear waste, as well as on regulating enrichment, recycling and other activities that have major safety and national security implications. Much like consent, trust takes years to build, but only seconds to lose.

Ms. McMurrian, you have previously served at the NRC and on the Nuclear Waste Technical Review Board. Can you explain the importance of maintaining an independent NRC and scientific oversight of DOE's waste management policies?

Ms. MCMURRIAN. I think you might have meant to direct that question to Mr. Barrett, with respect to the Nuclear Waste Technical Review Board. I will say that independence is very important in all of these processes.

It is why the Nuclear Waste Strategy Coalition has certainly supported getting the program out of DOE over the long term, that all of this program's entirety of being subject to every 4 years, every 8 years, having the goalpost kind of move in a different strategy has not served this program well. We think that ultimately getting that kind of independence that you speak of would definitely make progress on this entire issue.

Senator MARKEY. I apologize. Again, public trust is paramount. If the Trump administration is serious about finding a real solution to nuclear waste in this Country, it would relinquish its chokehold over the NRC and the review board. If it is not clear to the public that safety is being given priority and instead utilities or others are compromised in those safety protections, then the community will just turn on a facility in a nanosecond because of the danger.

That is ultimately what we are talking about. The DOE's Nuclear Lifecycle Innovation Campus initiative would set up integrated full cycle nuclear ecosystems that could collocate and support the entire nuclear value chain. This includes interim storage for intermediate and high-level waste, fuel reprocessing, reactors and even onsite manufacturing and data centers.

However, we received little or no detail on how the agency and host States plan to prevent and mitigate the many security risks that come with fuel reprocessing. Once plutonium is separated from spent nuclear fuel, it can be used to produce nuclear weapons.

Again, Dr. Huff, are there nuclear proliferation risks that would be created by siting reprocessing facilities on a large campus like those proposed by DOE?

Ms. HUFF. I believe that nuclear material security can be managed, but it is costly. We store and manage very dangerous nuclear materials across this Nation.

However, the process of enabling a private entity, for example, to conduct that work also has to include strict regulations with regard to nuclear material security at those facilities, which will need government oversight and is likely to be costly.

It will have to incorporate itself into the economics.

Senator MARKEY. Okay. There is definitely going to be big questions on personnel access, how it is going to be managed, reprocessing.

If DOE is going to change the campus plan to change traditional personnel and security measures, we are going to have big nuclear proliferation risks. That uranium, the plutonium is the only thing missing from the ability to build a nuclear bomb. The security will have to be intense.

Thank you, Madam Chair.

Mr. BARRETT. Senator, if I could, let me add to that. I agree with much of what you just said about the importance of the independence and the connection. DOE needs to work with the States and the communities to develop what good rules are, so DOE cannot initially say, here is how it is going to be, the details, which you well spoke to that we have to do.

It has to be done in a partnership with the host State and with the communities. As to the Technical Review Board, I was a Republican on the Technical Report appointed by President Biden. I was fired on the first full day of the Trump administration. I have confidence that in the Federal system of the NRC and others and my one remaining colleague on the Technical Review Board that safety rules be given to the American people no matter what goes forward, and that the American people should have confidence in what is going forward, as some of these political things play their way out.

I believe the safety is there and we are now on our approach that will address the issues of the social side, that we have got to do better on. We are on our way to do that.

Thank you.

Senator MARKEY. I would just say, over-confidence breeds complacency and complacency breeds disaster. To the extent to which everybody turns into a cheerleader and we have lost that sense of responsibility to make sure that it is safe, then we are sighting up a consequence where you go another 30 years, with Chernobyl and Three Mile Island as a shadow over the nuclear industry.

Thank you, Madam Chair.

Senator CAPITO. Thank you.

Thank you all very much. With no further questions, I would like to thank the witnesses, as I just did, and all of my colleagues for participation in today's hearing.

Senators who wish to submit written questions for the record have until 5 p.m. on Wednesday, October 7th, to do so. The witnesses' responses to these questions are due back to the committee no later than 5 p.m. on Wednesday, October 21st and will be submitted for the record.

With that, this hearing is adjourned. Thank you.

[Whereupon, at 11:19 a.m., the hearing was adjourned.]

