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on Energy and Natural Resources  
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Chairman Murkowski, Ranking Member Manchin, and members of the Senate Energy and Natural Resources Committee, I appreciate the opportunity speak to you today on behalf of the American Nuclear Society or ANS. We represent 10,000 men and women who have brought incredible benefits to society through clean, reliable electricity generation, detecting and curing cancer through nuclear medicine, developing power systems to enable deep space exploration and other applications of nuclear technology. America's nuclear professionals have the skills and expertise to manage our country's portfolio of nuclear waste through the safe and secure storage, transportation and, ultimately, disposal of nuclear material.

I have spent a substantial portion of my professional career working on used fuel and nuclear waste, both on the behalf of the government and for a major nuclear utility. In addition to my current leadership of the ANS Spent Fuel Policy Task Force, I chair the Nuclear Industry Council's Backend Working Group and I am a member of the Nuclear Waste Strategy Coalition. These and other stakeholder groups are committed to putting the waste program back on track, and they are in general agreement about the important steps required to do so.

All energy-producing technologies produce wastes that must be managed responsibly. The good news is that used nuclear fuel, the by-product of operating reactors for electricity production, is a robust and stable waste form that the nuclear industry has a sterling record of storing and transporting safely. High-level radioactive waste, the by-product of chemical reprocessing which, in the United States, was conducted primarily for weapons production purposes, is also robust and stable once converted to solid form. However, these materials are 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 in stable geologic formations, and several countries are making good progress toward siting and constructing repositories. Unfortunately, the U.S. program has foundered. While it has generated huge federal government revenues through fees charged to generators of nuclear electricity (and generally collected from their customers), due to political considerations those revenues have not translated to steady and adequate funding for the critical job of nuclear waste management.

There are many social, financial, and environmental imperatives for addressing used nuclear fuel and high-level radioactive waste management (collectively, high-level waste or HLW). Today, America's nuclear power reactor fleet provides a majority of the nation's zero-emissions electricity, and advanced reactors offer the promise of additional clean, "always on" energy production for the future. ANS professionals are working diligently to develop and

deploy advanced nuclear energy systems such as small modular light water reactors and Generation IV reactors. However, we are very concerned that the lack of a credible, demonstrated HLW management plan threatens these efforts, which are essential for our clean energy future.

When evaluating potential changes to the U.S. HLW program, it is important to appreciate the specific problems that have plagued the program for the past 35 years. Appropriations to support program activities have been less than requested by past administrations, highly variable, and, for the last seven years, non-existent, despite the accumulation of tens of billions of dollars in the Nuclear Waste Fund. The key appointed position of Director of the Office of Civilian Radioactive Waste Management (OCRWM) has been vacant for extended periods, to the extent that one career Department of Energy (DOE) employee filled the office on an acting basis longer than any actual director on a permanent basis. A previous administration eliminated OCRWM nine years ago despite the fact that the office was—and still is—required by federal law. I highlight these realities not to cast blame, but to remind the committee that as you seek to fix problems associated with the waste program, any effective solution to the problem must be insulated, to the extent possible, from detrimental political action (and inaction). HLW management is a long-term endeavor that needs steady and consistent management over many decades, but it has suffered greatly due to the vagaries of the annual appropriations process and the two-year election cycle.

The official ANS positions on HLW management policy issues are documented in four ANS Position Statements. PS-80 “Licensing of Yucca Mountain as a Geologic Repository for Radioactive Wastes” states the Society’s support for completing the Nuclear Regulatory Commission (NRC) licensing action on the DOE’s construction authorization request for the proposed repository, as is required by current law. The country has invested more than \$10 billion in determining the acceptability of Yucca Mountain as a site for geologic disposal of HLW. The process is nearly completed, and finishing the job will provide valuable information and insights even if a repository is never built on the Yucca Mountain site. PS-76 “Interim Storage of Used or Spent Nuclear Fuel” summarizes our technical and operations experience with both wet and dry storage of used fuel and endorses moving forward with the development of centralized storage facilities as part of an integrated used fuel management system. This position statement makes it clear that centralized storage is only a “partial and temporary solution” and does not obviate the need for a geologic repository. PS-18 “The Safety of Transporting Radioactive Materials” documents the impeccable worldwide public safety record associated with the transportation of such material, including used fuel. PS-22 “Creation of an Independent Entity to Manage U.S. Used Nuclear Fuel” addresses the need for a management organization that has the authority and access to funding to successfully carry out the used fuel storage and disposition mission. These four position statements are attached to this testimony.

Having established the official ANS positions, I will now discuss several key provisions of the Nuclear Waste Administration Act of 2019, or NWAA. These remarks reflect the views of the ANS Nuclear Waste Policy Task Force on the proposed legislation and are informed by consultation with a number of knowledgeable and experienced ANS members. Clearly, there are a number of areas for improvement in the HLW management program, but in our view, governance reform and funding reform are the pre-eminent issues that Congress and the Administration must address in order to achieve tangible, convincing progress.

NWAA Section 306 would initiate a search for additional geologic repository sites other than Yucca Mountain, a prudent and appropriate course of action. A geologic repository is a “must have,” not an optional element of a successful waste management program. At the present time, the country’s waste program is stuck in the political logjam of Yucca Mountain. State of Nevada and other intervenor concerns have not yet been addressed by the adjudicatory process and there is no certainty that the site will be politically feasible even if it passes technical muster. ANS strongly supports the timely completion of Yucca Mountain licensing, and we are pleased that the NWAA does not preclude that action. At the same time, we believe the nation should resume the process of identifying a second repository site. If, for whatever reason, all HLW does not ultimately go to Yucca Mountain for disposition, it will have to go somewhere. The country deserves a better understanding of what options are realistically available.

Aspects of our regulatory structure need updating if the U.S. is to pursue a second repository. Specifically, the regulations which should be revisited are the Environmental Protection Agency’s (EPA’s) 40 CFR Part 191, Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes; DOE’s 10 CFR Part 960, General Guidelines for the Preliminary Screening of Potential Sites for a Nuclear Waste Repository; and the NRC’s 10 CFR Part 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories. All of these generic regulations are out-of-date and revisions will be well-informed by the experience gained characterizing multiple potential repository sites in the 1980s as well as Yucca Mountain site suitability and licensing work. Accordingly, we recommend the NWAA be modified to include a requirement for the timely revision of these regulations to reflect advances in science and other lessons-learned over the past three and a half decades.

Of the three regulations discussed above, the long pole in the tent is probably 40 CFR Part 191. While we recognize that this issue is largely outside the Committee’s jurisdiction, the update of this regulation is particularly important when determining the suitability of a repository site. The regulation establishes the acceptance criteria for the ability of a repository to isolate radioactive waste from the environment. The U.S. generic standard for repositories, 40 CFR Part 191, lacks transparency, is out-of-date, and focuses on population dose rather than individual protection, making it inconsistent with current international guidelines for such regulations. A transparent, up-to-date, workable generic standard is essential. A more recent standard, 40 CFR Part 197, is risk-based and has a clear nexus with public health and safety, but it was developed for, and legally applies to, the Yucca Mountain site only. It took the EPA more than a decade to put the previous generic standard in place and more than a decade and a half to promulgate a Yucca Mountain-specific standard, so the revision should begin as soon as possible. As a side note, completing Yucca Mountain licensing will support the revision of 40 CFR Part 191 by providing practical insights into the workability of a repository standard.

NWAA Section 305 authorizes a consolidated interim storage program with priority for used fuel residing at permanently shut down nuclear power plants. This is a very positive feature of the legislation—a successful consolidated storage program would (i) begin to discharge the government’s responsibility to manage used fuel, (ii) develop and exercise the used fuel transportation system, and (iii) act to minimize the government’s long-term financial liabilities.<sup>1</sup> However, without a credible geologic repository plan, our ability to implement a

consolidated interim storage program is very questionable . With no prospect of a permanent repository, key stakeholders are unlikely to support the temporary storage of used nuclear fuel in their states. This consideration highlights the need to complete Yucca Mountain licensing as well as the value of initiating a search for another repository site.

Title II of the NWAA of 2019 would move management of the waste program away from DOE to a new government agency—the Nuclear Waste Administration—which would have primary authority for carrying out the government’s responsibilities. As documented in its Position Statement 22, ANS supports establishing an “independent entity” to manage HLW. It is not clear, however, that the Nuclear Waste Administration as proposed in the NWAA would be significantly better positioned than DOE’s OCRWM to achieve success. Notably, several well-compensated leadership positions are established atop the Nuclear Waste Administration, but there are no hard and fast requirements to ensure that the political nomination and confirmation process will keep them continually filled by well-qualified individuals. We continue to believe that elements of the public corporation model, as suggested by the Blue Ribbon Commission on America’s Nuclear Future and others, and embodied in legislation proposed by the late Senator Voinovich in 2010,<sup>2</sup> deserve serious consideration as the legislative process moves forward.<sup>3</sup>

Funding reform is an essential element of successfully revamping the HLW management program. Title IV of the NWAA takes a step in the right direction by establishing a Working Capital Fund that would preserve new contributions to the Nuclear Waste Fund for application to the nuclear waste program without being subject to year-to-year appropriations. The NWAA does not, however, provide a reliable mechanism for accessing the large and growing balance in the Nuclear Waste Fund (more than \$40 billion currently, and increasing at a rate of approximately \$1.5 billion per year). As such, we recommend the Committee consider incorporating provisions for accessing the current balance of the Nuclear Waste Fund along the lines of those included in H.R. 3053,<sup>4</sup> passed by the House of Representatives in the 115th Congress. Another beneficial reform worthy of consideration would be to direct all future interest earned by the Nuclear Waste Fund into the Working Capital Fund. Such a measure would at least prevent the problem of lack of access to the corpus of the Nuclear Waste Fund from getting materially worse.

We strongly encourage the Committee to revisit Section 406 of the bill, which requires contract holders to settle standard contract lawsuits as a “condition precedent” for storage of used fuel under the NWAA. It is not at all evident why the government should be allowed to coerce standard contract holders into settling on the government’s terms in return for the government discharging its existing statutory and contractual responsibilities. Based on my past experience as a utility used fuel manager who was part of a team that successfully negotiated a durable used fuel settlement in 2006, I believe the only thing preventing all standard contract lawsuits from settling—to the joint benefit of the government, the American people who foot the bill for the Judgment Fund, and the companies overseeing the safe storage of used fuel on operating and shut down reactor sites—is the unwillingness of the federal government to settle the lawsuits on equitable terms.

With respect to consent-based siting of nuclear waste management facilities described in Sections 305 and 306 of the NWAA, the legislation appears to outline an equitable process for obtaining consent of local and state governments and affected Indian Tribes. The overriding

question is – can a consent-based process, with all parties having an absolute veto, succeed in our system of government? There is ample cause for skepticism. To date, there is no example, here or abroad, of a disposal facility for HLW being sited successfully using a consent-based process when a state government (or equivalent) is required to provide consent. Simply put, consent is unlikely, absent meaningful monetary and non-monetary incentives to states and communities in return for hosting waste management facilities.

To summarize the ANS perspective, we urge you to adopt three broad principles for action. First, commit to make real progress, focusing on achievable tasks. Create a viable management organization with the necessary funding and resources that can work without undue political interference. Empower that organization to complete Yucca Mountain licensing, investigate a second repository site and other suitable disposal techniques, and move forward on consolidated interim storage. Initiate the development of up-to-date regulations including a generic environmental standard for additional repositories. Engage with Nevada and other potential host states and communities.

Second, seek to combine the concepts of “consent” and “benefit.” In addition to a portion of the substantial monies collected from electricity customers over the years for the express purpose of HLW management, the federal government has at its disposal many means of providing infrastructure improvements, federal land, educational opportunities and other means of support to any state and/or community interested in taking on the responsibility of managing nuclear materials. Make those potential benefits abundantly clear from the beginning.

Third, empower our scientists and engineers, who remain world leaders in radioactive waste management. Congress must address the political, legal, and public acceptance issues associated with nuclear waste, but we will not succeed if good science takes a back seat to other considerations. We must allow our best and brightest nuclear professionals the opportunity to take on the challenge with some degree of independence, funding and flexibility.

In closing, ANS is grateful for the Committee’s willingness to address this very important issue. I thank you again for the opportunity to testify and stand ready to answer your questions.

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<sup>1</sup> Steven Nesbit, “Centralized Interim Storage – Does It Make Sense Today?” International High-Level Radioactive Waste Management Conference, Albuquerque, NM, April 2011.

<sup>2</sup> United States Nuclear Fuel Management Corporation Establishment Act of 2010, S.3322, 111th Congress 2D Session (introduced May 6, 2010).

<sup>3</sup> Steven Nesbit, Lake Barrett, Rod McCullum, and Dan Stout, “A Blueprint for the New Used Fuel Management Organization,” International High-Level Radioactive Waste Management Conference, Albuquerque, NM, April 2013.

<sup>4</sup> Nuclear Waste Policy Amendments Act of 2018, H.R.3053, 115<sup>th</sup> Congress (passed House of Representatives May 10, 2018).