



# THE PATH FORWARD FOR NUCLEAR WASTE IN THE U.S.

A BIPARTISAN SOLUTION TO THE NUCLEAR WASTE PROBLEM

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A Bipartisan Solution to the Nuclear Waste Problem

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## Introduction

With nuclear energy in the U.S. positioned to make a comeback, the need to find a permanent solution for the spent nuclear fuel from commercial nuclear power plants is more important than ever. While the U.S. has safely stored spent nuclear fuel at reactor sites for decades, such storage is a temporary measure and spent fuel must be moved from the more than 76 sites where it currently sits to one or more deep geologic repositories for final disposal.

The Nuclear Waste Policy Act of 1982, as amended in 1987 (NWPA), identified Yucca Mountain, Nevada as the potential location for a deep geologic repository for spent nuclear fuel (SNF) and high-level nuclear waste (HLW).<sup>1</sup> However, such a facility never received a license and was never constructed. Congress has not appropriated funds for Yucca Mountain since 2010, and it has treated the Nuclear Waste Fund, which was paid by electricity customers, as taxpayer money, severely restricting the ability to use it for its intended purpose. Now a quarter of the way into the 21<sup>st</sup> century, it is time to move forward with a solution to nuclear waste disposal.

Globally, important progress has been made in addressing the nuclear waste issue. This shows that it is possible to find a permanent solution for this waste. Finland, for instance, has progressed to constructing a repository, and it intends to begin to dispose of spent fuel before 2030.<sup>2</sup> The absence of a viable program for U.S. nuclear waste management and disposal not only represents a hindrance to the expansion of nuclear energy in the U.S., but it is also a major detriment to America's ability to compete with nations like Russia that can demonstrate their ability to offer full fuel management services, including waste disposal. In attempting to lay out a solution to the U.S. nuclear waste problem, we draw from current thinking about nuclear waste and deep geologic repositories from the US and around the world, including Canada, Finland, France, Sweden, and Switzerland.

To formulate a successful path forward for nuclear waste disposal in the United States, we gathered a bipartisan group of nuclear waste experts, all of whom have worked on this issue for many years, most for multiple decades. They included representatives of the nuclear industry, former government officials, members of public interest groups,

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<sup>1</sup> <https://www.energy.gov/articles/nuclear-waste-policy-act>

<sup>2</sup> Sonal Patel, 2024, Trial Run at Finland's Onkalo Repository Sets Stage for World's First Spent Nuclear Fuel Disposal, Power Magazine, December 2, 2024, <https://www.powermag.com/trial-run-at-finlands-onkalo-repository-sets-stage-for-worlds-first-spent-nuclear-fuel-disposal/>.

academics, and representatives of states, Native American Tribes, and communities where SNF and HLW is currently stored.

In preparing this report, we have focused on what is needed to advance the unfulfilled mission of the 1982 NWPA: that our generation, which has benefited from defense and commercial nuclear activities, must responsibly manage the waste so as to not unreasonably burden future generations. The heart of this endeavor must be the development of one or more deep geologic repositories for nuclear waste,<sup>3</sup> and the past decade and a half has seen no substantive progress toward that goal.

First and foremost, the US needs an entity that can successfully implement a solution: an organization that is responsible to find a suitable site for a geologic repository, characterize the site, apply for and obtain a license from the Nuclear Regulatory Commission (NRC), construct the facility, transport the waste, operate the facility, decommission the facility, all while engaging successfully with the affected state, community,<sup>4</sup> any Native American Tribe that may be impacted, and other affected groups and regions. That entity would be responsible for all safety, environmental protection, and financial accountability functions. Subject to the necessary oversight, it could subcontract particular functions to private entities as it deems appropriate. In addition, this organization would have authority to develop a consolidated storage facility (CSF) for spent nuclear fuel as a bridge to a repository.

Under the NWPA, the designated implementer for management of SNF and HLW is the U.S. Department of Energy (DOE). However, what has become clear is that using a government agency, severely constrained by ever-changing leadership and uncertain funding, is challenging. The four-plus decades since the passage of the NWPA have unfortunately proven the point. We believe the new model we are proposing will have a much higher chance of success.

The other major reform required to make progress toward a solution for nuclear waste disposal is to fix the financing. The Nuclear Waste Fund that was established by the NWPA and now totals more than \$50 billion<sup>5</sup> has been used for decades by Congress to offset the national debt. As a practical matter, this dedicated fund, which was mostly paid by electricity customers at a rate of \$0.001/kWh, is inaccessible to any entity that needs to use it to develop a nuclear waste disposal solution because Congress subjects it to same appropriations rules that apply to taxes the Internal Revenue Service collects.

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<sup>3</sup> Geologic disposal of nuclear waste in a repository is the emplacement of the radioactive material in a deep, stable geologic formation with appropriate engineered barriers that provide an adequate level of protection against potential exposure to radiation from the waste for hundreds to hundreds of thousands of years in the future. Geologic disposal is the international consensus approach for disposal of spent nuclear fuel and high-level radioactive waste.

<sup>4</sup> By community we mean the individuals, institutions, and social groups that recognize themselves as connected through shared place, governance, identity, or shared stakes in the facility's benefits and risks. A community may encompass several governance units, including Tribal lands, towns, cities, counties, school districts, as well as ecological and administrative units like watersheds, irrigation districts, or regional planning areas.

<sup>5</sup> These totals are found in the Office of Inspector General (2025) Audit Report, see [Financial Statement Audit: DOE-OIG-26-02 | Department of Energy](#).

As a result, use of the Nuclear Waste Fund, money collected for the purpose of developing a repository for waste disposal, requires Congressional consent and is subject to both competing priorities and the shifting political dynamics in Congress. As a result of court orders, reactor owners (and therefore electricity customers) are no longer contributing to the Nuclear Waste Fund.<sup>6</sup>

The lack of progress on nuclear waste disposal has also had a very costly impact on taxpayers. Since 1998, DOE has been unable to meet its contractual obligations, laid out in the NWPA, to reactor owners to remove the spent nuclear fuel from reactor sites for disposal (because there is no waste disposal facility). This breach of contract has resulted in lawsuits and subsequent settlements in which the American taxpayer, through a Judgment Fund established by the Justice Department, has had to reimburse nuclear power plant owners for the continued costs of on-site storage of the spent fuel. Under existing law, taxpayer liability for on-site storage costs will continue to grow until DOE is able to remove the fuel. To date, the Department of Justice has paid out more than \$12 billion to reactor owners for their on-site storage costs. Independent audits predict that around \$40 billion more of taxpayer money will be paid in the future.<sup>7</sup> These liability estimates assume that DOE will be able to start taking used fuel in the fairly near future, which is impossible unless the government takes immediate action. Based on past and current experience, that will not happen and the taxpayer liability will likely be much higher.

With vendors of traditional large light water reactors, small modular reactors, and advanced reactors ready to develop those technologies and a clear need for clean and reliable power, it seems likely that more nuclear power plants will come online in the next decade or so. This should provide additional momentum for the development of a program leading to a permanent solution to the management of spent nuclear fuel. Given that spent fuel will remain radioactive for millions of years, it is essential that the nation find a permanent solution to dispose of this material.

The geographic magnitude of the problem is also large: there are 17 nuclear power plants permanently shut down, seven of which are completely decommissioned with only the spent fuel remaining, which prevents the reuse of these sites for other useful purposes.<sup>8</sup> In addition, all operating reactor sites have had to add new extended spent fuel storage facilities to allow continued power production.

What follows is our legislative proposal to fix the current impasse and begin to develop a workable solution to the ongoing problem of nuclear waste disposal, while providing limited consolidated storage capacity to address the needs of shutdown plants and

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<sup>6</sup> In 2013 the US Court of Appeals for the D.C. Circuit decided a lawsuit brought by the National Association of Regulatory Utility Commissioners against the DOE, stopping the collection of fees into the Nuclear Waste Fund as a result of partial breach of contract by DOE to collect SNF.

<sup>7</sup> These costs are found in the Office of Inspector General (2025) Audit Report, see [Financial Statement Audit: DOE-OIG-26-02 | Department of Energy](#).

<sup>8</sup> See Banerjee et al, 2024. Note that the Palisades Plant in Michigan is going to be restarted by Holtec; the Duane Arnold plant in Iowa is under discussion for restart; neither is included in the total here.

optionality for privately funded recycling interests to collocate with storage and disposal facilities.

## The Implementer

The most important element to make progress on nuclear waste disposal in the U.S. is the establishment of a trusted, capable, properly-funded implementing organization, or implementer, that can be successful. In the U.S., the implementer under the Nuclear Waste Policy Act, as amended, is the DOE, which initially set up an Office of Civilian Radioactive Waste Management to do the job. The DOE disbanded this office in 2010, when Congress stopped funding the Yucca Mountain repository program.

The Blue Ribbon Commission on America's Nuclear Future (BRC) concluded in 2012 that a new organization was necessary to manage spent nuclear fuel and high-level radioactive waste, including establishing a geological repository for waste disposal.<sup>9</sup> The basis of its conclusion was that the DOE would likely never be able to lead the country to the successful siting of a repository due to a lack of public trust and because it is continually subject to politics and focused on other priorities, including managing the nuclear weapons complex and energy technology development. The BRC concluded that only an implementer with a single focus of managing and disposing of the nation's nuclear waste and control over needed finances would be able to develop the trust and have the necessary continuing focus needed to complete the job.

To better understand the realm of possibilities in designing a more successful implementer, we considered a number of sources, including: the Advisory Panel on Alternative Means of Financing and Managing Radioactive Waste Management Facilities report of 1984;<sup>10</sup> the BRC report; and the Reset of America's Nuclear Waste Management, Strategy and Policy report of 2018.<sup>11</sup>

We also evaluated how countries that have made successful siting decisions and progress have structured their implementers. In particular, we considered Canada, which selected a repository site in 2024;<sup>12</sup> Sweden, which selected a site in 2009 and has begun construction of a repository;<sup>13</sup> Finland, which began excavation of its repository deposition tunnels in 2021, and plans to emplace the first waste in the next

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<sup>9</sup> [https://www.energy.gov/sites/prod/files/2013/04/f0/brc\\_finalreport\\_jan2012.pdf](https://www.energy.gov/sites/prod/files/2013/04/f0/brc_finalreport_jan2012.pdf)

<sup>10</sup> Advisory Panel on Alternative Means of Financing and Managing Radioactive Waste Facilities (AMFM). 1984. Managing Nuclear Waste – A Better Idea. Washington, DC: Department of Energy.

<sup>11</sup> Stanford University and George Washington University, 2018, Reset of America's Nuclear Waste Management: Strategy and Policy, [https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/reset\\_report\\_2018\\_final.pdf](https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/reset_report_2018_final.pdf).

<sup>12</sup> <https://www.nwmo.ca/news/the-nuclear-waste-management-organization-selects-site-for-canadas-deep-geological-repository>.

<sup>13</sup> Sonal Patel, 2025, Sweden Begins Construction of World's Second Deep Geological Repository for Spent Nuclear Fuel, POWER Magazine, January 16, 2025, <https://www.powermag.com/sweden-begins-construction-on-worlds-second-deep-geological-repository-for-spent-nuclear-fuel/>.

few years;<sup>14</sup> and Switzerland, which selected a site in 2022 and plans to make a final parliamentary decision by 2031.<sup>15</sup>

In response to its Seaborn Report in 1998,<sup>16</sup> Canada restructured its nuclear waste disposal plans through new legislation. Its Nuclear Fuel Waste Act of 2002<sup>17</sup> required the reactor owners and Canada's national nuclear laboratory to establish an independent non-profit corporation, Canada's Nuclear Waste Management Organization (NWMO), to implement its disposal program. We also looked at both Sweden and Finland, and their respective implementers, SKB and Posiva Oy, which are also independent corporations set up by the reactor owners that are required by law to manage and dispose of the nuclear waste they produce. Finally, we looked at the Swiss implementer model, NAGRA, which is a cooperative that is jointly-owned by the reactor owners and the federal government. Of NAGRA's nine board positions, one seat is held by the federal government, which provides three percent of the financing.

Using these examples as models, we recommend that the implementer for our country be a *Nuclear Corporation*, or NuCorp, a nuclear reactor owner-led corporation,<sup>18</sup> either an independent public benefit corporation<sup>19</sup> or a non-profit corporation. Under both models, the company is obligated to work towards a public benefit, which in this case is final nuclear waste disposal. NuCorp would be required by new legislation and established by reactor owners. NuCorp would be federally chartered with a governing Board of Directors. This corporate structure should ensure that the entity will adhere to good corporate management practices and generally accepted accounting principles. The corporation would be designed to treat all members or shareholders without discrimination in managing their nuclear wastes.

While we strongly support a wholly nuclear reactor-owner-led corporation, we also believe that the Swiss model of a corporation jointly owned by the reactor owners and the federal government could also be successful in the US.<sup>20</sup> In such a model, the

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<sup>14</sup> <https://www.powermag.com/sweden-begins-construction-on-worlds-second-deep-geological-repository-for-spent-nuclear-fuel/>

<sup>15</sup> <https://www.drbg.ch/erlaeuterungen-de-en-fr/explanations/how-is-the-site-determined.>

<sup>16</sup> [https://iaac-aeic.gc.ca/archives/evaluations/431C8844-1/default\\_lang=En\\_n=0B83BD43-1\\_printfullpage=true.html#TOClink.](https://iaac-aeic.gc.ca/archives/evaluations/431C8844-1/default_lang=En_n=0B83BD43-1_printfullpage=true.html#TOClink)

<sup>17</sup> [https://laws-lois.justice.gc.ca/eng/acts/N-27.7/.](https://laws-lois.justice.gc.ca/eng/acts/N-27.7/)

<sup>18</sup> By "reactor owners" we mean both owners of operating and shutdown reactor sites.

<sup>19</sup> Thirty-six states and Washington DC have established laws for the establishment of public benefit or benefit corporations in which the corporation exists to make a positive societal impact (see for example, [https://sos.ks.gov/forms/business\\_services/PBC.pdf](https://sos.ks.gov/forms/business_services/PBC.pdf) and <https://mgaleg.maryland.gov/mgaweb site/search/legislation?target=/2010rs/billfile/sb0690.htm>).

<sup>20</sup> We recognize that other models for the implementer are available. In France, which is also on a road to success in establishing a geologic repository, the implementer is a government agency focused on the management of radioactive waste. The BRC recommended the use of the government-owned federal corporation model, similar to the Tennessee Valley Authority. A Rand Corporation report commissioned by DOE after the publication of the BRC report concluded that multiple models could be successful, provided the implementing company or agency is provided the authority and funding to carry out its mission. With all of that being said, given the preponderance of the reactor owner model internationally, we proposed that model for the waste management implementer in the United States.

federal government would have a seat on the Board of Directors, giving it a stake in the process and outcomes and recognizing its significant nuclear waste disposal needs.

### **A Private vs Non-profit NuCorp**

In our discussions on the best form of the implementer, though we strongly agreed on the formation of a nuclear reactor owner-led corporation, we could see arguments for both a for-profit and a non-profit entity. Canada's Nuclear Waste Management Organization was established by law to be a non-profit entity to assure public confidence in its work. Sweden's SKB, in contrast, is a for-profit company owned by the reactor owners; however, its mandate, financing, and operations are tightly constrained by law and subject to regulatory oversight. The for-profit motive does not provide a major steering function for SKB, which offers its expertise on technical nuclear waste repository siting and development as well as their expertise in public engagement to generate profits for the company. Some committee members saw that for-profit status might incentivize NuCorp, others raised concerns that a for-profit company would be less inclined to pursue the public interest of disposing of SNF. We suggest that the non-profit or for-profit status of NuCorp needs a national discussion.

## **Responsibilities of NuCorp**

NuCorp would be responsible for the management, transportation, possible storage, preparation for disposal, and disposal of commercial spent nuclear fuel, specifically all waste that is covered by the existing standard contracts under the NWPA. NuCorp would also be authorized to enter into disposal contracts with new reactor licensees, to dispose of spent fuel or high-level waste from their operations. Thus, new entrants into the reactor field could use NuCorp services to meet the NRC licensing requirement that they have disposal contracts in place. Should DOE or other federal government entities choose to use its services, NuCorp would be obligated to contract for the disposal of such spent nuclear fuel or high-level waste, subject to reaching a mutually acceptable agreement with the federal government. We concluded that it would be mutually advantageous for DOE to contract with NuCorp for disposal services for DOE's SNF and HLW.

In accordance with applicable NRC and Environmental Protection Agency (EPA) standards, NuCorp would be responsible for siting, licensing, construction, operation, and decommissioning of a deep geologic repository or repositories. It would also be responsible for the transportation of spent fuel from reactor sites to storage facilities and

a repository or repositories. The NRC, as part of the licensing process, would be responsible for compliance with the National Environmental Policy Act (NEPA), including preparation of an Environmental Impact Statement (EIS). NuCorp could use its resources for the siting, licensing, construction, operation, and decommissioning of one or more CSFs, were it to deem them appropriate to accompany an operating deep geologic repository for final disposal. These functions would be carried out in accordance with NRC standards. Once the repository site(s) are permanently closed, responsibility for monitoring and long-term security would revert to the federal government. During operations, NuCorp would be required by NRC regulations to develop a perpetual care fund to pay for post-closure expenses.

NuCorp would be authorized to partner with private recycling/reprocessing companies that may be interested in co-locating their facilities with NuCorp's facilities, as long as they do not use the Nuclear Waste Fund monies that are designated for a permanent solution to pay for recycling facilities' capital, operating, maintenance or other costs. Of course, the safety and security of these facilities would have to be demonstrated in accordance with NRC regulations. Such ventures would have to be supported by private investors.

NuCorp would be responsible for creating - through extensive public engagement - a set of ethical principles that would guide all aspects of the organization's activities from site selection to the decommissioning of the repository or any other facility NuCorp establishes. One model is suggested by NWMO in Canada, which has a set of principles that could be a model for NuCorp, including a focus on safety standards that exceed minimum regulatory requirements, finding an informed and willing host community, the right to withdraw, and shared decision-making, among others. NuCorp principles should also incorporate respect for future generations, respect for all life, peoples, and cultures, justice, fairness, and dedication to productivity and cost effectiveness.

NuCorp would be expected to use a collaborative siting process in establishing a site for the repository. Thus, it would be responsible for entering into a required, voluntary hosting agreement for any of its facilities with the affected host state and local government as well as any Indian Tribes, if impacting their reservations or Trust lands, before licensing and construction of said facility.

## The Structure of NuCorp

### *Board of Directors*

NuCorp would be governed by a Board of Directors that would be responsible for providing the management, direction, and oversight of NuCorp. That Board of Directors would be composed of members who represent a cross-section of nuclear reactor owners who are chosen by the owners of spent fuel. More on Board membership is discussed below in the box.

The Board would have fiduciary responsibilities and NuCorp would follow generally accepted accounting principles. The Board would have committees such as a finance committee, an audit committee, a membership committee, and other standing or special purpose committees, as it deems appropriate. The Board would be required to implement a policy regarding conflicts of interest.

NuCorp would be managed by corporate officers such as a CEO and a CFO, and others as appropriate. For example, it may be advantageous to add officers such as a Chief of Public Engagement to its Board.

### **Board Membership**

In our discussions of membership on the Board of Directors, we agreed that the Board would be expected to have representatives from decommissioned and operating plants, geographically diverse members, and those with differing capacities and public oversight (i.e., large and small reactors, merchant and regulated plants). The Board could also add external members that could include host state and host local communities and affected Tribes. If ownership of NuCorp was shared between the reactor owners and federal government, then the Board would also have a representative from the federal government on it, but the majority of the Board would be made up of reactor owners.

On the topic of whether Board membership would be decided by NuCorp itself or written into law, the committee split. Some saw an advantage in specifying Board composition, including requiring government representation, in law. Others thought NuCorp should be allowed to develop board composition and that it should be allowed the flexibility to develop over time, as other corporate boards manage their membership. Certainly, this topic requires debate at the national level.

As an organization formed in the public interest, NuCorp and its Board would operate in the public view and be subject to independent oversight – as described below.

### *Advisory Committee*

To ensure that NuCorp operates fairly and according to its principles, it would, by law, be required to establish an independent Advisory Committee that would report periodically to the Board and to Congress. The law would specify the composition of the Advisory Committee and require the Board to develop and implement a policy regarding conflicts of interest for the members of the Advisory Committee (see more on membership in the box below). The Advisory Committee would hold annual or more frequent public meetings on the work of NuCorp in management and disposal of nuclear waste, reporting on the challenges faced and successes achieved by NuCorp in its

mission. The Advisory Committee would be responsible for examining both technical and socio-political issues.

### **Advisory Committee Membership**

Another complex issue that had varying committee member views was that of the selection of members of the advisory committee. Some thought that the Board of Directors should choose diverse Advisory Committee members; others saw that as removing an important oversight capability, were the Board to stack the Advisory Committee with friendly members, even employees of reactor owners. As a result, we suggest how Advisory Committee members could be identified and leave the final process to a larger national discussion. We agreed that Advisory Committee members should serve 3-year terms, with one additional reappointment possible.

Either way, the following organizations could supply individual recommendations or nominees for the Advisory Committee for final approval by the Board or as stand-alone members. Affected local and state governments (or the National Governors Association or National Conference of State Legislatures prior to a siting decision) could nominate representatives to serve 3-year terms; technical and social science expertise could be sought from the U.S. National Academies of Science, Engineering, and Medicine. Native American committee members could be solicited through organizations such as the Nuclear Energy Tribal Work Group (NETWG), the National Congress of American Indians (NCAI), the United and South and Eastern Tribes (USET).

The Advisory Committee would represent a broad range of expertise and interests, including technical expertise that reflects the many scientific and engineering disciplines involved in management and disposal of nuclear waste; expertise in social sciences, especially in the fields of organizational culture, behavior psychology, and governance; practitioners in public participation; expertise in traditional Native American knowledge (if there are affected Tribes); and representatives of local and state governments and Native American Tribes, as well as local members of the public near the affected site.

Given the broad scope of responsibilities of the Advisory Committee, it could assign work to subcommittees with expertise in particular areas, such as the technical aspects of siting (similar to the work of the Nuclear Waste Technical Review Board), public engagement in siting, fiduciary oversight, and others.

As a result of the establishment of NuCorp and its Advisory Committee, the Nuclear Waste Technical Review Board, which is advisory to DOE, would no longer need to exist. All documentation that it produced should be transferred to the Advisory Committee and continue to be publicly available.

## Financing

NuCorp's financial needs will vary over time. There will be high financial needs when the repository is under construction and in operation, for instance. Thus, NuCorp must have assured access to funds when and where it needs them to complete its mission. Given that there is an existing Nuclear Waste Fund established by law and paid into by nuclear power plant operators of which most was recovered from their electricity customers (at a rate of \$0.001/kWh), NuCorp will need to acquire access to the Nuclear Waste Fund. Initially, legislation should stipulate that interest earned on the Nuclear Waste Fund (currently approximately \$1.8B/year)<sup>21</sup> be transferred to NuCorp without need for further Congressional action. If NuCorp does not use this amount in a given year, it would put the unused funds into an escrow account for future use.<sup>22</sup> Eventually, there will be a need to ensure access to the corpus of the Fund to allow the corporation to fulfill its mission.

Making the monies paid into the Nuclear Waste Fund available to any implementing organization is a complex legislative matter. As documented by the BRC, the funding mechanism Congress hoped to create in the Nuclear Waste Policy Act has not been carried out during implementation. Instead of a "user financed" trust fund, policies of the Office of Management and Budget as well as subsequent legislative enactments (for example, the Balanced Budget and Emergency Deficit Control Act of 1985, popularly known as Graham-Rudman-Hollings Act) have resulted in a fund where revenues are valued as a deficit reduction tool similar to tax collections, and funds needed for the mission of securing a permanent disposal facility are forced to compete with other priorities in an annual appropriations battle. Planning for and executing a multi-generational program in this environment presents any implementer with untenable obstacles.

Fixing this element of the program will require bipartisan support in both the legislative and executive branches in order to overcome arcane legislative "scoring" rules created in an effort to control increasing budget deficits. A number of options were adopted by the BRC after consideration of a commissioned paper noted in Appendix D of the final report.<sup>23</sup>

More recently, the 116th Congress passed, and the President signed, the Great American Outdoors Act (P.L. 116-152) which (1) established a new National Parks and Public Lands Legacy Restoration Fund where revenues deposited in the fund were to be made available for specified purposes "without further appropriation or fiscal year limitation" (54 USC 200402(c)) and similarly clarified that revenues deposited into the

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<sup>21</sup> <https://www.energy.gov/sites/default/files/2024-12/FY24%20-%20NWF%20Annual%20Financial%20Report%20Summary.pdf>

<sup>22</sup> This concept implements a working capital fund similar to that proposed in House Bill 118-9786 (Pfluger/Levin Bill), or the National Parks and Public Land Legacy Restoration Fund, <https://www.congress.gov/bill/118th-congress/house-bill/9786>

<sup>23</sup> Joseph S. Hezir, 2011, Budget and Financial Management Improvements to the Nuclear Waste Fund (NWF), Background Report to the Blue Ribbon Commission on America's Nuclear Future, May 2011.

existing Land and Water Conservation Fund would be available after fiscal year 2021 "without further appropriation or fiscal year limitation" (54 USC 200303(a)).

We believe this model needs to be a part of the national debate and given serious consideration by the Congress and the Executive Branch in fashioning a path forward.

As progress is made, NuCorp would decide when and if it is necessary to reinstate an appropriate and reasonable Nuclear Waste Fee and would be given this authority by amendment to the NWPA. NuCorp would transmit any proposed fee reinstatement to Congress. The amount of any future fee would be based on well-documented estimates of actual costs necessary to provide disposal services based upon the characteristics of the spent nuclear fuel or high-level waste requiring disposal.

The Nuclear Waste Fund would continue to be used solely for the purpose of disposal and preparation for disposal of spent nuclear fuel from commercial nuclear power plants in a deep geologic repository. As noted above, NuCorp would be authorized to partner with privately funded recycling interests to collocate their facilities, provided they meet NRC safety and security requirements. Commensurate with these partnerships, NuCorp could offer contracts to the recycling/processing companies for disposal of their high-level wastes. For exotic spent fuels and other waste forms requiring treatment prior to disposal, NuCorp would be required to assure that the costs of such treatment or processing are paid by the waste generators.

## Implementation

NuCorp's first task, required by law, would be to develop a mission plan: an initial road map to the ultimate permanent disposal of the radioactive waste products in spent nuclear fuel and HLW, if DOE so contracts with NuCorp for disposal services. Initially, this should be focused on a geologic repository site or sites and a CSF as a bridging pathway towards disposal and reduction of taxpayer liability costs due to existing contract partial breach damage award payments. Such a plan should include objectives, planned outreach and collaborative engagement approaches, schedule goals, and conceptual plans for siting, design, licensing, construction, operation, and decommissioning. The initial mission plan should be completed within one year of the establishment of the entity. This mission plan should include a schedule of activities and milestones necessary for operation of a geologic repository. Mission plan revisions, which describe progress and changes, should be provided within a two-year period for Congressional and public review and comment. The Advisory Committee would be obligated to provide written comments on the plan. Both the plan and the Advisory Committee report should be made available to Congress, contract holders, and the public.

In parallel, with the initial first draft of the Mission Plan, DOE should provide a report to Congress and NuCorp defining the volume and characteristics of DOE's HLW and SNF requiring disposal in a deep geologic repository to support a possible contract between DOE and NuCorp for disposal services.

Once NuCorp develops its mission plan, its next step would be to identify potential geologic repository sites by working with interested states, Tribes, and local communities, using a collaborative siting process.

Though focused primarily on disposal, NuCorp may elect to develop a CSF for spent nuclear fuel. There may be several advantages to having such a facility in operation. Given that development of an operational geologic repository is expected to take significantly longer than a CSF, moving some of the spent fuel to an integrated CSF is the quickest way to begin discharging the government's contractual obligations related to spent nuclear fuel. This would begin to mitigate the annual damages paid by the government for failing to remove spent fuel from reactor sites. The CSF would remove fuel from shutdown nuclear power plant sites first, thereby freeing up the land for reuse. The CSF would also help establish the spent fuel transportation infrastructure that will be required to support a geologic repository.

However, a CSF will cost money to design, license, construct, and operate, and resources in the Nuclear Waste Fund are not infinite. NuCorp will need to weigh the costs of establishing a CSF against the benefits to be derived, but would be authorized to use these resources for a limited amount of storage. A CSF is an interim solution, not a permanent solution, to spent fuel management, and it must not be used as an excuse to defer the development of a geologic repository nor inordinately drain resources from that objective. Accordingly, we recommend limiting the capacity of a CSF by law until a repository site is selected *and* the necessary hosting agreements are consummated (see Box below for more discussion). Limiting the overall capacity of a CSF would preserve the impetus for developing a U.S. geologic repository for disposal of spent nuclear fuel.

### Linkage between a Repository and a CSF

The committee agreed that there needs to be a link between the development of a CSF and the siting and operation of a deep geologic repository for spent nuclear fuel. A future in which all effort has gone into the development of a CSF and none into a repository may lead to indefinite delay of final disposal of spent nuclear fuel, leaving the CSF to become a de facto final resting place for the waste. To avoid that outcome, a clear linkage between the development of a CSF and that of a repository should be assured in law. The NWPA assures that a repository will be the final resting place of nuclear waste by preventing construction of a CSF until a repository site has been licensed for construction, not having more than 10,000 MTHM before a repository is operational, and never exceeding a capacity of 15,000 MTHM. Given the situation today, these older linkage requirements appear too restrictive and should be relaxed, however we had no agreement on what an appropriate linkage going forward should be. The Blue Ribbon Commission noted the need for a CSF for SNF from the permanently shutdown plants, which now number 17 and hold, collectively, 10,010.58 MT of spent fuel.<sup>1</sup> A preponderance of members wanted to limit the size of a CSF to 20,000 MT of SNF as a way to ensure that NuCorp develops a repository. Other committee members wanted to increase the size to 100,000 MT SNF, the current inventory of SNF at all nuclear power plants, but below the nominal 140,000 MTHM amount of spent fuel expected to be generated from the current reactor fleet. In addition, there was discussion within the group that appropriate linkage specifics could be established within a legally enforceable state, local government, or tribal (if necessary) hosting agreement.

<sup>1</sup> Note that as of 2022, 10,010.58 MT of spent fuel was stored at 17 permanently shutdown nuclear power plants, not including Palisades, Three Mile Island, and Duane Arnold, which are in the process of being restarted, in the US, Banerjee, K, Rigato, A, and Wilson, V (2024) Spent Nuclear Fuel and Reprocessing Waste Inventory, December 2024, Pacific Northwest National Laboratory, PNNL-33938, Rev. 1.1.

## Operation

Any repository that NuCorp seeks to establish would have to receive a license from the NRC based on radiation safety standards set by the EPA. Because there are no up-to-date generic safety standards for a repository, new legislation should require EPA and NRC work together to establish generic radiation safety standards and licensing regulations for a repository so that they are ready to support assessment of site suitability and preparation of an application for any selected site.<sup>24</sup>

NuCorp would be authorized to take title to commercial spent fuel, for which the federal government is currently obligated, when it leaves the reactor site. In addition, NuCorp

<sup>24</sup> See for instance, American Nuclear Society, 2023, 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, <https://www.ans.org/file/12339/1/ANS%20Disposal%20Standards%20Report%20final%20booklet-online.pdf>.

would be required to honor applicable law and existing treaties with federally-recognized Indian Tribes.

Responsibility for commercial spent fuel would remain with the generating utility until it leaves the site for either a storage facility or deep geologic repository, at which point it becomes NuCorp's responsibility. DOE would remain responsible for DOE-owned waste unless and until it signs a contract with NuCorp to dispose of those materials. If DOE elects to contract with NuCorp, NuCorp would be obligated to negotiate with the federal government and then, if there is a mutually acceptable contract, would assume responsibility only in accordance with the agreed contract terms.

NuCorp would be required to follow national and international safety and security nuclear transportation regulations. NuCorp would also be required to follow the NWPA Section 180 (c) transportation funding and technical assistance functions to states and Tribes, through whose lands NuCorp plans to ship spent fuel to either a CSF or repository. NuCorp should employ best practices, reflecting the extensive experience base with safe and secure transportation of radioactive materials in the U.S. and abroad. The NuCorp Advisory Committee may establish a transportation subcommittee, similar to the National Transportation Stakeholders Forum (NTSF).<sup>25</sup>

## NuCorp Oversight and Monitoring

NuCorp would have the responsibility to develop a repository or repositories for nuclear waste and receive licenses to construct and operate the facility from the NRC. Canada selected a site about 20 years after the NWMO was established; other countries have followed a similar timeline. Congress, state governments, other interested organizations such as Public Utility Commissions, and the public would hold NuCorp responsible for progress towards a repository. NuCorp would be required to provide annual reports to Congress, public utility commissions, and the public. The Advisory Committee would be required to provide comments on those reports. Congress, through its committees, would be expected to hold hearings to monitor progress towards a repository and to ensure that electricity customer monies are being spent in the manner set out in law.

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<sup>25</sup> <https://www.energy.gov/sites/prod/files/em/FinalINTSFDraftCharter.pdf>

## The Role of States, Tribes, and Local Governments

NuCorp would be required by law to collaborate with Tribes, states, and local governments to identify a suitable and acceptable site or sites for a geologic repository for spent nuclear fuel, and, if NuCorp deems necessary, a CSF for spent nuclear fuel. NuCorp would enter into legally enforceable hosting agreements with the affected State, the local government, and Tribes if the site is located on tribal lands (reservation or Trust lands), prior to licensing or any significant construction activities. NuCorp would not have the authority to compel any Tribe, state, or local government to consent to hosting an interim storage facility or repository. We also recommend that NuCorp consider aspects of directives pertaining to its engagement with federally-recognized Indian Tribes, similar to the DOE's Order 144.1, DOE American Indian Tribal Government Interactions and Policy.<sup>26</sup>

## Best Practices

To achieve success in managing and disposing of the nation's spent nuclear fuel and high-level nuclear waste, NuCorp should follow best practices that have led to siting success elsewhere. These practices include the following:

- States/local governments/Tribes have the ability to opt out at any time up to the point of license application submission; the Tribe(s), state(s) and local government(s) determine how best to reach their mutually agreed upon hosting agreement with the implementer.
- The implementer provides reasonable funding for states/local communities/Tribes to hire their own independent experts and do their own analyses of the issues.
- The implementer commits to being adaptive and flexible over the full course of the process.
- The implementer provides appropriate benefits to the host community
- The implementer and regulator must commit to transparency - making documentation and decision-making open to the public - and openness - hearing public concerns and considering changes based on public input in the siting of the facility.
- The implementer may grant a regulatory/oversight role to a Tribe, state, or local government if it believes that it is appropriate to do so.

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<sup>26</sup> <https://www.directives.doe.gov/directives-documents/100-series/0144-1-border-admchg1>

## Conclusions

We strongly urge amending the existing nuclear waste legislation in the U.S. to make real progress on final disposition of spent nuclear fuel that continues to linger at current and former nuclear power plants around the country. This legislation should include the following elements:

- Establishment of a NuCorp, a nuclear reactor owner-led corporation formed to manage and dispose of the nation's spent nuclear fuel and HLW, if a mutually acceptable agreement is made by NuCorp and DOE; NuCorp will have both:
  - A Board of Directors made up mainly of nuclear reactor owners, and
  - An independent Advisory Committee that includes affected state government, affected local government and affected Tribal representatives, if any, as well as technical and social science experts to provide oversight of NuCorp's activities.
- Amendments to the existing financial arrangements in the NWPA, including:
  - Timely transfer of the assets of the Nuclear Waste Fund to NuCorp, to be held in escrow until needed;
  - Use of all monies derived from the Nuclear Waste Fund to site, construct, operate, and decommission one or more deep geologic repositories for SNF; and HLW, if NuCorp reaches a mutually acceptable agreement with DOE
  - Authorization to develop an integrated CSF facility, with priority for shutdown plants, if appropriate, as long as there is demonstrable progress on the siting of a geologic disposal repository, and there is adequate funding to do so.

It is incumbent upon us as a nation to ensure that a repository for spent nuclear fuel and high-level waste is established. The nation has benefited from the electricity and security that created the waste. Thus, it is a national imperative to responsibly dispose of the waste. Moreover, demonstrating success in dealing with nuclear waste is necessary for enabling sustainable public confidence in nuclear energy, which is a key element of America's clean and reliable energy future. As other countries are actively demonstrating, we can do this.

## A Path Forward for Nuclear Waste Committee Members

**Lake H. Barrett** is a former official of the Department of Energy who directed for a number of years the DOE program for disposal of spent fuel and high-level waste culminating in the statutory selection of the Yucca Mountain geologic repository site in 2002.

**Allison Macfarlane** is Director and Professor of the School of Public Policy and Global Affairs at the University of British Columbia. She was previously a member of the Blue Ribbon Commission on America's Nuclear Future (2010-2012) and the Chair of the Nuclear Regulatory Commission from 2012-2014.

**Kara Colton** has worked with the Energy Communities Alliance for more than 20 years, representing local elected officials and leaders in communities impacted by Department of Energy activities; coordinating with the federal government, states and Tribes on environmental management, siting and developing new nuclear projects, nuclear waste management and disposal.

**Fred Dilger** is the executive Director of The Nevada Agency for Nuclear Projects. He has been involved US nuclear waste policy at the State and local levels for 32 years.

**Rod McCullum** is an internationally recognized expert on used nuclear fuel who has 40 years of nuclear engineering, regulatory affairs, and policy experience in both government and industry.

**Timothy E. Smith** has been involved in efforts to develop a workable national policy for spent nuclear fuel and high-level waste beginning with his work on the Senate Environment and Public Works Committee during the development of the 1987 NWSA Amendments and in succeeding years as counsel for industry trade associations and as a consultant to companies involved in various aspects of the nuclear fuel cycle.

**Jack Spencer** is author of *Nuclear Revolution*, host of the Power Hour podcast, and a senior research fellow at the Heritage Foundation. Spencer has testified before Congress and the *Blue Ribbon Commission on America's Nuclear Future*, served the 2016 DOE transition team, and worked on the nuclear energy documentary, *Powering America*.

**Mary Anne Sullivan** was General Counsel of the Department of Energy from 1998 to 2001. She supported DOE's efforts to open Yucca Mountain and to commence disposal operations for transuranic waste at the Waste Isolation Pilot Plant. In her private legal career, she has represented nuclear utilities on waste issues.

**Thomas Webler** is a Senior Research Fellow at the Social and Environmental Research Institute in Massachusetts. He most recently co-led a DOE-funded research

consortium that investigated community engagement in collaboration-based siting for spent nuclear fuel and high-level wastes.

**Heather Westra** has over thirty-five years of experience working with Federally recognized Indian Tribes on a variety of environmental issues, including nuclear power plant and spent fuel storage facility licensing and tracking national policies related to the storage and disposal of spent nuclear fuel.

**Greg R. White** is the former Executive Director of the National Association of Regulatory Utility Commissioners (NARUC), and of the National Regulatory Research Institute. Greg served as a Commissioner on the Michigan Public Service Commission (2009-2015). He is recognized nationally for his work on nuclear waste policy.

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