

**Testimony of Prof. David G. Victor, Chairman of the San Onofre Community Engagement Panel, before the House Oversight and Government Reform Subcommittee on Interior, Energy and Environment**

Subcommittee Chairman Farenthold, Ranking Member Plaskett, and members of the subcommittee, including Representative Issa and Representative Gomez, thank you for the invitation to testify today about the national problem of storage and disposal of spent nuclear fuel. About 35 years ago Congress laid out a plan for long-term disposal of spent fuel from the country's nuclear reactors: the Nuclear Waste Policy Act (NWPA) of 1982. Since passage of that law, the government has consistently failed to meet key deadlines to remove spent fuel from the 99 operating commercial reactors at 59 sites around the country.<sup>1</sup> Worse, there are now 17 reactors at 14 sites in 11 states that are no longer operating—reactors, such as at San Onofre in Southern California where the spent fuel will remain stuck onsite long after the rest of the site has been shut down and removed.<sup>2</sup>

The Department of Energy has collected upwards of \$750 million annually from customers into a fund that amassed \$46 billion dollars by late 2016, the most recent audit.<sup>3</sup> These funds were intended to defray the cost of removal and long-term disposal of spent fuel. Instead, the funds sit essentially idle. A series of lawsuits has halted those payments for many utilities, and some utilities are now being paid damages from taxpayer funds to recover the cost of continued storage of their spent fuel beyond the time when it was supposed to be accepted by the government.

For many years, this persistent failure to perform was, outside the nuclear utility industry, largely unnoticed. Nearly all reactors that were built kept operating. Unable to ship spent fuel to a permanent repository they left it on site—in pools and in dry cask storage.

The situation today is completely different. While most of the US nuclear fleet continues to operate, a growing number of reactors are in the midst of decommissioning. For these sites, the inability to remove spent fuel is particularly deplorable. Local communities have seen most of the jobs associated with these reactors, along with many other benefits, disappear. They are watching massive deconstruction projects remove reactors domes, buildings and other facilities. Yet they are still left with the spent nuclear fuel onsite, without a proper home and without any indications as to when it will eventually be removed. Some solutions to this problem are coming into focus, but they require changes to federal law as well as new investments where Congress and the Administration must work together.

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<sup>1</sup> Kim Cawley, "Testimony: The Federal Government's Responsibilities and Liabilities Under the Nuclear Waste Policy Act," Before the Subcommittee on Environment and the Economy, Committee on Energy and Commerce, U.S. House of Representatives (3 December 2015).

<sup>2</sup> For detail see generally NUREG 1350. <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>

<sup>3</sup> Office of the Inspector General, DOE, "Audit Report," OAI-FS-17-04 (December 2016).

I testify today as Chairman of the San Onofre Nuclear Generating Station (SONGS) Community Engagement Panel (CEP). SONGS Units 2 and 3 are the largest commercial reactors slated for decommissioning in the country, and the political environment around the plant is more intense than almost anywhere in the country. I serve in that role as a volunteer. I am also a Professor at the School of Global Policy and Strategy (GPS) at UC San Diego where I am also an adjunct professor in Climate, Atmospheric Sciences and Physical Oceanography at the Scripps Institution of Oceanography.

Back in 2013 when the operator of the plant, Southern California Edison (SCE) decided to decommission the facility it also set up this panel to open a two-way conduit between SCE (and its co-owners, San Diego Gas and Electric, the City of Anaheim and the City of Riverside) and the communities that would be affected by the decommissioning process. Over the last three years the CEP has provided exactly that function. It has offered ways for SCE to learn about the concerns of the communities—for example; the impact of shrinking the SONGS emergency planning systems, now that the plant poses a lower hazard to the community, on the budgets of first responders, hospitals and other essential public services. It also offers a way for SCE to help inform the communities about how decommissioning will unfold; the economic and environmental impacts, and the various strategies being adopted to mitigate adverse impacts. We meet quarterly and have 17 members (with one vacancy)—all volunteers, drawn from the local communities and a blend of public officials, representatives from environmental NGOs, business, labor, and other stakeholders. We are not a formal decision-making body nor do we have official oversight functions—there are plenty of other bodies with those powers and responsibilities.<sup>4</sup> I speak today as a private citizen who happens to be Chairman of the CEP, and I reflect on what we have learned over the three years of CEP operation.

Without a doubt, one topic has attracted the most attention at our CEP meetings and in the local communities: spent fuel. As in any community, there are many different views about a technology like nuclear power. With the closure of SONGS, I thought, that many of those diverging viewpoints would become moot and the communities could come together and focus on the best plan for decommissioning. Instead, many people have been shocked to learn that decommissioning of the plant does not mean removal of everything—the spent fuel remains because there is no place to send it. By not offering a practical place and method to ship spent fuel the Federal government has, through inaction, created a whole new array of acrimonious debates and controversy within local communities about how best to steward the spent fuel. I have observed and been in the middle of those debates for three years and the rest of my testimony outlines what I have seen and learned.

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<sup>4</sup> For more, including documents and video from every meeting, see [www.songscommunity.com](http://www.songscommunity.com)

## The importance of moving the fuel out of local communities at decommissioned sites.

First, I can't emphasize enough the importance of offering practical ways for decommissioned sites to move spent fuel out of their communities to other, more appropriate locations. Offering a practical route to that outcome would be enormously valuable to our communities. That route could involve finishing Yucca Mountain and allowing consolidated interim storage (CIS), also known as interim storage facilities (ISF), and I'll talk about that next. But people are most looking for is a viable plan that addresses an urgent problem—a problem that is not so pressing in communities with operating reactors but is vitally important to those where reactors are undergoing decommissioning and will have stranded spent nuclear fuel left with reduced security at the decommissioning site.

We are particularly concerned that the current arrangements at the Department of Energy (DOE) are opaque about which spent fuels will ship first. This problem has not been important to solve over the last few decades because there was no place to ship. Today that might be different and I would urge Congress to help DOE develop a more coherent set of priorities. The current "standard contract" for fuel shipments, while ambiguous, suggests that the oldest fuel will ship first. That approach will create an inefficient and incoherent shipment pattern—with canisters moved across a patchwork of sites, and no site happy with the outcome. We should put the decommissioned sites first because those sites are no longer generating spent fuel, in most cases are removing reactors and support buildings, and gain much smaller economic benefit from hosting these facilities. By contrast, sites with operating reactors will always have spent fuel in their reactor cores, fuel pools and dry cask pads. For all these communities, it is important to have a viable long-term plan for spent fuel removal; for decommissioned sites the imperative is particularly compelling.

## Political Realism

We in the San Onofre communities have learned that the politics of finding solutions to this problem are difficult. For years, Yucca Mountain has been a political lightning rod in ways that have made it exceptionally difficult—at times, impossible—to move forward with that site. The prospect of Consolidated Interim Storage might prove politically more tractable because, when combined with consent-based siting, it allows communities to nominate themselves to become storage sites. Following the guidance of the bipartisan Blue Ribbon Commission (BRC) report, we are encouraged that a process of informed consent has emerged and led to two communities volunteering themselves for CIS facilities. Today, my sense is that one of those sites is viable and that it enjoys healthy support from much of the local communities. The other site is owned by a company that paused its licensing process due to a planned acquisition which most likely will leave their CIS operations by the wayside. The viable site is in New Mexico where the governor of New Mexico has given approval for this CIS facility. The local entity that owns the land Eddy-Lea Energy Alliance (ELEA) wants the facility that is set to monitor at least 10,000 dry storage canisters in partnership with Holtec International. The ELEA is composed of cities of Carlsbad and Hobbs and the counties of Eddy and Lea. The community purchased the 1000 acres and has strong local support for the CIS facility. This is the model we must continue

to pursue of the government working with communities to find volunteers who want to help deal with the national crisis of stranded spent nuclear fuel around the country. Earlier this year we hosted officials from ELEA at a CEP meeting, and I was impressed by the level of planning and awareness.

In the densely populated communities around San Onofre, our interest is to advance any responsible program that moves the spent fuel out of our neighborhoods as quickly as possible. For us, that means Yucca and CIS simultaneously. Over the last three years, we have learned three important things about how to pursue this goal.

First, the nation does not benefit from monopolies. To some degree, the problems at Yucca Mountain are the result of the country having just one option. As that option has faltered the whole nation's industry, along with communities around nuclear power plants, have suffered. The original plan, way back when the NWPA was signed into law, was to have two sites. Expedience in public sector spending and noxious politics whittled that roster down to one, and that outcome has been harmful. I am very concerned that the same will happen with CIS. Overall, the nation and the communities that are hosting spent nuclear fuel would benefit from having many options.

Second, and equally important, it is crucial that CIS be viewed as a complement to Yucca Mountain (and to other means of permanent spent fuel disposal—for example, deep borehole technology). I appreciate that over the last year that much of the newfound enthusiasm for acting on spent fuel is rooted in a desire to restart Yucca Mountain. But any realistic scenario for Yucca must deal with the reality that Yucca is still a long time coming. The site is not operational. Once operational, fuel will need repackaging so that casks with large numbers of fuel assemblies are put into smaller units with fewer assemblies and lower heat loads. All that will take time.

For the communities around San Onofre, those realistic delays in starting Yucca create the imperative for CIS. We want the spent fuel moved. For the nation as a whole, those delays offer an important logic for CIS: safety and saving money. It is much wiser to store spent fuel at a small number of large sites, far from population centers, than dozens of sites scattered around the country. Scientists at Oak Ridge National Laboratory have estimated the cost savings from a robust CIS program and found that we could avoid \$15-30b in expenditure in light of expected delays in reopening Yucca Mountain.<sup>5</sup> Fiscal prudence demands that CIS be part of the overall strategy.

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<sup>5</sup> For an overview see J. Jarrell "Does Consolidated Interim Storage Make Sense in an Integrated Waste Management System?" Oak Ridge National Laboratory, NEI Used Fuel Management Conference, May 2017, Savannah, GA. Numbers here are undiscounted. For discounting and sensitivity analysis see: Cost Sensitivity Analysis for Consolidated Interim Storage of Spent Fuel: Evaluating the Effect of Economic Environment Parameters (Cumberland et al., FCRD-NFST-2016-000721, Rev. 1 ORNL/SR-2016/681) Available at <https://curie.ornl.gov/content/cost-sensitivity-analysis-consolidated-interim-storage-spent-fuel-evaluating-effect-economic>

Third, the political coalitions around nuclear power are in flux when it comes to spent fuel. There is a well-known debate about the role of nuclear power in the nation's future energy mix, and active industry efforts to improve performance to keep as many of the existing fleet operational. There are also well-known battle lines drawn for and against nuclear power. What has impressed me about spent fuel is that those battle lines have shifted. Many groups that have been skeptical or outright against operational nuclear plants—such as the Natural Resources Defense Council and the Union of Concerned Scientists—are aligned in favor of finding smart strategies for storing spent fuel, including CIS. It is really important that the larger, heated and probably irreconcilable differences about operational reactors not cloud the fact that many more communities are coming together to find solutions to storing spent fuel.

For Congress, these three lessons suggest that the current efforts—far advanced in the House and still developing in the Senate—to amend the NWPA are profoundly important. As those efforts proceed it is important that the Yucca mission, which has attracted more attention and political energy, not leave CIS aside.

#### Toward a Long-term Strategy: the Roles of Stewardship and Transportation

Compared with three years ago, there has been striking progress, especially in the House, toward new legislation that would address many of the obstacles to restarting Yucca and also authorizing a new program of consolidated storage. While that is admirable, we also need to grapple with the consequences of a long delay in arriving at this point. It is also crucial to grapple with the fact that most people outside Washington are skeptical that Washington can organize and motivate itself to make practical changes in law and back those with reasonable appropriations. What I have seen in the local communities around San Onofre is concern that Washington is so broken that reasonable bipartisan legislation, such as smart amendments to the NWPA, can't survive the legislative process.

This skepticism has three practical implications. First, while there are some actions that DOE or NRC can do to advance consolidated storage and promote smart stewardship of the nation's spent nuclear fuel, the most important actions require a change in federal law. Getting House (HR 3053) and Senate versions into conference is essential, lest Congress itself be seen as a central obstacle to progress in what has been, so far, largely an Executive Branch failure to deliver on promises made to the American people—especially the people living within the foot prints of nuclear reactors. I have testified at the NRC about their efforts to streamline the regulatory process, which are admirable.<sup>6</sup> But the reality is that the NRC is already doing what it can; even without streamlining of the regulatory process for decommissioned sites those sites

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<sup>6</sup> 2014. David G. Victor. Decommissioning at San Onofre: The Community Engagement Experience. Testimony to the Nuclear Regulatory Committee. For more information see <https://www.nrc.gov/reading-rm/doc-collections/commission/slides/2014/20140715/victor-20140715.pdf>

are finding ways to cope with NRC procedures through exemptions. What everyone is waiting for is enabling federal law.

Second, because of these delays—and skepticism about when they will be resolved—the nation’s nuclear sites are now gearing up to monitor and manage spent nuclear fuel casks in ways that were never intended. The original plan was that spent fuel would be removed from reactor cores, cooled in pools onsite, and then put into canisters and casks for brief local storage and expeditious removal. Because that last step in the chain has never happened, the canisters and cask systems are now aging in place. At the urging of the CEP, SCE has developed an extensive program for monitoring the casks and inspecting the canisters while they are on site.<sup>7</sup> Recent legal challenges and settlements have reinforced that effort.<sup>8</sup> We are fortunate in that other sites built dry cask systems before SONGS and we can learn from their aging management programs. To give you a sense of just how long the delays have extended, as of today several sites have seen the original 20 year NRC license for on-site dry cask storage run its course, with each getting a 40-year renewal. At the most recent CEP meeting we devoted the entire session to this topic.<sup>9</sup>

Third is transportation. There is an understandable tendency in Washington to do what can be done. This tendency has generated legislation that focuses on Yucca Mountain and brings CIS along. But we must focus, now, on the reality that all of these strategies will not work unless there are viable ways to move spent fuel from reactor sites to CIS and/or permanent repositories. The US Navy safely ships defense spent nuclear fuel and related materials around the country on a regular basis—thousands of shipments—using an effective and credible government planning system and emergency training for its routes. This system must be available to the DOE as it takes authority over spent nuclear fuel transportation. The NRC has procedures ready for use in this area (NUREG 0725). Safe transportation of spent commercial reactor fuel is not a technical problem, but it is one that needs careful administrative planning and political awareness.

A serious transportation plan would have several elements:

- A program for testing and building railroad cars for moving spent fuel casks. This is a DOE responsibility, and with current appropriations DOE will test a prototype rail car (along with other support cars) over the next 2 years. That’s good news, but there are

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<sup>7</sup> 2014. David G. Victor. Safety of long-term storage of spent nuclear fuels at SONGS. Report of the Chairman of the Community Engagement Panel of the SONGS. For more information see [https://www.songscommunity.com/docs/LongTermStorageofSpentFuel\\_120914.pdf](https://www.songscommunity.com/docs/LongTermStorageofSpentFuel_120914.pdf)

<sup>8</sup> 2017. Citizens Oversight, Inc. V. Southern California Edison. For more information see [https://www.songscommunity.com/doc\\_library\\_settlement.asp](https://www.songscommunity.com/doc_library_settlement.asp)

<sup>9</sup> 2017. 3Q Meeting of the Community Engagement Panel. Oceanside, California. For more information see <http://www.songscommunity.com/091417CEPMeetingAgenda.pdf>

no appropriations to build a fleet of these cars as will be needed to move spent fuel expeditiously. Elsewhere I have outlined the state of play and costs, which are small.<sup>10</sup>

- The states and regions must get ready. When DOE was planning to move waste from the nuclear weapons sites—such as in Colorado and Washington—state and regional officials got organized to help plan routes, safety and procedures. The states where these sites were shipping nuclear materials had an incentive to make this work because they wanted the sites cleaned up. By contrast, very little to none of the necessary spadework for local, state and regional planning of spent fuel shipments has been done. There is legislation in California that would help.<sup>11</sup> The CEP has reached out to the California Energy Commission on this topic.<sup>12</sup> And the Western Governors Association could easily be tapped—as could regional state associations in other parts of the country. The problem is that nobody has believed that serious solutions for spent nuclear fuel would be forthcoming. Now that they are, the transportation planning processes must gear up—with a key role for the Federal government.

All the authority needed to fix this problem does not rest with Congress but many are looking to Congress for leadership and initiative in getting the process started. A good start would be to ensure that a title on transportation is included in NWPA Amendments (inserted, presumably, in Conference), appropriations to build the needed railcar system are included in a timely way (probably starting next fiscal year), and the states are encouraged if not mandated to get organized. Under plausible yet optimistic scenarios, CIS facilities could be open in the early 2020s. Spent fuel at SONGS (and many other sites) would be ready for shipment then. It would be a pity if all the work done to open storage and permanent disposal facilities falters for lack of attention to transportation.

### Final Words

In a large and diverse nation such as ours, there always seems to be a more pressing and urgent matter that captures political attention. Meanwhile, critical questions about the nuclear industry and its infrastructure remain unanswered for decades while leaving un-spent billions of dollars. Inaction has pushing these questions to future generations to answer.

These delays only succeed in creating distrust in the ability of government to find a workable solution, anger towards the plant operators and creates an impossible future for those communities that involuntarily host these sites. All we ask is that those who can act and make a difference, do so with all possible urgency.

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<sup>10</sup> David Victor, Tim Brown and Dan Stetson, “Participants in 12 June telephone call with DOE to discuss transportation of spent nuclear fuel,” 26 June 2017, see [www.songscommunity.com](http://www.songscommunity.com)

<sup>11</sup> 2017. Nuclear Waste Policy Amendments Act of 2017. For more information see <https://www.congress.gov/bill/115th-congress/house-bill/3053>

<sup>12</sup> Letter from David Victor, Tim Brown and Dan Stetson to Robert Weisenmiller, Chairman of the California Energy Commission, 12 December 2016. see [www.songscommunity.com](http://www.songscommunity.com)

A plan for smart removal of spent nuclear fuel from the nation's commercial reactors is now coming into focus. It will require new legislation and a new focus by the federal government, as well as the states and regional planning authorities.

I see three steps as essential. First, the political deal must be done that allows for consolidated interim storage, and that deal as far as I can tell centrally requires restarting the Yucca Mountain process. Yucca and CIS should be seen as complements to each other. Politically they are combined; economically and technically they are also combined because interim storage allows for a more rational long-term strategy that includes opening a permanent storage facility. Second, a fresh look at the priorities for removing spent fuel is needed. When options for sending the fuel become viable there will be much more fuel ready to move than the system can handle. We think decommissioned sites should be high in the queue. Third, a viable strategy for transportation is needed—a topic that has been orphaned by the lack of suitable places to send the fuel. Transportation requires some funds (small, mainly for rail cars and planning) and crucially that federal, state and other officials begin working together on strategies.