Union of Concerned Scientists

Citizens and Scientists for Environmental Solutions

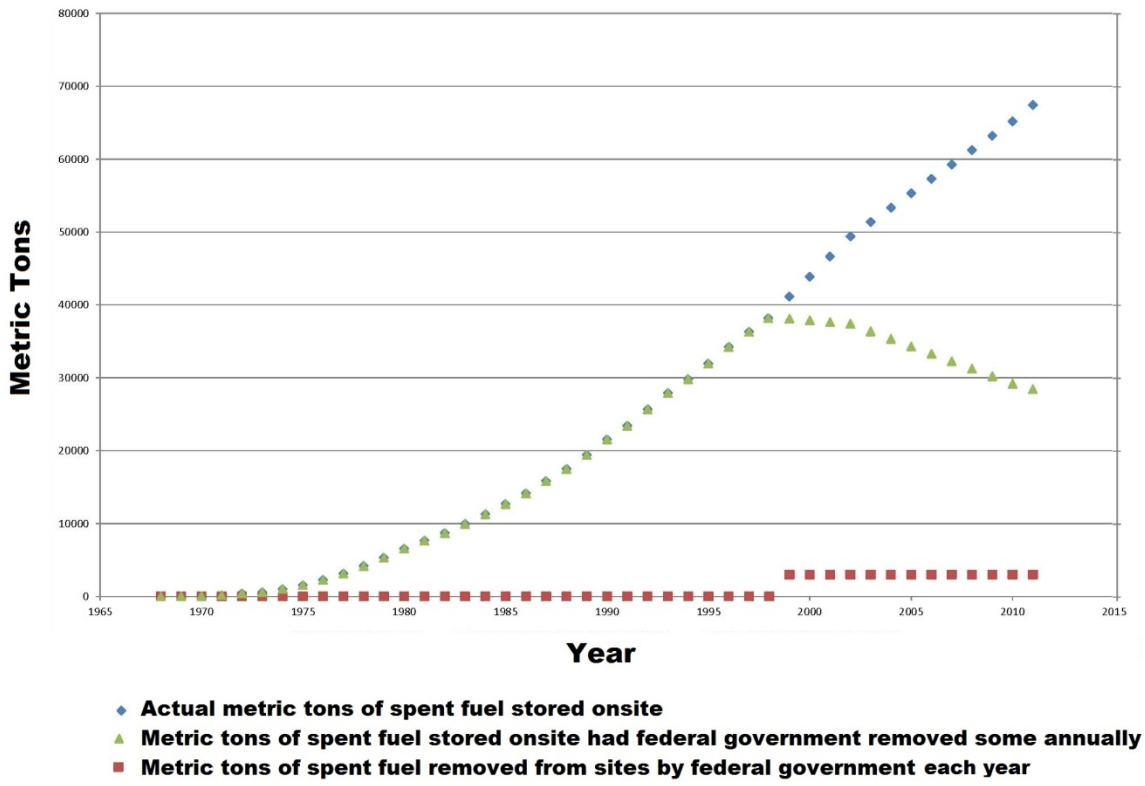
Statement of David Lochbaum Director, Nuclear Safety Project Before the Senate Committee on Energy and Natural Resources

On behalf of the Union of Concerned Scientists, I thank Chairman Wyden, Ranking Member Murkowski, Senator Feinstein, Senator Alexander, and all members of the Energy and Natural Resources committee for this opportunity to provide our views on S.1240, the Nuclear Waste Administration Act of 2013.

S.1240 seeks to remedy problems resulting from the Nuclear Waste Policy Act of 1982 not attaining its specified outcome; namely, a geological repository for spent fuel from civilian nuclear plants operated by the federal government and accepting waste by January 31, 1998.

Had the Nuclear Waste Policy Act (NWPA) been implemented as enacted, the federal government would have begun accepting spent fuel in 1998. The nominal 3,000 metric tons per year transfer rate from plant sites to the federal repository exceeded the rate at which spent fuel was being generated. Thus, the amount of spent fuel stored at plant sites around the country would have peaked in 1998 at around 38,000 metric tons and steadily declined thereafter as shown in Figure 1.

Figure 1: Onsite Spent Fuel Storage Had NWPA Been Met and Because It Was Not Met



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The delay in opening the federal repository meant that spent fuel continued to accumulate at the plant sites. By year end 2011, over 67,000 metric tons remained at plant sites while 0 ounces resided in a federal repository under the NWPA.

The departure from the NWPA plan forced nuclear plant owners to pay for expanded onsite spent fuel storage capacity (e.g., replacing original low-density storage racks in spent fuel pools with high-density racks and building onsite dry storage facilities to supplement storage in wet pools). Plant owners have sued the federal government for recovery of costs they incurred for storing spent fuel at their sites that should have been in a federal repository under the NWPA. The U.S Government Accountability Office reported that these lawsuits cost American taxpayers $1.6 billion with an estimated $19.1 billion of additional liability through 2020.[1]

There was another consequence from expanded onsite spent fuel storage. Spent fuel pools initially designed to hold slightly over one reactor core's inventory of irradiated fuel now hold up to nearly 9 reactor cores of irradiated fuel. Unlike the reactor cores, the spent fuel pools are not protected by redundant emergency makeup and cooling systems and or housed within robust containment structures having reinforced concrete walls several feet thick. Thus, large amounts of radioactive material – which under the NWPA should be stored within a federal repository designed to safely and securely isolate it from the environment for at least 10,000 years – instead remains at the reactor sites.

There is no easy solution to this situation. UCS applauds this committee for trying to end the status quo. Unfortunately, it is not a task of picking the best among an array of suitable options. It is the more unpleasant chore of picking the lesser of many evils. UCS wants to make it clear that sustaining the status quo is one of the evil options. Under the status quo, costs and risks of onsite spent fuel storage will continue to increase unnecessarily.

UCS wants to see the status quo ended by reducing the inventories of irradiated fuel in spent fuel pools. We strongly advocate accelerating the transfer of irradiated fuel from spent fuel pools to dry storage. In our view, currently available and used dry storage technologies can be used to substantially reduce the inventory of irradiated fuel in spent fuel pools, with a goal of limiting it to the equivalent of one or two reactor cores per pool.

Figure 1 contrasts the actual amount of spent fuel stored at nuclear plants sites with the amount that would have been there had the NWPA been implemented as intended. The green triangles represent onsite spent fuel storage amounts steadily declining from a peak of about 38,000 metric tons in 1998 as fuel gets transported to the federal repository at a rate of 3,000 metric tons per year (the red squares). The blue diamonds show the amounts instead climbing to over 67,000 metric tons.

The lawsuits brought by nuclear plant owners and the financial portions of S.1420 address the cost implications of the failure of the federal government to accept spent fuel under the NWPA. This is fair and reasonable because the plant owners have incurred costs they would not have encountered had the federal government fulfilled its obligations under the NWPA.

[1] U.S. Government Accountability Office, "Spent Nuclear Fuel: Accumulating Quantities at Commercial Reactors Present Storage and Other Challenges," GAO-12-797, August 2012.

But fairness also dictates that the other primary consequence from the federal government's failure also be rectified. Had the federal government met its obligations under the NWPA, spent fuel pools would not contain up to 9 reactor core's worth of irradiated fuel. More fuel in the pools means a greater risk to the surrounding public if there is a problem with the pools that releases radioactivity. If lawsuits and legislation address the financial repercussions caused by the performance gap identified in Figure 1, then it is only fair and reasonable that this legislation also address the associated safety and security implications. They are inseparable in reality and must also be inseparable in law. If the Congress approves and sends to the president a nuclear waste bill that fails to address this serious risk and inequity, it will have failed the American public in a major way.

Accelerating the transfer of irradiated fuel from spent fuel pools to onsite dry storage reduces the overall safety and security threat profile of the plant as shown in Figure 2. The columns labeled High Density (1x4) reflect the current situation. The columns labeled Low Density reflect the situation if irradiated fuel transfer into dry storage is expedited. The risk reduction is undeniable: the contaminated land area is reduced from 9,400 square miles to 170 square miles and the number of people displaced from their communities for a long time drops from 4,100,000 to 81,000. Dry storage is not absolutely or inherently safe and secure; if so, the federal government's repository problems would be solved. But dry storage provides significantly better management of the onsite spent fuel storage risks.

Figure 2: Results from Table 33 of NRC's June 2013 Draft Spent Fuel Pool Study

Status Quo — Expedited Dry Storage

SFP Fuel Loading	High Density (1x4)		Low Density	
Seismic Hazard Frequency[1] (/yr) (PGA of 0.5 to 1.0g)	1.7E-05		1.7E-05	
50.54(hh)(2) Mitigation Credited	Yes	No	Yes	No
Conditional[2] Probability of Release	0.036%	0.69%	0.036%	0.69%
Hydrogen Combustion Event	"Not Predicted"	"Possible"	"Not Predicted"	"Not Predicted"
Conditional[3] Consequences (Release Frequency-Averaged[4])				
Cumulative Cs-137 Release at 72 hours (MCi)	0.26	8.8[(8)]	0.19[(7)]	0.11
	Measures Related to Health and Safety of Individuals			
Individual Early Fatality Risk	0	0	0	0
Individual Latent Cancer Fatality Risk[5] Within 10 Miles	3.4E-04	4.4E-04	3.4E-04	2.0E-04
	Measures Related to Cost Benefit Analysis			
Collective Dose (Person-Sv)	47k	350k	47k	27k
Land Interdiction[6] (mi^2)	230	9,400	230	170
Long-term Displaced Individuals[6]	120k	4,100k	120k	81k

Risk Reduction Too Significant to Ignore

The Nuclear Regulatory Commission's (NRC's) actions illustrate this point. After the tragic events of 9/11, the NRC issued orders to upgrade security measures for nuclear facilities. On February 25, 2002, the NRC issued orders to upgrade security for operating nuclear reactors. On May 23, 2002, the NRC issued orders to upgrade security for spent fuel pools. And on October 16, 2002, the NRC issued orders to upgrade dry storage security. The NRC properly triaged the hazards, tackling the highest first and the lowest last.

After the tragic events at Fukushima, the NRC instructed its nuclear plant inspectors to look at capabilities for cooling the reactor core and spent fuel pool in event of a beyond design basis challenge like that faced in Japan. The NRC quite properly did not instruct its inspectors to waste resources examining the low hazard posed by onsite dry storage.

In March 2012, the NRC ordered plant owners to implement an array of measures intended to better protect irradiated fuel in reactor cores and spent fuel pools from damage. The NRC did not require owners to take any additional measures to better protect irradiated fuel in dry storage from damage. This low hazard was already adequately protected.

Because the federal government failed to meet its obligations under the NWPA, spent fuel pools contain much more irradiated fuel and are essentially loaded guns aimed at neighboring communities. The scope of S.1420 must include removing some of these bullets.

We urge the Congress to accelerate the transfer of irradiated fuel from spent fuel pools to dry storage. This does not introduce an additional step in the road to a repository since spent fuel must be moved from pools to dry casks in order to be transported; it merely entails taking necessary steps on that path sooner rather than later.