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300-year SNF disposal solution
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September 22, 2009

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC AND SAFETY LICENSING BOARD

In the Matter of	)	MOTION
	)	
U.S. DEPARTMENT OF ENERGY	)	Docket No. 63-001-HLW
License Applicant Appellant	)	
v.	)	(High-Level Waste Repository)
	)	license application speculation
U.S. NUCLEAR REGULATORY	)	
COMMISSION, Licensor Appellee	)	Before the A&SL Board
	)	
& v.	)	ASLBP Nos. 09-876-HLW-CAB01
	)	09-877-HLW-CAB02
William D Peterson, 300-year spent nuclear	)	9-878-HLW-CAB03
fuel permanent disposal solution	)	09-892-HLW-CAB04
Third Party License Applicant Appellant	)	

MOTION

Extending on-site storage of spent nuclear fuel (SNF) is like plowing money into the economy before understanding what is wrong and having a plan in place to fix it. We are fueling our problems. Energy and the dollar are in trouble, and the situations are related. Peterson's "Operations Research" model of the U.S. economy teaches that the U.S. must produce as much as it consumes, i.e. that international "trade" must balance. Our deficit is a consequence of our imbalance of trade. Import of oil is our single largest deficit item.

The U.S. needs 1,150 new nuclear power plants making electricity / hydrogen as soon as possible. Until the transition the U.S. economy will get to be very uncomfortable. So we are in double trouble. The World's demand for oil is rising fast while supplies are running out. The U.S. has reached a deficit limit, as it can no longer borrow to cover its imbalance of trade. Our creditors are now coming in and taking our spoils as we crash.

Not processing SNF and geologically burying it is throwing away 97% of our nuclear fuel resource. It does not make sense. Burying SNF for a million years is not

realistic. Our new 300-year SNF disposal solution consisting of reprocessing, some real time storage, and using the transuranics for fuel is a real solution in comprehendible time. So things can be fixed by making nuclear-hydrogen for fuel and bringing U.S. manufacturing back. We can supply our own needs without deficit. We would not need another Yucca Mountain for hundreds of years.

Amid all the crises, there is the dependence on foreign oil, which drains huge amounts from our economy, and which enriches many countries that dislike us. So our addiction to oil is financing terrorism against us. Politicians pledge to stop this, and have been gently promoting nuclear energy, which is clean and cheaper than coal energy, and doesn't kill 30,000 U.S. citizens per year with coal smoke, or harm anyone with pollution or radiation. Yucca Mountain has been put on hold by Sen. Harry Reid (D, Nevada), although it will still be needed for military waste from weapons production. But there is a far better way to handle spent nuclear fuel which our U.S. congressional leaders should be made aware of: see this below.

Introduction to 300-Year permanent disposal of Spent Nuclear Fuel*

The 300-year method of disposing of high level waste from commercial or military spent nuclear fuel (SNF) can handle more than the projected capacity of Yucca Mountain (YM) exceeding it significantly on a single site. To make this clear, a brief outline of the 300-year method is given, along with a basic outline of the design.

The 300-year method initially involves canisters of SNF lowered into concrete silos surrounded by gravel fill and capped with massive lids. The base of each silo would be connected to a tunnel which supplies fresh air, used for passive convection of heat from each canister upward and out around the massive lid. The gravel fill and lid provide adequate shielding while the SNF is new, and more than adequate shielding as the SNF activity decays with age.

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*Two patents have been issued and there is one Patent Pending,

Operation with 5-9s SNF reprocessing

At some convenient time the SNF would be reprocessed into three streams. The fission waste would have 99.999% (5-9s) of the transuranics removed, leaving isotopes of half lives 30 years or under with less than 100 nCi TRU/g contamination. This "purified fission waste" could be stored in silos for 300 years (10 half lives), becoming low level waste class C, and continued in storage in place for another required 500 years to become low level class A (harmless). The removed transuranics could be completely burned for energy in a fast neutron reactor. The remaining uranium could be warehoused for future use as fuel. Thus by 300 years the high level fission waste would be decayed, while the transuranics would largely be used up, and the remaining uranium would be harmless in storage.

The purified fission waste could be vitrified or similarly immobilized and put into canister shapes, to be stored in the same facility until the 300 years plus 500 years were passed.

With 5-9s reprocessing, almost nothing remains which would ordinarily be put into YM. The exception may be Tc-99 and I-129, isotopes with long half lives of 213 thousand years and 15.7 million years respectively. They would be separated out during reprocessing. While they could be disposed of in YM or equivalent as low heat generators, there is also a possibility that they could be transmuted in a fast neutron reactor. Even storing tiny amounts of these isotopes along with the military waste, it is likely that YM would have capacity for many centuries.

The overall benefits to YM purposes are very impressive. The nation seems to be moving toward 5-9s reprocessing. Nuclear chemists at Argonne and Idaho National Laboratory have demonstrated their techniques on commercial and Navy samples of SNF. In addition, there is a Global Nuclear Energy Partnership (GNEP) in which the U.S. has agreed to take SNF from 21 nations. We will need site(s) to store SNF, which YM is not prepared to provide before 2020.

Improving the capacity compared to YM would only be a small part of the benefits for YM purposes. In light of the coming nuclear expansion, the difficulty and

cost of additional YM-type facilities (that would thus not be required under the 300-year plan) raises the savings to $60 billion many times over, decade after decade. The difficulty and cost would also increase dramatically with each new YM, considering that the present YM site is an optimum for many reasons. Indeed, if the present YM-type plan remained the only plan, the difficulty would increase so much as to eventually stop the growth of the nuclear industry in the U.S. altogether, and stop U.S. leadership in the world nuclear industry.

Radiation to the environment and inhabitants

While the SNF and purified fission waste are stored in the concrete silos, there is no public access, so no radiation to the public. For workers, there would be no exposure except possibly at the lids and underground air tunnels. The concrete lids could be twice as thick as the walls of the NRC-approved HOLTEC casks (those walls are 27 inches of concrete plus 3 inches of steel), making the radiation minuscule. After 300 years out of the reactor the separated SNF fission products would be low-level waste, class C, and continue to decay for a required 500 more years isolation from human intrusion. Thereafter public access would be permitted, except for the massive lids which would prevent access to the now low-level waste, class A.

Beyond the 800-year point, radiation levels would continue to decline, making compliance to 10,000-year and 1,000,000-year levels trivial. Thus all the high level waste of SNF from a given reactor operation would be permanently disposed of and not a problem to any future generation.

Engineers would determine SNF storage locations per EPA & NRC Approvals

While this disposal could be safely done near a city, the public would be much more comfortable if it were done in a remote desert location with railroad access, such as could be found in any of several states. In fact a square mile of such land could store more SNF than was designed for YM. The significant benefits of the 300-year plan with reprocessing are elimination of the need for disposal beyond 1000 years and not having to emplace the SNF wastes a half-mile underground.

It would be difficult to imagine a more significant positive impact on the functioning, economy, and ease of accomplishing the YM purpose. It is a much easier method of meeting the radiation safety goals.

Extending plant site storage of SNF would further discourage the nuclear power industries and not contribute to a needed final disposal solution. More importantly, this would only prolong solving both our nation's fuel and economy problems, which should not be put off. Peterson moves that the Atomic Safety and Licensing Board find that building four or five 300-year type SNF storage facilities would immediately fix the SNF problem for the utilities, could be built sooner and cost less than the cost of finishing YM, and give the U.S. time to scale up the 5-9s process. And so for now the need for Yucca Mountains is uncertain, and consideration needs to be given to reasonable alternatives, such as the 300-year spent nuclear disposal solution.

In a July 9, 2004 ORDER of the United States Court of Appeals FOR THE DISTRICT OF COLUMBIA CIRCUIT, in NEI v EPA, in Case No. 01-1258 the court indicated that the Congress has given the U.S. EPA the responsibility and authority to do what is required maintain its standards for disposition of SNF.

By this pleading appellant Peterson MOTIONS TO COMPEL for the NRC staff for production of documents asserted as privileged by NRC Staff. Under 10 C.F.R. Part 2, Subpart J, the participants in this proceeding must make "documentary material" in their possession available on the LSN. The term "documentary material," as defined in 10 C.F.R. § 2.1001.

Dated this Tuesday, September 22, 2009.

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300-year SNF permanent disposal solution

Note: The composition of this Document was in part prepared by and is approved by physicist Dr. Steven Barrowes, KY, and physical chemist Dr. Jerry Christian, ID. As well as engineer Peterson. Technical questions can be put to Dr. Barrowes at Tel 270-351-8772, or Email barrowescb@juno.com and Dr. Christian at Tel 208-522-6793, or Email physicalchemist@msm.com . Copies of the questions and Peterson and his scientists' answers would be emailed by Peterson to all the parties.