

## Rulemaking1CEm Resource

---

**From:** RulemakingComments Resource  
**Sent:** Tuesday, October 29, 2013 2:47 PM  
**To:** Rulemaking1CEm Resource  
**Subject:** FW: Docket ID No. NRC-2012-0246  
**Attachments:** Waste\_Confidence\_comment\_10\_28\_13.doc

**DOCKETED BY USNRC—OFFICE OF THE SECRETARY  
SECY-067**

**PR#:** PR-51

**FRN#:** 78FR56775

**NRC DOCKET#:** NRC-2012-0246

**SECY DOCKET DATE:** 10/29/13

**TITLE:** Waste Confidence—Continued Storage of Spent Nuclear Fuel

**COMMENT#:** 00082

---

**From:** Sally Shaw [<mailto:acer8sac@comcast.net>]

**Sent:** Tuesday, October 29, 2013 1:45 PM

**To:** RulemakingComments Resource

**Subject:** Docket ID No. NRC-2012-0246

Docket ID No. NRC-2012-0246

Please read and carefully consider my comments on the Waste Confidence GEIS, attached below, Thanks. Sally Shaw

**Hearing Identifier:** Secy\_RuleMaking\_comments\_Public  
**Email Number:** 91

**Mail Envelope Properties** (377CB97DD54F0F4FAAC7E9FD88BCA6D00124D66C4A60)

**Subject:** FW: Docket ID No. NRC-2012-0246  
**Sent Date:** 10/29/2013 2:46:50 PM  
**Received Date:** 10/29/2013 2:46:51 PM  
**From:** RulemakingComments Resource

**Created By:** RulemakingComments.Resource@nrc.gov

**Recipients:**  
"Rulemaking1CEM Resource" <Rulemaking1CEM.Resource@nrc.gov>  
Tracking Status: None

**Post Office:** HQCLSTR01.nrc.gov

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	564	10/29/2013 2:46:51 PM
Waste_Confidence_comment_10_28_13.doc		72442

**Options**  
**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

## “Waste Confidence” GEIS Public Comment

Oct 28, 2013

Sally Shaw, Gill, MA

In June of 2012, The US Court of Appeals, DC Circuit, found that the NRC’s “Waste Confidence Rule” was deficient. The Court stated that

“The rulemaking at issue here constitutes a major federal action necessitating either an environmental impact statement or a finding of no significant environmental impact. We further hold that the Commission’s evaluation of the risks of spent nuclear fuel is deficient in two ways: First, in concluding that permanent storage will be available “when necessary,” **the Commission did not calculate the environmental effects of failing to secure permanent storage—a possibility that cannot be ignored.** Second, in determining that spent fuel can safely be stored on site at nuclear plants for sixty years after the expiration of a plant’s license, the Commission failed to properly examine future dangers and key consequences. For these reasons, we grant the petitions for review, vacate the Commission’s orders, and remand for further proceedings. “

The Court, in its background comments, stated

“Even though it is no longer useful for nuclear power, SNF poses a dangerous, long-term health and environmental risk. It will remain dangerous “for time spans seemingly beyond human comprehension.” *Nuclear Energy Inst., Inc. v. Env’tl. Prot. Agency*, 373 F.3d 1251, 1258 (D.C. Cir. 2004) (per curiam). Determining how to dispose of the growing volume of SNF, which may reach 150,000 metric tons by the year 2050, is a serious problem. See *Blue Ribbon Commission*, supra, at 14. **Yet despite years of “blue ribbon” commissions, congressional hearings, agency reports, and site investigations, the United States has not yet developed a permanent solution. That failure, declared the most recent “blue ribbon” panel, is the “central flaw of the U.S. nuclear waste management program to date.”** Id. at 27. Experts agree that the ultimate solution will be a “geologic repository,” in which SNF is stored deep within the earth, protected by a combination of natural and engineered barriers. Id. at ix, 29. Twenty years of work on establishing such a repository at Yucca Mountain was recently abandoned when the Department of Energy decided to withdraw its license application for the facility. Id. at 3. **At this time, there is not even a prospective site for a repository, let alone progress toward the actual construction of one.”**

The Court corrected a longstanding injustice by ruling that:

“We have long held that NEPA requires that “environmental issues be considered at every important stage in the decision making process concerning a particular action.”

And that

“It is not only reasonably foreseeable but eminently clear that the WCD will be used to enable licensing decisions based on its findings. The Commission and the intervenors contend that the site-specific factors that differ from plant to plant can be challenged at the time of a specific plant’s licensing, but the WCD nonetheless renders uncontested general conclusions about the environmental effects of plant licensure that will apply in every licensing decision. See 10 C.F.R. § 51.23(b).”

“Instead, we hold the WCD is defective on far simpler grounds: As we have determined, the WCD is a major federal action because it is used to allow the licensing of nuclear plants. See *supra* Part II. Therefore, the WCD requires an EIS or, alternatively, an EA that concludes with a finding of no significant impact. **The Commission did not supply a suitable FONSI here because it did not examine the environmental effects of failing to establish a repository.**”

“The Commission apparently has no long- term plan other than **hoping** for a geologic repository. If the government continues to fail in its quest to establish one, then SNF will seemingly be stored on site at nuclear plants on a permanent basis. The Commission can and must assess the potential environmental effects of such a failure.”

“With full credit to the Commission’s considerable enforcement and inspection efforts, merely pointing to the compliance program is in no way sufficient to support a scientific finding that spent-fuel pools will not cause a significant environment impact during the extended storage period.”

**A 1997 report for the NRC by Brookhaven National Laboratory found that a severe pool fire could render about 188 square miles uninhabitable, cause as many as 28,000 cancer fatalities, and cost \$59 billion in damage.**

**Based on a Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plant in 2000, the US Nuclear Regulatory Commission (NRC) conceded, "The possibility of a zirconium fire cannot be dismissed even many years after a final reactor shutdown."**

**([http://belfercenter.ksg.harvard.edu/publication/364/radiological\\_terrorism.html](http://belfercenter.ksg.harvard.edu/publication/364/radiological_terrorism.html))**

In a May 24, 2011 article, The NY Times reported that “At one plant that is a near twin of the Fukushima units, Vermont Yankee on •the border of Massachusetts and Vermont, the spent fuel in a pool at the •solitary reactor there exceeds the inventory in all four of the damaged •Fukushima reactors combined.” The report’s author, Robert Alvarez, wrote:

“The largest concentrations of radioactivity on the planet will remain in •storage at U.S. reactor sites for the indefinite future. In •protecting America from nuclear catastrophe, safely securing the spent fuel •by eliminating highly radioactive, crowded pools should be a public safety •priority of the highest degree.”•

Yet NRC arrogantly claims it is “confident” that what has happened at 3 reactors in Japan due to loss of power, loss of cooling capability and hydrogen explosions• could NEVER happen here in reactors of nearly identical age and design. And because they think it could never happen, they do not consider the consequences of which Alvarez warns.

This is faith-based science. We should not be creating any more highly irradiated nuclear waste until REAL science comes up with a solution. If they are so confident that a solution is at hand, NRC should put its money where its mouth is, shut down all reactors, stop making more waste, take care of the waste already manufactured by putting it in transportable dry casks, and suspend all new and recently renewed operating licenses until the final waste solution is built and in place, and the existing waste safely stored there.

When NRC ignores actual experience while relying on theoretical and wishful probabilities, we the people can have NO CONFIDENCE in their regulations.

And what is to be done with all the melted fuel and damaged fuel rods from the meltdowns that *have* actually occurred (despite NRC’s misplaced confidence, probabilistic risk assessments and continued speculating that that can never happen)? According to an article revealing failure of the concrete storage system for melted and damaged fuel from the Three Mile Island meltdown:

<http://www.platts.com/RSSFeedDetailedNews/RSSFeed/ElectricPower/6002873>

The concrete modules are "showing significant cracking and degradation," even though they were built in 1999 to last for 50 years, NRC said in the letter, [to DOE] which is dated April 7.

DOE has analyzed the structural integrity of the modules, which have walls two feet thick, and determined that the problem is getting progressively worse, NRC said.

NRC Staff scientists declare that a nuclear fuel fire in fuel exposed to air cannot be ruled out even in the oldest fuel.

## In the report cited below, U.S.NRC NUREG-1738 Spent Fuel Pool Accidents Risks at Decommissioning Nuclear Power Plants

For Vermont Yankee (BWR), Ref. 1 states that the critical failure mode for the gross structural failure of the pool is an out-of-plane shear failure of the pool floor slab. With this failure mode, the liner will be breached and a large crack will develop through the concrete floor slab within a distance equal to the floor slab thickness from the pool walls. Possibly the entire floor will drop out, but I think that such a gross failure is unlikely. However, the concrete crack will be sufficiently large that the water in the pool will quickly drain out.

U.S. Congressman Edward Markey has sought to understand the lessons of Fukushima. Here are some facts about the inadequate regulation of U.S. spent fuel storage pools Rep. Markey and his staff have uncovered, in the report “Fukushima Fallout: Regulatory Loopholes at U.S. Nuclear Plants;” (<http://markey.house.gov/docs/05-12-11reportfinalsmall.pdf>)

- Spent fuel pools contain no protection from hydrogen explosions such as the hardened vents that the NRC misleadingly pretended made US reactors invulnerable to hydrogen explosions (Fukushima reactors had hardened vents too, but the loss of electrical power made them inoperable!).
- NRC does not require **any** form of hydrogen mitigation at spent fuel pools.
- Spent fuel pools at offline reactors (such as those undergoing refueling) require **no secondary emergency generating capacity**. Thus the conditions that led to the Fukushima Unit 4 fuel pool meltdown are legal under NRC regulations.
- NRC has no requirement that reactor hardened vents must be operable, and there has never been a requirement in place for hardened vents in spent fuel pool buildings.
- US fuel pools are holding, on average, 4 times more spent fuel than they are designed for and are densely compacted.

The Institute for Policy Studies reports that:

“Over the past 30 years, there have been at least 66 incidents at U.S. reactors in which there was a significant loss of spent fuel water. Ten have occurred since the September 11 terrorist attacks, after which the government pledged that it would reinforce nuclear safety measures. Over several decades, significant corrosion has occurred of the barriers that prevent a nuclear chain

reaction in a spent fuel pool — some to the point where they can no longer be credited with preventing a nuclear chain reaction. For example, in June 2010, the NRC fined Florida Power and Light \$70,000 for failing to report that it had been exceeding its spent fuel pool criticality safety margin for five years at the Turkey Point reactor near Miami. Because of NRC's dependency on the industry self-reporting problems, it failed to find out that there was extensive deterioration of neutron absorbers in the Turkey Point pools and lengthy delays in having them replaced.

There are other strains being placed on crowded spent fuel pools. Systems required to keep pools cool and clean are being overtaxed, as reactor operators generate hotter, more radioactive, and more reactive spent rods. Reactor operators have increased the level of uranium-235, a key fissionable material in nuclear fuel to allow for longer operating periods. This, in turn, can cause the cladding, the protective envelope around a spent fuel rod, to thin and become brittle. It also builds higher pressure from hydrogen and other radioactive gases within the cladding, all of which adds to the risk of failure. The cladding is less than one millimeter thick (thinner than a credit card) and is one of the most important barriers preventing the escape of radioactive materials.”

All of the above argue for a comprehensive NEPA review of the environmental impacts of a failure of temporary storage of spent fuel at all operating reactors, and of all new licenses or license renewals. NRC should also require use of hardened onsite storage to mitigate these risks, and should investigate the environmental impacts of failure of a single or multiple dry casks.

Irradiated fuel casks can withstand environmental disasters that spent fuel pools cannot, as evidenced by the continued function of the dry casks at Fukushima. The casks survived the 9.0 quake and continue to protect the irradiated fuel, even though the tsunami flooded them. These containers have not exploded; are not on fire; are not catastrophically leaking and do not require ongoing addition of liquid to cool. They are out-performing the pools on the site. However, casks such as the Holtec High Storm 100 have leaked, even before their 20 year license expired. How then can NRC assume with confidence that they will not leak in the future, over 100 years to 1,000,000 years, and that these leaks will not have environmental impacts. Such assumptions are wishful thinking, not science.

In the GEIS, To guide its analysis, the NRC relied upon certain assumptions regarding the storage of spent fuel. These included two assumptions that have

no basis in experience or reality, never having been accomplished in the US. These are:

Spent fuel canisters and casks would be replaced approximately once every 100 years.

Independent spent fuel storage installation (ISFSI) and dry transfer system (DTS) facilities would also be replaced approximately once every 100 years.

Given that NRC has ignored both past experience and staff recommendations to implement the “lessons learned” from experience (such as when they went against the recommendation of their staff scientists to require hardened filtered vents in Mark 1 BWRs to prevent the explosions and massive release of radiation that occurred at Fukushima); to make assumptions based on NO evidence at all, no experience or confidence that such transfers of fuel from dry casks to new storage casks will occur without damaging embrittled fuel cladding, or that the technology will exist to safely transfer damaged fuel assemblies over unimaginable time frames is yet another example of NRC hubris and pattern of substituting wishful thinking for scientific integrity.

NRC’s conclusion in the GEIS that the **impact** of a severe accident in a spent fuel pool would be *small*, based as it is on a vague and hopeful probability of occurrence rather than on actual experience from Fukushima, once again devalues consequences ordinary people would find monstrously unacceptable, and erroneously and unscientifically confounds (or multiplies) probability of occurrence with consequences.

The explosion of the spent fuel pool in reactor number 4 at Fukushima resulted in bits of fuel assemblies blown up to a mile from the reactor. These are more than hot particles, they are lethal chunks of highly irradiated fuel assemblies that TEPCO and Japan’s NRA had full “confidence” would be safely stored in that fuel pool indefinitely. Their probabilistic assumption was wrong. Therefore NRC has no basis for making a similar assumption generically about all nuclear waste sites in the US. NRC is ignoring the Court’s order to base their decisions on reality, and to provide evidence in an EIS. In this GEIS, NRC persists in magical thinking. **THE MAGIC IS IN MULTIPLYING UNACCEPTABLE CONSEQUENCES BY VANISHINGLY SMALL AND UNREALISTIC RISK ESTIMATES.** This fatal flaw in all NRC thinking puts this country at risk. It is belied by NRC’s decision to recommend evacuation of Americans to 50 km away from Fukushima, due to concerns about a catastrophic spent fuel pool failure. This demonstrates NRC’s inconsistency and disingenuousness in this GEIS, and the failure of theoretical numbers to inform about stochastic events.

Terrorism and Natural Disasters

Under NEPA, an EIS is intended to carefully investigate the environmental impacts of a potential action. One of NRC's assumptions underlying the opinion that the impacts of spent fuel storage can be considered generically, not on a site-by-site basis, is that

Changes in the environment around spent fuel storage facilities are sufficiently gradual and predictable to be addressed using a generic approach.

This assumption clearly ignores past experience and the realities of a changing global climate. It ignores the very real possibility of severe storms and extreme circumstances such as earthquake, malicious attack, or multiple failures of equipment at multiple reactors, as we witnessed at Fukushima. It ignores the indirect cumulative impact of Murphy's law and how it played out at Fukushima (failure of on and offsite power due to natural disaster, plus failure of onsite backup power due to destruction of cooling pumps at the waterline, flooding of the diesel generators themselves, failure of the hardened vents to open causing explosion, and certainly human error compounding all of the above.

NEPA and the Appeals Court require NRC to study the environmental **consequences**, not the environmental **risk**.

NRC's logic regarding the environmental impact of a terrorist attack on a spent fuel pool having anything to do with probability of occurrence entirely ignores the need to evaluate what the consequences would be should such an attack occur. Thus NRC fails to satisfy the intent of NEPA. The GEIS states:

The NRC finds that even though the environmental consequences of a successful attack on a spent fuel pool beyond the licensed life for operation of a reactor are large, the very low probability of a successful attack ensures that the environmental risk is SMALL.

AND in regard to spent fuel pool fires

As a result, the NRC finds that the 1996 and 2013 License Renewal GEIS conclusion that the probability-weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts of spent fuel pool fires are SMALL is applicable for a spent fuel pool fire during the continued storage timeframe.

"NEPA and the CEQ regulations require that, when a federal agency proposes legislation or another major federal action significantly affecting the quality of the human environment, **the agency must prepare a detailed statement of the environmental effects** and obtain comments from any other federal agency having jurisdiction by law or special expertise with respect to any environmental impact involved (42 USC 4332(C); 40 CFR 1503.1)."

**There is no such thing as a probability-weighted consequence. However, there is such a thing as an unacceptable consequence.** That is what the NEPA process, if it worked, would uncover, preventing catastrophically stupid alternatives from being acted upon. The public, and the Court want to know, if X happens, Y will result. It is the NRC's responsibility to investigate and describe in detail "Y", the consequences. They have

shirked this responsibility yet again. The waste confidence GEIS is flawed for the same reasons as the original Waste Confidence decision. It remains faith based, grounded in probabilistic thinking, not reality or experience-based science, which we unfortunately have in abundance, due to the severe accidents at Chernobyl and Fukushima.

Because of the explosion of the #4 fuel pool at Fukushima, and the wide dispersal of fuel elements up to a mile away, the area around those reactors will never again be habitable by humans. This is an environmental consequence that really happened. It is not a probability-weighted consequence, it is a real one. The proper multiplier is ONE, not  $10^{-14}$ . Because of the need to continually cool the melted fuel, water is being pumped into a leaking SFP at Fukushima #4. Because there is no engineering solution to the infiltration of ground water to the site, the #4 fuel pool is listing dangerously and we, as a global community, are not yet out of the woods. Because the site has not been isolated or contained in any way the water intentionally poured on to prevent fire and the groundwater infiltration is carrying radioactive Cesium and Strontium into the Pacific Ocean. The fish caught in that area are too radioactive to eat. In California, across the Pacific, a study of Tuna found that 100% of the fish sampled were contaminated with radioactive Cesium. These are real environmental consequences the NRC cannot magic away with wishful probabilistic thinking. What is probabilistic is the likelihood of a tsunami or earthquake. A probability is not a certainty. But unacceptable consequences of such an occurrence are a certainty. If we could prevent earthquakes or tsunamis, we would. Former NRC Chairman Gregory Jaczko recently spoke at the State House in Boston. He said, "Society doesn't not accept severe accidents at Nuclear Power Plants. That is an **unacceptable consequence**, not matter how low the probability. "

As Mr. Jaczko also said, "The Fukushima Daichi accident lasted nine months. The consequences of the accident, the incident itself, will go on for decades." If the National Academy of Sciences BEIR VII report is correct, and it is the best science we have on this question, there is no threshold below which exposure to ionizing radiation has no effect on the living cell. Therefore, given the half lives of all the radioactive isotopes ejected from the SPF, leaked into groundwater, and spread around the region via atmospheric deposition and ocean currents, the genetic legacy of this horrifying impact to marine and human life in Japan will go on as long as life exists in this place.

It is simply unbelievable that NRC would probabilistically weight these very real consequences out of existence for the purpose of this GEIS. It is my opinion that the requirements of NEPA are not met due to this glaring omission.

NRC needs a paradigm shift. Instead of wasting our tax dollars trying to convince us that a small risk outweighs an unacceptable consequence, maybe they should begin to regulate with the understanding that sometimes consequences are so unacceptable to the people and the environment that they outweigh even the smallest theoretical risk.

That said, of the three alternatives presented, the No Action Alternative is the one I support. Decisions regarding highly irradiated fuel assemblies should be made on a site-

by-site basis, with full transparency and maximum input from the public and the affected community.