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From: Kevin Kamps <kevin@beyondnuclear.org>
Sent: Friday, December 20, 2013 11:39 PM
To: RulemakingComments Resource
Subject: Re: Docket ID No. NRC-2012-0246, public comments on NRC WC DGEIS

Submitted by:

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Beyond Nuclear aims to educate and activate the public about the connections between nuclear power and nuclear weapons and the need to abandon both to safeguard our future. Beyond Nuclear advocates for an energy future that is sustainable, benign and democratic.

[Please note: Exhibits A to O, mentioned below, are being submitted via FAX.]

Dec. 20, 2013

Re: Docket ID No. NRC-2012-0246 (Public Comment on NUREG-2157)

Comments on NRC's WC DGEIS ("Waste Confidence" Draft Generic Environmental Impact Statement

In the Executive Summary and Introduction, NRC speaks about 80 years of reactor operations – that is, two 20-year license extensions. For example, on Page 1-12, in Figure 1-1, "Continued Storage Timeframes" (line 17), NRC speaks of "Reactor Licensed Life" as "40 years of reactor operation on original license" and "Up to 40 years of additional renewed license (up to 2 license renewals)."

What is most significant about NRC's apparent plans – to someday grant rubberstamps for not just 20-years of extended operations, but an additional 20-years on top of that – is that this WC DGEIS would grease the skids for just such license extension approvals. This, despite NRC's claims to the contrary.

For example, on Page xxvi in section ES.7 of the Executive Summary (lines 12-20, inset box), NRC states:

"The Waste Confidence rulemaking is *not* a licensing action. It does not permit a nuclear power plant or any other facility to operate or store spent fuel. Every nuclear power plant or specifically licensed spent fuel storage facility must undergo an environmental review as part of its site-specific licensing process." (emphasis in original)

This is very deceptive and misleading on NRC's part. Obviously, if this WC DGEIS is finalized into a WC FGEIS (Final Generic EIS), and a Record of Decision is issued, then that would serve as a pre-ordained license approval for all future licensing actions, at least insofar as the generation of irradiated nuclear fuel, its storage, and its ultimate disposition is concerned.

NRC admits as much, in Section 1.5, “Purpose of and Need for the Proposed Action,” on Page 1-6, lines 2 to 10. NRC states:

“The purpose and need for the proposed action are threefold: (1) to improve the efficiency of the NRC’s licensing process by generically addressing the environmental impacts of continued storage; (2) to prepare a single document that reflects the NRC’s current understanding of these environmental impact statements; and (3) to respond to the issues identified in the remand by the Court in the *New York v. NRC* decision.

The NRC intends to codify the results of its analyses in this draft GEIS at 10 CFR 51.23. NRC licensing proceedings for nuclear reactors and ISFSIs will continue to rely on the generic determination in 10 CFR 51.23 to satisfy obligations under NEPA with respect to the environmental impacts of continued storage.”

Thus, NRC would effectively block any future public or state government interventions, against old reactor license extensions, or new reactor combined license applications, raising challenges regarding the safety, security, cost, risk, etc. implications of the generation, storage or disposal of irradiated nuclear fuel. It is unacceptable for NRC to foreclose all such future challenges under NEPA, regarding the generation, storage, or disposal of irradiated nuclear fuel – one of the most hazardous materials humans have ever generated – based on such a shallow to non-existent NEPA analysis as is currently included in the WC DGEIS.

NRC has abused its “Waste Confidence” Decision, Rule, and Policy in just such a way for a long time. The very first time I ever heard the phrase “Nuclear Waste Confidence” was in March 2003 – right around the time the George W. Bush administration launched the invasion of Iraq -- at an Early Site Permit public meeting held at the public library in Clinton, IL, having to do with a proposed new Exelon reactor targeted at that town (since cancelled, thankfully!). An elder local farmer, sitting in the front row, raised his hand early on in the meeting. He asked how Exelon and NRC could even be considering building a new reactor in Clinton, IL, when the high-level radioactive waste from the first reactor already operating in Clinton had nowhere to go, and no solution in sight.

One after another, several NRC staff persons attempted an answer, all to no avail. Each punted to his or her NRC co-worker around the room. After a number of such punts, the last NRC staff person was about to punt the question to Exelon officials, several of whom were also in attendance. At this point, the NRC facilitator – Chip Cameron, who has also facilitated numerous of the WC DGEIS public comment meetings of recent months – intervened. “What about the **Nuclear Waste Confidence Rule**,” Chip Cameron – who has also long worked for NRC’s Office of General Counsel, in addition to its Office of Public Affairs -- prompted his colleagues, who then, having remembered their lines, cheerfully informed the concerned local resident that NRC has “Confidence” that a repository will be opened somewhere, somehow, someday, by someone, and in the meantime, the highly radioactive wastes are safe and sound right where they are in Clinton, IL. The farmer seemed a little less than convinced. I also did not share NRC’s “confidence.” It seemed very much a con game. (A con game is defined as: “any swindle in which the swindler, after gaining the confidence of the victim, robs the victim by cheating at a gambling game, appropriating funds entrusted for investment, or the like.”)

I was soon to be victimized by the NRC’s “nuke waste con game” myself. On August 8, 2005, Nuclear Information and Resource Service, for which I served as Nuclear Waste Specialist, as well as Don’t Waste Michigan, for which I served as a board of director member, representing my hometown of Kalamazoo, officially intervened against Consumers Energy’s application to NRC for a 20-year license extension at the Palisades atomic reactor in Covert, MI, on the Lake Michigan shoreline in southwest Michigan.

The following irradiated nuclear fuel-related contentions were filed by NIRS, Don't Waste MI, and their organizational and concerned local resident allies (REQUEST FOR HEARING AND PETITION TO INTERVENE, pages 5 to 6):

"ENVIRONMENTAL CONTENTIONS

3.

The Palisades reactor has no place to store its overflowing irradiated nuclear fuel inventory within NRC regulations.

The indoor irradiated fuel storage pool reached capacity in 1993. But the outdoor dry cask storage pads at Palisades, both the older one nearer Lake Michigan and the newer one further inland, are in violation of NRC earthquake regulations. 10 CFR § 72.212(b)(2)(i)(B) requires that:

Cask storage pads and areas have been designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, and soil liquefaction potential or other soil instability due to vibratory ground motion. . . .

According to Petitioners' anticipated expert, Dr. Ross Landsman, former U.S. Nuclear Regulatory Commission Region III dry cask storage inspector, the older pad violates the liquefaction portion of this regulation, and the new pad violates the amplification portion of the regulation. Petitioners contend that neither the older nor new dry cask storage pads at the Palisades plant were designed in consideration of the factors contained in the cited regulation.

4.

The unloadable, unmovable dry storage cask #4 at Palisades.

In 1993, Consumers Power (now Consumers Energy) assured a federal district judge that if it encountered problems with loaded dry casks at Palisades, it would simply reverse the loading procedure and return the high-level radioactive waste to the storage pools. But the fourth cask loaded at Palisades, in June 1994, was shortly thereafter admitted by Consumers Power to be defective, having faulty welds. However, eleven years on, Consumers has yet to unload the defective cask, because it cannot.

Petitioners state that Consumers perpetrated a fraud upon the court and the public, with the complicit support by the NRC, and has critically undermined its credibility as to any pledges about the safety of dry cask storage. The significance of this problem with cask #4 is considerable. For example, the configuration of the 18 to 19 dry casks currently stored on the older pad nearer Lake Michigan is such that the casks furthest back cannot be moved or unloaded until all other casks in front of them have been moved out of the way first. This configuration increases the risks, making it very difficult to address emergencies involving certain casks in the configuration in a timely manner.

[In a February 6, 1997, letter, Dr. Mary Sinclair, co-chair of Don't Waste Michigan, wrote to the five U.S. Nuclear Regulatory Commission Commissioners, highlighting possible perjury – as well as clearly established incompetence – by NRC staff when they assured a federal judge that dry storage casks at Palisades could be safely unloaded if the need arose. A copy of Dr. Sinclair's 8 page letter, preceded by an introductory note

written by me, is posted online at: <http://www.nirs.org/reactorwatch/licensing/sinclairltr020697.pdf>. I will also submit it as an exhibit, Exhibit A.

Dr. Sinclair worked closely with the State of Michigan's Attorney General, Frank Kelley, to argue the case against the loading of Palisades' dubious VSC-24 dry casks in federal court, to no avail. Consequently, a defective cask has remained, fully loaded with high-level radioactive waste, just 100 yards or so from the waters of Lake Michigan, for nearly 20 years now, despite the nuclear utility's assurances, backed by NRC, that problem casks could simply be unloaded back into the indoor storage pool by reversing the loading procedure. Lake Michigan is, of course, the drinking water supply for many tens of millions of people downstream.]

5.

There is no permanent repository for the nuclear waste which would be generated at Palisades after 2010.

Any waste generated at Palisades after 2010 would be excess to the capacity of the proposed national dump at Yucca Mountain, Nevada according to U.S. Department of Energy projections in its Yucca Mountain Final Environmental Impact Statement (Feb. 2002), as revealed in Tables A-7 and A-8 on pages A-15 and A-16 of Appendix A.

In fact, the waste generated at Palisades from 1971 to 2010 may also be excess to Yucca, in that the proposed dump may never open. The State of Nevada maintains that NRC's "Nuclear Waste Confidence Decision" is erroneous, in that it biases NRC to favor the Yucca Mountain dump license lest it be proven wrong in its assurance to the public that a high-level radioactive waste geologic repository will open in the U.S. by 2025. Because so much uncertainty surrounds the Yucca Mountain dump proposal, as well as other high-level radioactive waste proposals, Petitioners-Intervenors contend that waste generated at Palisades during the 20 year license extension could very well be stored at Palisades *indefinitely*, a scenario inadequately addressed by the applicant and NRC. [emphasis added; note that "Indefinite Storage" is exactly what NRC refers to in the WC DGEIS, on Page 1-12, as: "Assumes no repository becomes available; Indefinite storage and handling of spent fuel."]

6.

Intensifying sand erosion and avalanche risk around dry cask storage pads.

The more casks loaded on the storage pads at Palisades, the more risk of erosion to the sand supporting the pads, given the large weight of the casks themselves (well over 100 tons each), weather related erosion of the sand dunes, as well as the erosion that will occur due to more severe weather impacts from the global climate crisis and climate de-stabilization. Arresting erosion at both pads is important to safety and radiation containment over the long haul, given the proximity of the waters of Lake Michigan. The State of Michigan and the U.S. Army Corps of Engineers have designated the sand dunes upon which the older pad is located - so close to the waters of Lake Michigan - as a high-risk erosion zone.

The Lake Michigan dunes are subject to "blow outs" where entire dunes are blown out during wind storms and lightning strikes. See F. Nori, P. Sholtz, and M. Bretz (Department of Physics, The University of Michigan), "Sound-Producing Sand Avalanches," Scientific American, Vol. 277, No. 3 (September 1997).

At Warren Dunes, some 35 miles south of Palisades, sand blowouts have been estimated to travel as much as one-quarter mile per day, exposing 5,000-year-old trees that have long since turned to charcoal. “Some chilling facts about Dunes history,” <http://www.nwtimes.com/articles/2005/07/25/news/region/0256d4c429632b30862570460062843b.txt>

The Palisades dunes could, in a wind storm or lightning strike, shift, blow and cover the dry cask storage area. As weather patterns intensify (as anticipated) this potential for erosion will increase.

Additionally, the dunes and shore line are geologically prone to sand avalanche. A sand avalanche coupled with a seismic event could compromise the integrity of one or more casks at Palisades.”

(the entire REQUEST FOR HEARING AND PETITION TO INTERVENE is posted online at <http://www.nirs.org/reactorwatch/licensing/petition.pdf>)

The contention regarding Consumers Energy’s Palisades dry cask storage (now owned and operated by Entergy Nuclear) violating NRC earthquake safety regulations was prompted by a warning from NRC dry cask storage inspector for the Midwest Region, Dr. Ross Landsman, dating back to February 17, 1994. Dr. Landsman wrote to NRC’s Chairman, Ivan Selin, warning him about the risk at Palisades that an earthquake could result in high-level radioactive waste storage casks falling into Lake Michigan, or being buried in loose sand.

Dr. Landsman wrote: “Actually, [it’s] the consequences that might occur from an earthquake that I’m concerned about. The casks can either fall into Lake Michigan or be buried in the loose sand because of liquefaction...It is apparent to me that NMSS [NRC’s Nuclear Materials Safety and Safeguards department] doesn’t realize the catastrophic consequences of their continued reliance on their current ideology.”

The full text of Dr. Landsman’s letter to Dr. Selin is posted online at: <http://www.nirs.org/reactorwatch/licensing/021794rosslandsmanltrnrcchairmanselin.pdf>. I will also submit it as an exhibit, Exhibit B.

Underwater submersion could lead to inadvertent nuclear chain reactions in the fissile materials still present in the wastes; burial under sand could cause the wastes to dangerously overheat.

Although written as a warning about the risks of shipping high-level radioactive waste by barge on Lake Michigan, a backgrounder I wrote a decade ago provides specific, relevant information on how an inadvertent nuclear chain reaction, or accidental criticality, could be sparked by the underwater submersion of a Palisades dry cask (whether that were to occur by a barge shipment sinking, or Palisades’ dry cask storage being plunged underwater by an earthquake):

“As part of its plan to transport high-level radioactive waste to Western Shoshone Indian land at Yucca Mountain, Nevada, the U.S. Department of Energy (DOE) proposes up to 453 barges carrying giant high-level radioactive waste containers onto the waters of Lake Michigan. See the second page of this fact sheet for a map of the proposed routes and a breakdown of shipment numbers by port.

Accidents happen. But what if high-level radioactive waste is involved? U.S. Nuclear Regulatory Commission (NRC) design criteria for atomic waste transport containers are woefully inadequate. Rather than full-scale physical safety testing, scale model tests and computer simulations are all that is required. The underwater

immersion design criteria are meant to “test” (on paper, at least) the integrity of a slightly damaged container submerged under 3 feet of water for 8 hours. An undamaged cask is “tested” (on computers, at least) for a 1 hour submersion under 656 feet of water.

But if a cask were accidentally immersed under water, or sunk by terrorists, is it reasonable for NRC to assume that the cask would only be slightly damaged, or not damaged at all? Given that barge casks could weigh well over 100 tons (even up to 140 tons), how can NRC assume that they could be recovered from underwater within 1 hour, or even within 8 hours? Special cranes capable of lifting such heavy loads would have to be located, brought in, and set up. And what about the fact that Lake Michigan is deeper than 656 feet at locations not far from DOE’s proposed barge shipment routes?

The dangers of nuclear waste cask submersion underwater are two fold. First, radioactivity could leak from the cask into the water. Each container would hold 200 times the long lasting radioactivity released by the Hiroshima atomic bomb. Given high-level atomic waste’s deadliness, leakage of even a fraction of a cask’s contents could spell unprecedented catastrophe in the source of drinking water for tens of millions of people – Lake Michigan. Second, enough fissile uranium-235 and plutonium is present in high-level atomic waste that water, with its neutron moderating properties, could actually cause a nuclear chain reaction to take place within the cask. Such an inadvertent criticality event in Sept. 1999 at a nuclear fuel factory in Japan led to the deaths of two workers; many hundreds of nearby residents, including children, received radiation doses well above safety standards.”

This fact sheet is posted online at <http://www.nirs.org/factsheets/mibargefactsheet92804.pdf>. I will also submit it as an exhibit, Exhibit C.

As woefully inadequate as NRC shipping container safety regulations are, NRC’s storage-only container safety regulations are even worse. Thus, an earthquake plunging one or more storage-only casks underwater at Palisades is even more problematic a risk than a barge shipment sinking a transport cask, at least in terms of the safety standards applied to each type of container for survival of an underwater submersion, that is.

To drive the point home, I attended an NRC-industry technical meeting several years ago, regarding the risks of underwater submersion to the particular casks in use at Palisades (as well as at Point Beach nuclear power plant on the Wisconsin shoreline of Lake Michigan, as well as at Arkansas Nuclear One, ANO, nuclear power plant), namely, VSC-24s (for Ventilated Storage Casks holding 24 Pressurized Water Reactor irradiated nuclear fuel assemblies).

In fact, NRC’s WC DGEIS, at Table G-4, “ISFSIs with General Licenses under Part 72,” Pages G-9 to G-11, confirms that VSC-24s are in use at Palisades (as well as at Point Beach and ANO).

The industry representatives at the meeting represented cask vendor BNG Fuel Solutions (as confirmed in WC DGEIS Table G-4), which acquired ownership of the VSC-24 license from Sierra Nuclear. BNG Fuel Solutions is now a part of EnergySolutions of Salt Lake City, Utah.

NRC staff had 65 RAIs (Requests for Additional Information) for EnergySolutions regarding the risk of inadvertent criticality in VSC-24s due to underwater submersion. Thus, it became clear to me that the earthquake risk described by Dr. Landsman as early as 1994 is quite significant.

Dr. Landsman, now retired from NRC, served as NIRS and Don’t Waste Michigan’s expert witness in the Palisades license extension proceeding.

On September 15, 2005, Dr. Landsman submitted an expert witness Declaration, renewing his contentions that Palisades' dry cask storage pads violate NRC earthquake safety regulations. This expert witness Declaration is posted online at: <http://www.nirs.org/reactorwatch/licensing/drrosslandsman0915005affidavit.pdf>. I will also submit it as an exhibit, Exhibit D.

Despite the merits of our contentions, the three-administrative judge NRC Atomic Safety and Licensing Board Panel made short shrift of all of our contentions, including those having to do with irradiated nuclear fuel (the ASLB ruling is posted online at: <http://www.nirs.org/reactorwatch/licensing/contntnsruling030706.pdf>).

At Page 47 of its ruling, the ASLB cited NMC's (Nuclear Management Corporation, the operator of Palisades, arguing on behalf of the atomic reactor's then-owner, Consumers Energy) invocation of NRC's Nuclear Waste Confidence Decision, Rule, and Policy:

"Further, NMC avers, Contention 3 is barred by the Waste Confidence Rule, as stated at 10 C.F.R. § 51.23(a)."

The ASLB provided the following reference in footnote 183:

"Id. [NMC Answer] at 18. Section 51.23 states in relevant part that "[t]he Commission has made a generic determination that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations." 10 C.F.R. § 51.23(a)."

The ASLB went on to state "To the extent the Petitioners seek to raise a NEPA issue, Contention 3 challenges and runs afoul of both the Waste Confidence Rule...according to [Nuclear Management Corporation]," and then goes on, on Page 48, to state: "**NRC Staff Response to Contention 3**...The Staff asserts most of the same arguments offered by NMC," referencing, at footnote 186 "See Staff Answer at 15-16."

Thus, the NRC ASLB explicitly cited NRC's "Waste Confidence Rule, as stated at 10 C.F.R. [Part] 51.23(a)," in rejecting NIRS and Don't Waste Michigan's irradiated nuclear fuel-related contentions. The NRC ASLB went on to approve the 20-year license extension at Palisades, the 48th such reactor license extension granted up to that time. Currently, 73 such reactor license extensions have been granted by NRC.

Despite appealing to the five member NRC Commission, NIRS and Don't Waste Michigan did not prevail (our appeal is posted online at <http://www.nirs.org/reactorwatch/licensing/objections031706.pdf>).

The ASLB suggested, as an alternative to its now-rejected license extension intervention proceeding, that the environmental interveners instead file a 10 CFR Part 2.206 "emergency enforcement petition" with NRC. The environmental interveners did so, less than a month later, regarding the violation of NRC earthquake safety regulations by Palisades' dry cask storage pads.

The April 4, 2006 emergency enforcement petition is posted online at <http://www.nirs.org/reactorwatch/licensing/2.206.pdf>. I have submitted this as an exhibit, Exhibit E.

The environmental interveners simultaneously attached Dr. Landsman's expert witness Declaration of September 15, 2005, yet again (posted online at <http://www.nirs.org/reactorwatch/licensing/landsmandec.pdf>). [Submitted here as Exhibit D, above.]

In early 2007, NIRS and Don't Waste Michigan commented upon, and objected to, NRC's Director's Decision, which effectively rejected our emergency enforcement petition (posted online at <http://www.nirs.org/reactorwatch/licensing/020207finalcomments.pdf>). This appeal fell upon deaf ears. This is Exhibit F, submitted.

On June 28, 2007, the environmental coalition then appealed the NRC Commission decision to the D.C. Circuit Court of Appeals (see press release, posted online at <http://www.nirs.org/press/06-28-2007/1>). This is Exhibit G, submitted.

On August 2, 2007, NRC then moved to have the federal appeals case dismissed (see NRC filing, posted online, at <http://www.nirs.org/reactorwatch/licensing/finalmotiontodismiss080207.pdf>).

On August 17, 2007, NIRS and Don't Waste Michigan defended their appeal to the U.S. Circuit Court of Appeals for the District of Columbia, against NRC's motion to dismiss. The environmental coalition alleged that NRC had abdicated its duty to protect the public health and safety by failing to enforce its own earthquake safety regulations at the Palisades nuclear reactor's dry cask storage facility for high-level radioactive waste, located on sand dunes on the shoreline of Lake Michigan. This "Reply" is posted online at <http://www.nirs.org/reactorwatch/licensing/respdmsreally.pdf>. This is Exhibit H, submitted.

The environmental coalition issued a press release about its appeals to the courts, and dire warning about the radioactive waste storage risks at Palisades: <http://www.nirs.org/press/08-23-2007/2>. This is Exhibit I, submitted.

Despite this, the courts ruled in NRC's favor. The courts grant huge deference to NRC's "technical expertise" in 10 CFR 2.206 matters, by the "strict by design" designs of the NRC itself. Unfortunately, they are largely, effectively, not appealable. Never mind that this leaves unresolved the clearly established earthquake safety violations at Palisades' dry cask storage pads.

NIRS and Don't Waste Michigan had endeavored, over the course of many long years, to get the risks of Palisades' dry cask storage pads and casks addressed by NRC, all to no avail. The environmental interveners had run head first into a brick wall labeled "Nuclear Waste Confidence."

Thus, it is deceptive and misleading for NRC to claim that **"The Waste Confidence rulemaking is *not* a licensing action."** Not only was "Waste Confidence" invoked to silence the concerned local farmer's very legitimate, fundamental question at the Clinton, IL Early Site Permit public meeting in March 2003, it was also invoked by an NRC ASLB – backed by the NRC Commission itself – to reject irradiated nuclear fuel-related contentions in a legal proceeding regarding the 20-year license extension at Palisades atomic reactor. The "Waste Confidence Rule" was used to reject our official legal contentions, and instead rubberstamp a 20-year license extension at Palisades.

But NRC has not restricted itself to invoking "Waste Confidence" to defend new reactor licenses or old reactor license extensions at its own public meetings or in its own licensing proceedings. It has made such claims in the pages of the *New York Times*.

In a *New York Times* article by Matthew L. Wald, entitled “3 States Challenge Federal Policy on Storing Nuclear Waste,” dated February 15, 2011 (posted online at <http://www.nytimes.com/2011/02/16/nyregion/16nuke.html>, submitted here as Exhibit J), it was reported:

“...David McIntyre, a spokesman for the Nuclear Regulatory Commission, said the lawsuit by the attorneys general had mischaracterized the nature of the December [2010 Nuclear Waste Confidence] decision. He described it as a commission “opinion” on how long waste could be safely stored rather than a rule permitting any plant to store spent fuel.

But people who favor building new reactors said the adoption of the policy was important because it helped outline a legal basis for approving the construction of new reactors and long-range plans for handling their spent fuel...”.

Thus, the NRC’s “nuke waste con game,” and deceptive, misleading claims that NRC’s Nuclear Waste Confidence Decision, Rule, and Policy have nothing to do with new reactor licensing or old reactor license extensions, have been played in one of the major media outlets in the nation.

The U.S. Court of Appeals for the District of Columbia Circuit, however, in its *New York versus NRC* ruling of June 8, 2012, seems not to have agreed with Mr. McIntyre’s description of NRC’s “opinion.”

On Page 1-13, NRC states under “long-term storage,” that “one-time replacement of ISFSIs and spent fuel canisters and casks” will occur, as will “construction and operation of a DTS [dry transfer system] (including replacement).” It then goes on to state, under “indefinite storage,” that “replacement of ISFSIs and spent fuel cansiters and casks every 100 years...construction and operation of an away-from-reactor ISFSI (including replacement every 100 years)...construction and operation of a DTS (including replacement every 100 years)” will also take place.

NRC concludes Section 1.8.2, Timeframes Evaluated, by stating, under “indefinite storage,” that “These activities are the same as those that would occur for long-term storage, but without a repository, they would occur repeatedly.”

At a September 11, 2013 meeting with NRC Nuclear Waste Confidence Directorate Director, Keith McConnell, he confirmed that this assumption of safe and smooth, repeated replacements would continue forever into the future. In fact, beyond the one million year hazard the U.S. EPA has acknowledged, under court-order, for high-level radioactive waste, in the context of the Yucca Mountain dump licensing proceeding. In fact, even beyond the known hazardous persistence of the various radioactive isotopes constituting high-level radioactive waste, such as Iodine-129, with a half-life of 15.7 million years, and thus a hazardous persistence of 157 to 314 million years.

Replacing dry casks, canisters, pads, and dry transfer systems once every hundred years is not “too cheap to meter,” despite Lewis Strauss, Chair of the U.S. Atomic Energy Commission’s, infamous words to the contrary in 1954. He was speaking about nuclear power, but irradiated nuclear fuel is the inevitable byproduct of commercial nuclear power. In fact, electricity is but the fleeting byproduct. The actual product is forever deadly high-level radioactive waste.

(Nor can nuclear power even be considered a low carbon source of electricity, much less zero carbon, or “emissions-free,” electricity source, as nuclear power industry public relations campaigns like to claim. Replacing high-level radioactive waste dry cask storage systems, structures, and components, once every hundred years from now till the end of time, will require significant quantities of concrete, steel, energy, etc., and hence a large carbon footprint. Technically speaking, assuming forever replacement of dry cask storage would mean multiplying costs, as above, as well as greenhouse gas emissions, by infinity – yielding infinite costs, and carbon emissions. These are NRC’s absurd assumptions worked out, not mine!)

In fact, Dr. Mark Cooper of Vermont Law School, expert witness on behalf of a coalition of dozens of environmental groups, including Beyond Nuclear, has provided NRC expert comments on the costs of such repeated replacements of dry cask storage infrastructure over time. Dr. Cooper’s analysis foresees staggering costs that future generations – which derived no benefit from the nuclear generated electricity that led to the production of the forever deadly radioactive waste – will be forced to pay, in order to isolate the irradiated nuclear fuel from the environment forevermore. Remarkably, NRC has neither estimated the costs of such activities, nor ventured a guess as to who would actually pay those costs, where that funding would come from.

As presented in Dr. Cooper’s 12/19/13 press release (posted online at <http://www.beyondnuclear.org/storage/kk-links/121913%20WCR%20comments%20news%20release%20FINAL2.pdf>), the “staggering cost” of waste disposal and storage that NRC can no longer ignore tops \$210 to 350 billion, including \$100 billion per century for dry cask storage.

I have submitted this press release as Exhibit K.

Nor has NRC taken NEPA’s requisite “hard look” at its mere assumption that such institutional controls will be maintained forevermore into the future. To the contrary, NRC has simply assumed it.

In Section 1.8.3, Analysis Assumptions, on Page 1-14 to 1-15, NRC states:

“Institutional controls, i.e., the continued regulation of spent nuclear fuel, will continue. This assumption avoids unreasonable speculation regarding what might happen in the future regarding Federal actions to provide for the safe storage of spent fuel. Although government agencies and regulatory approaches can be expected to change over long periods of time into the future, the history of radiation protection has generally been towards ensuring increased safety as knowledge of radiation and effectiveness of safety measures has improved. For the purpose of the analyses in this draft GEIS, the NRC assumes that regulatory control of radiation safety will remain at the same level of regulatory control as currently exists today.”

This is a most convenient, and overly optimistic assumption, by NRC. History provides countless counter-examples regarding what NRC is now phrasing “institutional control.”

Take the most relevant example, that of United States history. In the relatively short history of the United States (1776 to 2014, some 238 years, less than the hazardous persistence of reactor generated Cesium-137 or Strontium-90), a number of wars have ravaged the eastern part of the country: the American Revolutionary War; the War of 1812; the Civil War.

In fact, during the War of 1812, British troops sacked Washington, D.C., burning down the White House, the Capitol, and other federal institutions. The only reason that the famous White House portrait of George Washington, as well as original copies of the Declaration of Independence and U.S. Constitution, survived the

flames was the hastily arranged evacuation organized by First Lady Dolley Madison. Paul Jennings, a young White House slave himself, wrote in his memoirs that it was his fellow White House slaves who carried Washington's portrait and the Founding Documents to safety in the woods.

Just one fateful battle of the Civil War underscores the precariousness of the U.S. federal government – or at least, the survival of its capital. Near Frederick, Maryland on July 9, 1864, less than 2,500 green troops (the figure comes from a historic sign near the site present day, at an auto rest area) under the command of U.S. General Lew Wallace faced a battle-hardened Confederate force several times its size under the command of C.S.A. General Jubal Early. No Union reinforcements were in place to prevent Early's army from simply rolling into Washington, D.C. Wallace spread his men along a five mile stretch of Monocacy Creek. The Union forces suffered a shocking nearly 1,300 losses, over a 50% casualty rate. But their sacrifice may have saved the Union – or at least its capital city. General Wallace honored his men's sacrifice by stating "These men died to save the National Capital, and they did save it." Thanks to the delay bought at such a high price, the Union was able to rush reinforcements into place to defend Washington, D.C. before the bulk of Early's army arrived at its perimeter forts.

These may be dramatic examples of the fragility of "institutional control." Perhaps less dramatic, but very relevant, and ironically so, was the U.S. federal government shutdown of October 2013. It threw this very NRC WC DGEIS public comment meeting schedule into chaos. A number of meetings had to be postponed to a later date, greatly complicating public participation. As was pointed out by David Kraft of NEIS at the Oak Park, IL on November 12, 2013, once that meeting was rescheduled from its original October 24th date: "NRC expects the public to accept that spent-fuel can be safely stored at reactor sites indefinitely under its supervision. One month ago, NRC could not even guarantee that it could put a workforce in the field due to the government shutdown."

The postponement of public meeting dates pushed the Minnetonka, MN date back to Dec. 4th – sure enough, just in time for severe winter weather, which dampened public turnout.

Countless examples of loss of institutional control can be cited throughout human history. What are the oldest human institutions? The Roman Catholic Church? It is only around two thousand years old. Buddhism? Around 2,500 years. Judaism? Less than 4,000 years old. Recorded history? A mere 8,600 years old, at most. Only 15 years ago, archeologists found Jiahu symbols in Henan, China, a form of proto-writing dating back to 6,600 BC. But even those remnants of proto-writing had been lost from "institutional control" for many millennia, and only now are we left to puzzle the pieces back together, to try to understand what they have to tell us about our early ancestors. Some Indigenous Peoples' cultures claim to date back even further in time. But even these pale before the long hazards contained in high-level radioactive waste. The artificial element Plutonium-239, for example, with a half-life of 24,400 years, and thus a hazardous persistence of 240,000 to 480,000 years. That is roughly the amount of time *homo sapiens sapiens* has existed as a species! Pu-239, along with other isotopes of plutonium, accounts for roughly 1% of the content of irradiated nuclear fuel (Pu-239 is about 0.5% of the content of irradiated nuclear fuel, other isotopes of Pu the other 0.5%, according to Dr. Arjun Makhijani of IEER's expert commentary submitted in this proceeding).

This fact alone will become highly significant over time. Pu-239 is weapons usable. In fact, that is why atomic reactors were built in the first place, to generate Pu-239 from Uranium-238, during the Manhattan Project in World War Two. Separating Pu-239 from high-level radioactive waste is not too difficult to do, through straightforward chemical separation. One of the biggest challenges is protecting workers against the deadly doses of gamma radiation being emitted by the fission products mixed in with the Pu-239 in high-level radioactive waste. (This assumes that certain non-state actors, such as Al Qaeda, won't attempt to steal

plutonium; Al Qaeda specializes in suicide missions, so would not be deterred by the gamma radiation poisoning deaths to be faced by its “martyrs” in the carrying out of their mission.) But as the centuries pass, that “self-protective” gamma ray field will dissipate with the radioactive decay of the fission products. Eventually, although the Pu-239 and other radioisotopes still present will represent a very serious biological hazard in terms of alpha particle hazards, the material will be approachable without special radiation shielding precautions, other than respiratory and body covering to prevent alpha-particle-bearing contaminants from being ingested, inhaled or absorbed through open wounds. NRC has not analyzed the security risks of such nuclear weapons usable substances as Pu-239 becoming ever more available, over time, in on-site or away-from-reactor dry cask storage – another showstopper shortcoming of this DGEIS, NRC’s woefully inadequate treatment of nuclear weapons (as well as dirty bomb) proliferation risks.

NRC also makes an overly optimistic assumption that technological progress will advance as time goes on, or at the very least, our society will stay at the same level of civilizational advancement as it currently is at. NRC ignores the Dark Ages, at its, and all of our, peril. For several centuries in Europe, for example, previous cultural and technological advances were simply lost, forgotten about. The Dark Ages witnessed a reversion, a digression, to a previous, significantly lower technological stage in Europe, apart from the preservation of pockets of knowledge and culture in places like rural Irish monasteries (where the “dead” languages of Greek and Latin were kept alive, by St. Caoighim’s monks at Glendalough, for example). This one example – and there are countless more from various cultures and societies worldwide – shows that cultural and technological knowledge and capability cannot be assumed to remain at the same level, much less to advance over time. NRC’s assumptions to the contrary are not defensible.

If the EPA’s acknowledgement, that commercial irradiated nuclear fuel will remain hazardous for a million years, is the figure we use, that represents 10,000 replacements of dry cask storage under NRC’s “indefinite storage” (which also could be dubbed “infinite storage”) timeframe:

$1,000,000 \text{ years} \times 1 \text{ replacement}/100 \text{ years} = 10,000 \text{ replacements.}$

Dr. Mark Cooper has provided expert estimates as to what those staggering costs would be just for the first few replacements – around \$100 billion per century! But multiplying such price tags by 10,000 replacements boggles the mind in terms of costs future generations will face. Of course, it’ll be worse than that, due to inflation (even in the first century!), not to mention worsening problems of fuel degradation, which could be quite significant and boost the price tag astronomically! Not to mention the “worker doses” (and downwind resident doses) for the poor soul unlucky enough to face the replacement work.

But if institutional control is lost, which is almost guaranteed over a long enough period of time, the radioactivity releases will be catastrophic—on the surface of the Earth!

The U.S. Department of Energy has admitted to as much, in its 2002 FEIS on the now cancelled Yucca Mountain dump proposal. Although DOE didn’t delve into the catastrophic details, it observed that simply abandoning high-level radioactive wastes on-site at reactors would eventually result in the release of their radioactive contents into the environment over time, as the containers failed, with catastrophic consequences. DOE stated its preferred alternative was the Yucca dump, and examined the on-site releases of radioactivity no further. Dr. Makhijani covers this issue in his expert commentary in this proceeding.

(DOE downplayed to the point of ignoring the catastrophic releases of radioactivity that would result if high-level radioactive wastes were actually buried at the Yucca site, the geologic unsuitability of which eventually caught up to itself, resulting in the proposal’s cancellation.)

It is telling that NRC and DOE had a dispute about institutional controls over a decade ago, which seems not to have been resolved. NRC states on Page 1-15 (lines 6 to 15) that:

“The DOE analyzed a no-action alternative in their Final EIS for Yucca Mountain (DOE 2008) that considered the loss of institutional controls. In particular, the DOE considered a specific scenario in which spent fuel and high-level radioactive waste would remain in dry storage at commercial and DOE sites and would be under institutional controls for approximately 100 years, and beyond that time, it was assumed there would be no institutional controls. The NRC provided comments to the DOE related to their assumption about the loss of institutional controls (NRC 2000). The NRC stated that it did not consider the loss of institutional controls a reasonable assumption because the Federal government would continue to control licensed nuclear material under its authority for as long as necessary to protect public health and safety.”

What does DOE know that NRC does not?! Perhaps DOE’s own loss of institutional control over its own inventories of highly radioactive wastes, not after 100 years, but after just years and decades, has provided it with insights that NRC has chosen to blind itself to? Dr. Makhijani points out in his expert commentary in this proceeding that during the recent October 2013 government shutdown, active pumping of groundwater, at DOE’s contaminated Fernald site in Ohio, was nearly interrupted due to lack of needed funding! And this after just a few years of active pumping thus far!

NRC’s Section 1.8.3, **Analysis Assumptions**, goes on for several long pages (Pages 1-13 to 1-17).

On June 4, 2013, at a community forum in southern California concerning the dangerously botched San Onofre nuclear power plant steam generator replacements, alongside fellow panelists Naoto Kan (former Prime Minister of Japan, who served during the first several months of the Fukushima Daiichi nuclear catastrophe), Greg Jaczko (former NRC Chairman, who served for the first 15 months of the Fukushima Daiichi nuclear catastrophe), and Peter Bradford (former NRC Commissioner, who served during the Three Mile Island meltdown), Arnie Gundersen, Chief Engineer at Fairewinds Associates, Inc., and expert witness on behalf of Friends of the Earth, asked during his presentation “How BAD COULD IT BE?” He answered that question by saying “The Secret Is In the **Assumptions**,” and cited a Dilbert cartoon.

Gundersen said, “This is my favorite comic strip in the whole world. It’s a Dilbert. **The secret is in the assumptions.** It’s not in these gigantic super computers that the industry uses.”

Sitting in his cubicle, intensely studying a document, Dilbert says to his Pointy-Haired Boss, “I CAN DO THIS FEASIBILITY ANALYSIS IN TWO MINUTES.”

Dilbert adds, “IT’S THE WORST IDEA IN THE WORLD. NUMBERS DON’T LIE.”

But the Pointy-Haired Boss points out “OUR CEO LOVES THE IDEA.”

To which Dilbert responds, “LUCKILY, **ASSUMPTIONS DO LIE.**”

[taken from a video recording posted at the Fairewinds website, <http://fairewinds.org/media/in-the-news/live-naoto-kan-gregory-jaczko-peter-bradford-and-arnie-gundersen-speaking-in-san-diego>, starting at the 5:50 of 17:51 minute mark]

I have submitted this comic strip as Exhibit L.

Rather than analyze the risks of irradiated nuclear fuel generation, storage (on-site, in pools and dry casks; and away-from-reactor), and ultimate disposition, NRC has instead simply **assumed away all the risks**. Rather than analyze risks, NRC has simply **assumed safety**, at every turn. It has thus defied the court order in *New York v. NRC*. To all of our peril.

Whereas NRC assumes institutional control forever, on Pages 1-14 to 1-15, NRC and the commercial nuclear power industry NRC supposedly regulates has managed to lose institutional control in real time. Examples abound. Irradiated nuclear fuel has been “lost,” as at Vermont Yankee, Humboldt Bay (CA), and Millstone (CT) nuclear power plants, as but a few examples. As reported by GAO in its April 2005 report, *NUCLEAR REGULATORY COMMISSION: NRC Needs to Do More to Ensure that Power Plants Are Effectively Controlling Spent Nuclear Fuel*:

“Nuclear power plants’ performance in controlling and accounting for their spent fuel has been uneven. Most recently, three plants—Vermont Yankee and Humboldt Bay (California) in 2004 and Millstone (Connecticut) in 2000—have reported missing spent fuel. Earlier, several other plants also had missing or unaccounted for spent fuel rods or rod fragments.” [GAO-05-339, posted online at: <http://www.nirs.org/radwaste/atreactorstorage/gao04112005nrclostnwaste.pdf>]. I will submit the first two pages of this report as an exhibit, Exhibit M.

In the case of Vermont Yankee, NRC and industry eventually just assumed that the lost irradiated fuel was mistakenly shipped away, and buried in a ditch at Barnwell, South Carolina, mistaken for “low-level” radioactive waste, to dose workers, shippers, and residents downstream of the leaking dumpsite. At Humboldt Bay, NRC and industry eventually just assumed that the missing irradiated nuclear fuel was simply crushed beneath waste transfer casks weighing a hundred tons, and pulverized into particles which dissolved into the high-level radioactive waste storage pool cooling water, to clog filters and dose workers.

Far from the experience with the ancient pyramids in Egypt, where, despite the Pharaoh’s dire warnings that thieves would be cursed by the gods, the crypts were ransacked for their valuables within a century, NRC and industry managed to lose track of the “forever curse” of irradiated nuclear fuel within just years or decades, despite knowing that it is forever hazardous and needs to be carefully kept track of and kept out of the environment.

Far from losing track of the meaning of the ancient cave paintings in France and Spain, some tens of thousands of years old – and thus several times older than even the Jiahu symbols mentioned above – NRC and industry managed to lose track of irradiated nuclear fuel within years or decades.

The 2009 film “Into Eternity” by Danish filmmaker Michael Madsen makes many of these points. About the proposed geologic repository for just a few Finnish reactors’ irradiated nuclear fuel at Onkalo, immediately adjacent to the Olkiluoto nuclear power plant, the filmmaker interviews only Scandinavian proponents of geologic disposal, such as Finnish and Swedish industry and government officials. No anti-nuclear activists are interviewed. But even the proponents of geologic disposal cannot agree amongst themselves on a number of very basic questions, such as, should the repository be marked, to warn future generations? For, what if future generations want to mine the plutonium in order to make nuclear weapons? If the repository is to be marked as a warning against inadvertent human intrusion, how should it be marked? Current languages will evolve, and/or go extinct, long before the radioactive waste loses its hazard. But even once the gamma hazard dissipates, the nuclear weapons proliferation risk will remain for a much longer period of time – as will the alpha-particle hazard associated with such radiotoxic elements as Pu-239. Madsen puts forth in the film that

such unprecedented risks, as presented by high-level radioactive waste, take us into the realm of the mythological. Never before has a human civilization created a hazard that will haunt all future human generations. And for what? To boil water, to generate electricity.

Couldn't the electricity have been generated in some other way? Couldn't it be now?

During the decades-long struggle against the dangerous Yucca Mountain dump proposal, more than one comic episode has occurred. Judy Treichel of the Nevada Nuclear Waste Task Force, a long time watchdog on Yucca, recounts one of the best. At a DOE public meeting, DOE flashed an artist's rendition on the screen, of potential electricity supplies for running ventilation-cooling systems at the wickedly hot Yucca radioactive waste dump, reliably for centuries into the future. An atomic reactor? No. A coal burner? Natural gas? No. Rather, a mountain-side of solar panels, and a valley of wind turbines. It would be the world's first renewably-powered atomic waste dump! (Never mind that the solar panels were oriented in the wrong direction, but that could be fixed in the transition from artist's rendition to engineering plan.) Judy Treichel raised her hand and was called upon. "Couldn't the electricity generated by atomic reactors that produced the high-level radioactive waste have been made by renewables in the first place?" she asked. DOE didn't show that image of solar panels and wind turbines electrifying the Yucca's dump's ventilation-cooling systems any more after that, but the "institutional memory" of Yucca watchdogs keeps the story alive, many years later!

Even NRC's citation on Page 1-15 creates confusion. NRC cites DOE's "Final EIS for Yucca Mountain (DOE 2008)." But DOE's FEIS for Yucca is dated February 2002. Perhaps NRC is referring to a Supplement to the Yucca FEIS, of which there were a number? Yucca's Final EIS wasn't final, after all, as the resistance to the dangerous plan mounted over time, and as the site's hydrological, geological, seismological, volcanological, etc., risks could no longer be suppressed. NRC Chairwoman Dr. Allison Macfarlane's and U.S. Nuclear Waste Technical Review Board Chairman Dr. Rod Ewing's book, *Uncertainty Underground*, is one of the best treatments of the subject between two covers

(<http://www.state.nv.us/nucwaste/news2006/pdf/nv060707macfarlane.pdf>).

In addition to the replacements described on Page 1-13, the "routine maintenance," for a million years or longer, would add to the on-site and/or away-from-reactor costs even more. Again, NRC has not described how much maintenance and replacement forevermore will cost, nor identified where those funds will come from.

Given that the U.S. Circuit Court for the District of Columbia last month ruled that DOE should ask Congress to end the collection of the Nuclear Waste Fund fee from nuclear electricity consumers, there will be even less money to work with in the future than there has been in decades past, concerning high-level radioactive waste management.

Re: Page 1-14's discussion of Dry Transfer Systems (DTS), has this ever been done anywhere? At such a scale? How much will that cost at each site? NRC describes a prototype DTS that was actually abandoned before completion at Idaho National Lab. How can NRC assume all will go swimmingly with DTSs, till the end of time, when the prototype DTS, at INL, did not even go well?

Given the power of fanciful assumptions, why did NRC not assume replacement pools at reactor sites? Because pools would cost more than DTSs? But NRC hasn't identified how much DTSs would cost, nor where the money would come from.

What are the risks with DTSs? Although NRC has described a stuck fuel assembly during a DTS operation, that could remain stuck for two weeks, it assumes the incident would be resolved (without explaining how), with no significant impacts. NRC has largely, again, assumed safety, rather than analyzing risks. In this way, the DGEIS is meaningless, and violates NEPA, as well as the Atomic Energy Act.

On Page 1-12, in Figure 1-1, NRC assumes up to 80 years of operations at commercial reactors. That is, two 20-year license extensions, in addition to 40 years of initial operations. But how much high-level radioactive waste would that amount to, if all currently operating U.S. reactors were to continue to generate irradiated nuclear fuel for 80 years?

Doesn't this conflict with DOE's assumption of 50 years of operations at commercial reactors, as assumed in its 2002 FEIS on Yucca? The DOE's Yucca FEIS, as at Table A-8 on Page A-16, assumes 105,414 Metric Tons of Heavy Metal in terms of quantities of irradiated nuclear fuel to be generated by the commercial nuclear power industry in the U.S. by 2046. Are NRC's assumptions in this DGEIS compatible with DOE's projections, or not? Wouldn't 80 years of commercial reactor operations result in significantly more irradiated nuclear fuel being generated than DOE assumed in its 2002 Yucca FEIS? Given that DOE has estimated Yucca's price tag, had it been constructed, opened, and operated, would have approached \$100 billion (for just the first 63,000 MTHM of commercial irradiated nuclear fuel, per the limit set in the Nuclear Waste Policy Act of 1983, as Amended), how much does NRC calculate future commercial irradiated nuclear fuel disposal will cost, all told? Where will that money come from? Who will pay it? These questions are not answered in NRC's DGEIS. How then, can NRC grant *carte blanche* to the nuclear utilities to generate as much irradiated nuclear fuel as they want, as it proposes to do by finalizing this DGEIS and issuing a Record of Decision?!

On Page 1-16, at lines 13-14, NRC states: "The spent fuel is moved from the spent fuel pool to dry cask storage within the short-term storage timeframe." By NRC definitions, this means that high-level radioactive waste could remain in the storage pool throughout the decommissioning period, for up to 60-years post reactor shutdown. The Atomic Age has given new, Orwellian meanings to words, such as "short-term storage timeframe" referring to up to 140 years of pool storage (including during up to 80 years of reactor operations, and up to an additional 60 years post-reactor shutdown), well over half as long in terms of years into the future, as our country has been independent from the British Empire in terms of years into the past (1776 to 2013, 238 years).

On Page 1-17, lines 16-20, NRC makes the flippant assumption that: "Sufficient low-level waste (LLW) disposal capacity will be made available when needed. Historically, the demand for LLW disposal capacity has been met by private industry. NRC expects that this trend will continue in the future. For example, in response to demand for LLW disposal capacity, Waste Control Specialists, LLC, opened a LLW disposal facility in Andrews County, Texas on April 27, 2012."

NRC neglected to mention that several career Texas state environmental protection agency officials resigned their jobs, and careers, in protest over the decision to open WCS, nor that WCS now threatens the Ogallala Aquifer – essential to numerous Great Plains States for drinking and irrigation water – with radiological contamination.

All the more ironic is the fact that NRC is essentially parroting itself here, claiming "Waste Confidence" vis a vis so-called "low-level" radioactive waste. For, in 2010, although it dared no longer give a "date certain" for the opening of a high-level radioactive waste repository, NRC nonetheless expressed its "confidence" that one would open "when needed."

But, as reported by the *New York Times*, the D.C. Circuit Court of Appeals didn't buy NRC's "Waste Confidence" regarding such rosy prospects for the opening of a repository: "The commission apparently has no long-term plan other than hoping for a geologic repository," the appeals court wrote.' ("Court Forces a Rethinking of Nuclear Fuel Storage," by Matthew L. Wald, *New York Times*, June 8, 2012, posted online at http://www.nytimes.com/2012/06/09/science/earth/court-says-nuclear-agency-must-rethink-fuel-storage.html?_r=2&). The article is submitted as Exhibit N.

At Page 1-17, lines 22 to 24, NRC states: "These analyses are not intended to be, and should not be interpreted as, representative of any specific storage facility or site in the United States where spent fuel is currently stored or could be stored in the future."

This passage rings oddly legalistic in sound. That's a very strange thing to say. So this entire DGEIS is essentially a fictitious, meaningless document? With no connection to reality?

Re: footnote 3 at the bottom of Page 1-17, it should be pointed out that 80 years of operations should just be assumed, as a given, if NRC's granting of rubberstamps for 60 years of operations is any indication. Of 73 license extensions for 20 additional years of operations sought, all 73 have been approved by the Nuclear Rubberstamp Agency. Not one has been denied, no matter how age-degraded or problem-plagued the reactor, no matter how rogue the nuclear utility applying for the extension, nor how non-existent the safety culture amongst the reactor's management and workforce. The most painful such example, perhaps, was Vermont Yankee – NRC staff rubberstamped its 20-year license extension, despite deep, widespread opposition throughout Vermont and neighboring states, within days of the Fukushima triple-meltdown, at reactors of identical design and vintage to Vermont Yankee – GE Mark Is BWRs. If any applicant approaches NRC for approval for 80 years of operations, a rubberstamp is all but assured. NRC is itself a rogue, captured agency, captured by the industry it is supposed to regulate. This is very frightening, and dangerous. The Japanese Parliament concluded that the root cause of the Fukushima nuclear catastrophe was collusion between industry, regulator, and elected officials. We have that in spades here!

Re: Page 2-6, footnote 4, and its associated text, NRC needs to update the EIS by clarifying that Crystal River and Kewaunee have not just announced plans to permanently shutdown, but have in fact done so. In addition, so have San Onofre 2 & 3. Vermont Yankee has also announced that it will shutdown by the end of 2014. The good news from all this, of course, is that those five reactors will no longer generate irradiated nuclear fuel – the only real solution to the problem is to not generate it in the first place.

At Page 2-7 (lines 24-27) to 2-8 (lines 1-2), NRC states "For purposes of analysis in this draft GEIS, the NRC relies for impact analysis on the larger reactor lifetime amount of spent fuel discharged at low burnups (i.e. 1,600 MTU), unless otherwise stated in the description of environmental impacts. This is because many of the environmental impacts (e.g., land use, geology and soils, and terrestrial resources) will depend upon the greater amount of space needed to store the larger amounts of spent fuel that would be generated at low burnups." The aspect that NRC seems to not comprehend is that high burnup irradiated fuel very likely will require, as compared to low burnup fuel, more space and time in the storage pool for sufficient thermal cooling and radioactive decay; and/or more space and time in dry cask storage – perhaps with enhanced features, such as added cooling features, and/or radiation shielding; and/or more space in a repository setting. This, due to the added heat and radioactivity emanating from high burnup fuel.

Also on Page 2-8 (lines 14-16), NRC states "Because the MOX fuel is substantially similar to existing uranium oxide light water reactor fuel and was, in fact, used in existing light water reactors in the United States, it is within the scope of this draft GEIS." (Similar text is stated at lines 24-27.)

While MOX irradiated nuclear fuel certainly should be within the scope of this GEIS, given that its use is still on the table in the U.S., despite opposition to such use by countless groups, including Beyond Nuclear, it must be pointed out, and the record set straight, that MOX irradiated fuel is not like "typical" irradiated nuclear fuel. MOX irradiated nuclear fuel would be thermally hotter, as well as significantly more radioactive, in terms of its added plutonium content. MOX irradiated fuel could require more space and time in storage pools for cooling

and radioactive decay, as well as enhanced safeguards against inadvertent criticality; could require upgrades to typical dry cask storage; and could require more space within a repository setting.

On Page 2-11, NRC speaks confidently about high-level radioactive waste storage pools' robust design and structure, including "leak-detection systems." This begs the question, how then did so many pools, as are listed in Table E-4 on Page E-20, leak into the environment, sometimes for years, or even decades on end, without the nuclear utility nor even the NRC knowing about it? In short, NRC's confident claims about pools' robustness and leak-proof nature don't hold water.

At lines 12-14 on Page 2-16, NRC states: "Following the terrorist attacks on September 11, 2001, the NRC issued Orders to ISFSI licensees to require certain compensatory measures. For example, on May 23, 2002, the NRC issued an Order to GEH Morris wet storage ISFSI (NRC 2002b)."

But in August or September 2002, while traveling through Morris, IL, I saw with my own eyes that the GE Morris ISFSI was "wide open" to a potential attack. Although anti-car bomb concrete "Jersey" barriers had indeed been installed, they had been parted open, wide enough to allow a vehicle to drive through. And although a law enforcement squad car was parked there, its door was wide open, revealing that the car was in fact unoccupied. I witnessed this obvious security breach while just happening to pass by, which does not instill confidence in the security status of the GE Morris ISFSI.

On Page 2-18, NRC claims "The [PFS LLC] site would be located in the northwest corner of the reservation approximately 6 km (3.5 mi) from the Skull Valley Band's village." Having spent considerable time in the Skull Valley Band's village, as part of the resistance against the environmentally racist radioactive waste dump proposal, I find it hard to believe that the distance between the residences and targeted dumpsite was actually that great. I think the distance was shorter. Fortunately, this is now an academic point, as the dump proposal has been cancelled. NRC should really not be citing PFS, LLC in any positive way whatsoever, given the environmental injustice it represented, and its very welcome cancellation – that is, failure – despite NRC's rubberstamp of the construction and operating license.

I have submitted, as Exhibit O, the group letter, signed by 437 environmental and environmental justice groups, urging NRC to not license PFS, LLC, as a matter of environmental justice. NRC did anyway – a grave violation of environmental justice. The letter is posted online at:

<http://www.nirs.org/radwaste/scullvalley/skullvalleygoshutesgroupltr772005.pdf>

NRC continues to violate EJ, by citing PFS, LLC (even though it was cancelled a year ago) as a model, as proof positive that parking lot dumps can be licensed.

On Page 2-25 (lines 13-16), NRC states: "Beyond the decommissioning period, the NRC assumes that all of the spent fuel has been transferred to a dry cask storage system in an at-reactor or away-from-reactor ISFSI, **as no other option currently exists.**" (emphasis added) This is a refreshingly frank admission, for a change, coming from NRC! But we would add, these on-site, or away-from-reactor (centralized "parking lot dumps") ISFSIs could very well themselves become *de facto* permanent surface storage facilities – or dumps. The on-site ISFSI at Surry, VA has been there since 1986, with no end in sight. The so-called "away-from-reactor" ISFSI (wet pool storage) at GE Morris in IL (so-called, as the Dresden nuclear power plant's three reactors are just a half-mile away!) has been there since the late 1960s, with no end in sight. The list of examples is a very long one.

At Page 2-26, NRC admits, re: "Activities at At-Reactor ISFSIs," that there is but "limited physical and continuous electronic surveillance." Thus, ISFSI security leaves a lot to be desired! This is certainly the case at the Big Rock Point ISFSI in northwestern MI, the Palisades ISFSIs in southwestern MI, and many other sites! But security is not the only risk being neglected. So is safety. Even such basic safeguards as radiation monitors, temperature monitors, and pressure monitors are not required on ISFSIs, remarkably. At a site like Big Rock Point, MI, this is all the more alarming. NRC has permitted once every two week walk by inspections. This means a problem could be underway for two weeks, and Entergy Nuclear could well not even know about it!

NRC's statement, at line 21-22, that "A licensee will also maintain an emergency response plan for ISFSI-related events," is a significant admission that ISFSI emergencies are indeed possible. Whether or not the emergency response plan is adequate is a significant question. And Dominion Nuclear has requested an exemption from NRC, as of June 2013, that it not be required to have any Emergency Planning Zone requirements in place – even though its pool is still full. So any claims by NRC that emergency preparedness will remain in place for dry casks is suspect – as it appears poised to relieve Kewaunee of any such requirement re: its pool!

At lines 23-24, NRC states "In accordance with 10 CFR 72.42, the initial license term for an ISFSI must not exceed 40 years and licenses may be renewed upon NRC approval for a period not to exceed 40 years." This reflects a decrease in NRC safety oversight, over time. In the early 1990s, casks were certified for 20 years of operations, with the option for 20 year renewals. But last decade, by a split vote (Chairman Diaz dissented), the NRC Commission allowed for 40 year extensions at one fell swoop. That first one went to Surry, which happens to have the oldest ISFSI in the U.S. *Prima facie*, it is fair to say that NRC doubling ISFSI license extensions from 20 to 40 years (both for initial licensing, and for license extension) marks a significant decrease in regulatory oversight.

On Page 2-26 (lines 32-35) to 2-27 (lines 1-2), NRC states: "The kinds of aging effects managed under an aging management program include, but are not limited to: concrete cracking and spalling; loss of confinement; loss of material; and reduction in heat transfer (e.g., by blocked air duct screens). The application of aging management programs may include structure monitoring; monitoring of protective coating on carbon steel structures; ventilation surveillance; welded canister seal and leakage monitoring programs; and bolted canister seal and leakage monitoring programs (DOE 2012b).

It was just such meaningful oversight on aging degradation issues at Palisades ISFSIs that environmental interveners were seeking during the license extension proceeding, particularly in regards to the defective cask already identified there. But the interveners were rebuffed by NRC's ASLBP.

On Page 2-27, line 5, it is unclear why NRC writes "private fuel storage facility environmental impact statement," all in lower case. Private Fuel Storage, LLC was a proper name. The phrase "Environmental Impact Statement" is also usually capitalized when used in this way.

On Page 2-27, NRC writes "The proposed PFS facility was designed to store up to 40,000 MTU (44,000 tons of spent fuel) and was licensed to operate for 20 years. The NRC now allows an initial license term of 40 years with 40-year renewal terms, representing a decrease in safety regulatory oversight.

As mentioned above, 437 environmental and environmental justice groups protested NRC's licensing of PFS (see their letter, posted online at <http://www.nirs.org/radwaste/scullvalley/skullvalleygoshutesgroup1tr772005.pdf>). But NRC's oversight has been weakened even more since then, now allowing 40 year initial licensing for ISFSIs, followed by 40 year license extensions.

At Page 2-27, lines 10-12, NRC states "it should be recognized that the environmental impacts of constructing and operating an away-from-reactor ISFSI would be evaluated in more details (sic) in an environmental review associated with a site-specific license application." But NRC really doesn't know what it's talking about, as it

has never really done one. It's all assumptions. If PFS, LLC is the best they've got to point to, it doesn't instill much confidence. Its licensing was highly controversial, for good reason; and in the end, it got cancelled!

At line 18, NRC states "Groundwater wells could be installed for potable water use or aboveground storage tanks could be erected for potable water and water for fires and the batch plant." Re: fires at an ISFSI, would fire fighting water help or hurt, in terms of a zirconium fire, once initiated, as in a dry cask, a risk that Dr. Gordon Thompson, expert witness on behalf of dozens of environmental groups, has identified in this proceeding.

At line 23, NRC states: "If a repository becomes available, operations could include the transfer of spent fuel canisters to shipping casks and transportation to the repository." While the federal courts have ordered NRC to address the potential for no repository ever opening, NRC's admission here of "if, but not when" a repository ever open underscores the risk that on-site or away-from-reactor ISFSIs could well become *de facto* permanent, surface storage "parking lot dumps."

Re: Page 2-28, Section 2.2.2.1, Construction and Operation of a DTS [Dry Transfer System], the question is begged, why has NRC assumed DTSSs, instead of newly constructed wet pools for transfer of irradiated nuclear fuel? For example, a GAO study published in 2009, comparing the costs of the Yucca dump, to centralized interim storage, to long-term on-site storage, did consider the potential for installing new pools (after the old ones had been dismantled during decommissioning) for the transfer of irradiated nuclear fuel from old dry casks to new ones as containers degraded with age. However, building new pools at each site would be staggeringly expensive, measured in the tens or hundreds of millions of dollars *per pool*.

Steve Frishman, a consultant to the State of Nevada Agency for Nuclear Projects, has shared the story of a Yucca dump public meeting at which DOE officials presented ideas for the use of a large-scale pool for irradiated nuclear fuel storage, and transfer into disposal containers, at the Yucca site. After Mr. Frishman presented a number of concerns about pool storage during the discussion period, the DOE moderator called for a break in the meeting. When the meeting resumed, the DOE officials announced that the proposed pool, previously under discussion, was no longer under consideration. Dry transfer would not be the approach followed at Yucca. Cancelled, just like that, during a 15 minute coffee break!

I tell this story only to point out that a comprehensive DGEIS, which NRC should have carried out here, should have included a transparent examination of various options going forward. Pools? DTSSs? Some combination thereof? No such comparisons have been carried out. No explanation has been given as to why DTSSs were assumed, as opposed to pools. Given the large risks associated with irradiated nuclear fuel, NRC should have carried out a particularly "hard look" under NEPA at the pros and cons of various options, but has not done so.

At Page 2-28, lines 20 and following, NRC states "...the receiving cask lid and outer and inner canister lids are removed. Finally, the receiving cask is moved into the lower access area and mated to the transfer confinement area..." and so on.

NRC makes transfer of irradiated nuclear fuel sound so smooth and simple. Reality will be different, especially considering fuel degradation with age. Irradiated nuclear fuel could simply fall apart. What can be done then? Build a sarcophagus over the DTS? What about criticality risks, if fuel debris falls to the bottom of DTS, and a later flood were to inundate the inside of the structure? What about the radiological leakage risks from such a scenario, in addition to the criticality risks? NRC has simply "assumed safety" rather than analyze such potential, and even likely (over time, given age related degradation of irradiated nuclear fuel), risks.

Besides age related degradation, there is irradiated fuel that has already failed, or begun to fail, in the present day, as due to design defects, fabrication mistakes, operational damage, etc. These risks may not be off into the future – they have already begun to unfold in the present.

Page 2-29, line 3: the NRC’s mention of “effluent radiation monitoring” is a clear admission that there will be radiological releases from the DTSSs over time. The overall radiological impact on people and environment, over time, should be included in the NEPA decision making on whether, or not, the use of nuclear power to generate electricity is a wise societal decision.

While typos and grammatical errors are very minor in significance, compared to the radiological risks to people and environment of irradiated nuclear fuel, which should be the focus of this DGEIS comment and discussion, such errors are an indication of the rush NRC has displayed in racing through this EIS proceeding. NRC staff had previously indicated it would take 7 years to carry out such an EIS. Instead, a mere two years has been allotted. But one unpleasant aspect of NRC’s rush job has been its enforcement of mere three minute public comment opportunities at meetings across the country. It is certainly difficult to say much in three minutes about a topic as societally significant, not just for current, but for all future generations, as irradiated nuclear fuel generation, storage, and disposition. This NRC rush job may explain the large number of typos, grammar errors, and other mistakes in the DGEIS text, such as this one:

Line 10, “...construction of a new ISFSI pads adjacent to, or nearby, the initial pads”

At Page 3-1, lines 2 and following, NRC states: “the affected environment is the environment that exists at and around the facilities that store spent nuclear fuel (spent fuel) after the end of a reactor’s licensed life for operation.”

But of course, if the irradiated nuclear fuel spills into Lake Michigan, for example at the Big Rock Point and/or Palisades nuclear power plant sites on Michigan’s Lake Michigan shoreline, then it will flow downstream; if it leaks into the air, it will blow downwind. Over vast distances. It would re-concentrate up the food chain, atop which humans sit. And the effects would persist for many generations into the future. So, NRC’s definition of the potential “affected environment” needs to be expanded, significantly.

Re: lines 5 and following, “Where appropriate, this chapter will discuss the environmental impacts during reactor operations to establish the baseline affected environment at the beginning of continued storage.”

But reactor operations is not an appropriate baseline. The pristine environment that existed before the reactor was built is the appropriate baseline, at least from a radiological perspective. To exploit the fact that the adjacent reactor has already radioactively contaminated the environment, to justify further radioactive contamination from forevermore radioactive waste storage, is not appropriate.

At Page 3-2, lines 1 to 13, NRC states that nuclear power plants are often located in areas surrounded by “wooded or agricultural areas;” “undeveloped land (forest, wetlands, herbaceous cover, and shrub/scrub land), agricultural land, or open water;” “open water, forest, wetlands, and agricultural;” “agricultural land, open water, and forests.”

Left unstated is the reason for locating nuclear power plants in such undeveloped, or at least sparsely populated lands, or near open water: to create a buffer zone, so nearby, densely concentrated populations are not being exposed to “routine” radioactivity releases, and are further away if catastrophe strikes. But what

about the radioactive contamination of food? Of drinking water? Of fisheries? That results from the location of U.S. nuclear power plants?

Re: Page 3-3, lines 13 and following, “Some plant owners lease land for agricultural (farming) and forestry production, permit cemetery and historical site access, and designate portions of their sites for recreation, management of natural areas, and wildlife conservation.” – what about the contamination of food that results? Should persons be allowed to come close to the nuclear power plants? Doesn’t this increase their risk of radiogenic harm? Doesn’t this increase security risks? Don’t the nuclear plants irradiate wildlife?

Re: lines 19 and following, “Spent fuel pools are housed in shield buildings at nuclear power plants with boiling water reactors or in fuel buildings at plants with pressurized water reactors...”--The shield buildings, so called, did not survive the earthquake, tsunami, meltdowns and explosions in March 2011 at Fukushima Daiichi nuclear power plant in Japan. Now, those high-level radioactive waste storage pools, at Fukushima Daiichi Units 1, 2, 3, and 4, are exposed to the open air. The U.S. has 23 identically designed GE BWR Mark I reactors still operating. The U.S. has an additional 8 similarly designed GE BWR Mark II reactors still operating. Attached to these comments is a fact sheet I wrote in the aftermath of the Fukushima Daiichi nuclear catastrophe re: Mark I and II HLRW storage pool risks in the U.S. The NRC should address those risks in this DGEIS, but has not done so.

Re: NRC’s mention of “reinforced concrete pads” at line 35--At Palisades in MI, the pads are “reinforced” with 55 feet of loose sand underneath. That is, although they are three feet thick themselves, the pads are not anchored to anything. They are “floating” on top of 55 feet of loose sand. They are located right next to Lake Michigan, source of drinking water, and so much more, for tens of millions of people. This is a violation of NRC earthquake safety regulations, and a major risk to Lake Michigan. At Dresden in IL, the pads are “reinforced” with dirt, next to the river, thanks to an NRC regulatory exemption due to a bad pad pour. During a tour of nuclear industry and government regulatory officials conducted of Dresden’s ISFSI in September 2001, as part of the PATRAM [Packaging and Transportation of Radioactive Materials] conference I attended, an Exelon spokesman overseeing the ISFSI pad admitted that NRC had granted an exemption do to the bad cask pour.

Re: Table 3-1 on Page 3-4—Discussions of the land area requirements for dry cask storage can be significantly misleading, if context is not provided. An acre here, a half-acre there, 4/100ths of an acre there, sound like very small impacts in the grand scheme of things. Nuclear power proponents in the U.S., be they industry or government spokesmen, are wont to speak of the football stadium metaphor – all the irradiated fuel ever generated in the history of the U.S. nuclear power industry would only fill a football field to a certain height above the ground. The Canadian nuclear establishment equivalent utilizes a culturally-appropriate alternative – a hockey rink filled up so high with irradiated nuclear fuel. Of course, there’s no discussion of what would happen if that much irradiated nuclear fuel were actually piled that deep in one place. It would likely catch fire, due to quickly overheating, and lead to the biggest radioactive inferno the world has ever seen. And you certainly wouldn’t want to have fans in those stands – without radiation shielding, even those in the bleacher seats would be at grave risk of fatal doses, especially if the waste caught on fire. Of course, it’s not the volume of the waste, or the land area of the containers needed to keep it cool and isolate it from the environment, that constitute the most significant impacts. It’s the forever deadly nature of the material, and the risks should it ever escape into the environment, that much be addressed.

NRC’s dismissive remarks about rural economies, at Page 3-4, line 17 and following, leaves a bad taste. After all, it was the local concerned farmer at Clinton, IL, who not only educated me about NRC’s Nuclear Waste Con Game, but prompted NRC’s meeting facilitator, Chip Cameron, to have to remind his colleagues about the policy’s existence. Of course, the impacts of nuclear power – including, relevantly here, its forever deadly high-

level radioactive wastes – are of LARGE significance to agricultural areas of this country that have the dubious “honor” of “hosting” them – from Clinton, IL to Kewaunee, WI and many other sites.

At line 23, NRC’s describing the Indian Point, NY and Limerick, PA areas as “semi-urban” is puzzling? There are 21 million people within 50 miles of Indian Point! That is the most urbanized geographical area surrounding any nuclear power plant in the U.S.! And Limerick has some of the highest casualty figures on the CRAC-2 charts! Again, the 50 mile radius surrounding Limerick’s two reactors, and on-site irradiated nuclear fuel storage facilities, is amongst the most urbanized areas in the entire country! By the way, CRAC-2 refers to Calculation of Reactor Accident Consequences. The report is also known as the 1982 Sandia Siting Study or as NUREG/CR-2239. I specify this, because at the Davis-Besse license extension oral argument pre-hearings held in Port Clinton, OH on March 1, 2011 (yes, ten days before the Fukushima Daiichi nuclear catastrophe was to begin), FirstEnergy Nuclear’s attorneys, as well as NRC’s attorneys and staff, as well as the ASLB panelists themselves, claimed not to know what CRAC-2 referred to.

Re: the bottom of Page 3-4, top of Page 3-5—NRC’s socioeconomic analysis gives undue attention to the so-called “benefits” derived from “hosting” a long-term ISFSI. What about the negative economic consequences of being stuck with irradiated nuclear fuel for the long-term, perhaps forever? The radioactive stigma effect alone could prove very significant, in a negative way. As but two examples. Big Rock Point’s decommissioning ended in 2006. NRC has blessed the release of that site for unrestricted reuse, despite the radioactive contamination of the environment that still lingers (something that environmental watchdogs have protested, as in this report I wrote in 2006: <http://www.nirs.org/reactorwatch/decomissioning/bigrockbackgrounder272007.pdf>). But, because of the presence of 7 dry casks holding irradiated nuclear fuel, and an additional dry cask holding Greater-Than-Class-C so-called “low-level” radioactive waste, no development of that site can be expected anytime soon.

Likewise, at an end of cycle annual meeting near the Kewaunee nuclear power plant in northern WI in June 2013, a number of concerned local residents – many of them farmers – expressed their dissatisfaction that irradiated nuclear fuel would remain on-site for the long-term future. They could not envision any alternative use of the land, while the irradiated nuclear fuel is stored there, not only due to safety and security concerns, but also because of the stigma involved. Certainly, those local residents who attended this NRC public meeting did not regard long-term ISFSI storage at Kewaunee as an economic boon for their area – quite to the contrary.

Re: Page 3-5, line 1 and following—Again, NRC’s flip examination of supposed economic benefits is all the more ironic, given its shallow analysis of the risks of irradiated nuclear fuel generation, storage, and disposition in this DGEIS.

Those risks are potentially catastrophic, whether they unfold from pools or dry casks, whether due to accident, attack, or leakage. But so few people have been assigned to worry about such risks, it seems. And, as evidenced by this DGEIS itself, even those assigned to analyze the risks – under court order – have not done so. They have downplayed the risks, to the point of ignoring and even denying them, while here examining supposed benefits. This is very telling, not only about the nuclear utilities’ attitude toward irradiated nuclear fuel risks, but even that of the NRC staff.

As the old saying goes, “follow the money.” Why are such potentially catastrophic societal risks taken by industry, and allowed by NRC? Well, vast fortunes are being made. The nuclear power industry, with lots of help from friends in government, have largely succeeded in externalizing their costs, risks, and liabilities onto the public, whether the rate-paying public, or the taxpaying public (actually, most people I know are both ratepayers and taxpayers!). Meanwhile, the industry pockets the profits made from large-scale electricity generation, not to mention the large-scale subsidies enjoyed, again, at the expense of the public. Why does industry and NRC work so hard to convince themselves and others that nothing could possibly go wrong with irradiated nuclear fuel? Why don’t they do the health studies re: what “routine” radioactivity releases alone are doing to health in the area of atomic reactors and irradiated nuclear fuel storage sites, let alone the health and safety risks from potential disasters? To do so would risk the lucrative business they profit from, of course. So

risks are downplayed in the public arena, while their armies of lawyers make sure, behind the scenes, that the companies will not be held liable if the worst happens. The public will be left holding the bag, yet again. Upton Sinclair's famous quote is apt: "It is difficult to get a man to understand something, when his salary depends on his not understanding it."

At Page 3-5, line 30 and following, NRC states "At GEH Morris, an away-from-reactor spent fuel pool storage facility; fewer than 20 full-time employees monitor and maintain the spent fuel at the site (NRC 2004)."

Fewer than 20 people, manage 772 tons of irradiated nuclear fuel at GE Morris? What about the security and safety risks of 772 tons of irradiated fuel, stored in an age-degraded facility upwind of Chicago? What if a 9/11-scale attack were launched at GE Morris, involving 19 attackers as took part in the 9/11 attacks? How many of those 20 GE Morris are actually on shift at any given time? How many of those 20 are security guards? As I described above, driving past GE Morris in September 2002, I found GE Morris's truck bomb barrier wide open, and its security squad car not only open, but unmanned. The sight did not instill confidence.

I just hope that the new ownership, General Electric-Hitachi, decides to keep the heat turned on at its Morris ISFSI facility (well, the heat in the building, and the cooling water circulation in the pool storing the 772 tons of irradiated nuclear fuel, that is!). For just a half-mile away, at Dresden nuclear power plant, Commonwealth Edison decided to turn the heat off at Unit 1 after its permanent shutdown. Eventually this led to the freezing of pipes on service water systems in the winter time, leading to a large flood in the basement. Had vulnerable pipes and other systems, structures, and components frozen on the storage pool for high-level radioactive waste at Dresden 1, a pool drain down and high-level radioactive waste fire could have taken place, causing a radioactive catastrophe for Chicago downwind.

It's interesting that even with 20 employees, GE Morris seemed unaware of a radioactive hot spot on the pool walkway that I discovered with a handheld RadAlert monitor in September 2001, on the same tour where I learned that NRC had granted Commonwealth Edison/Exelon an exemption due to the bad pad pour at the Dresden ISFSI. I was the only person on the GE Morris tour who had a real-time radiation monitor, although we all wore film badges. My RadAlert alarmed, revealing a reading of some 4,500 counts per minute, as I stood about midway down the walkway alongside the GE Morris pool. Others on the tour were surprised and even alarmed at the radiation levels my RadAlert was revealing. One of those 20 GE Morris employees, the one leading the tour, then rushed us along.

My point is, I hope those 20 workers at GE Morris, and their counterparts at Dresden right next door, are very good at what they do. Between the two immediately adjacent nuclear facilities, there are some 3,000 metric tons of irradiated nuclear fuel, one of the biggest such concentrations in the entire country. This is a mother lode of radioactive risk, upwind of millions in the metro Chicago area.

Re: Page 3-6, line 29 and following, it is disconcerting to learn that a mere 35 workers watch over more than 50 casks at the Maine Yankee site. It is even more disconcerting to learn that only 10 workers watch over 240 casks holding high-level radioactive waste at the Fort St. Vrain site in CO. Only a small number of whom, presumably, are security guards. How many on those teams are PR officials? What role do they play in securing and safeguarding the high-level radioactive wastes?

At Page 3-15, in Section 3.5, Geology and Soils, NRC speaks confidently about earthquake preparedness and seismic safety. But what about Palisades' dry cask storage near Lake Michigan? What about its violation of NRC earthquake safety regulations, described above?

I'd like to here finish a comment I was making that was interrupted by NRC's strict three minute rule at the Perrysburg, OH public comment meeting. I had pointed out that the War of 1812 had also raged in the Toledo area 200 years ago, begging the question, what does the next 200 years have in store for the high-level radioactive wastes stored on the surface at nearby Davis-Besse atomic reactor? And I was going to close with a comment about seismic risks in the area. Tecumseh, the great Shawnee War Chief who led a broad Native American confederation, and fought in alliance with the British against the Americans in the War of 1812, is reported to have predicted the New Madrid earthquakes of 1811 to 1813. Based on historical records of the time, such as news accounts in the eastern U.S., personal journal entries, etc., as well as physical evidence, the monster quakes have been calculated to have been around 8.0 in magnitude on the Richter scale, which would make them the largest quakes in North American recorded history. Epi-centered in New Madrid, MO, the powerful quakes reversed the flow of the Mississippi River; rang church bells as far away as Maine; and created giant waves on the Great Lakes; among many other impacts. Has the NRC analyzed the seismic risks of 8.0 magnitude, or larger, earthquakes on pool and dry cask storage in the New Madrid zone region? 200 years after those quakes struck, some seismologists are concerned they are overdue to strike again. Of particular concern are the ISFSIs at Palisades, in violation of NRC earthquake safety regulations, and immediately adjacent to Lake Michigan, part of the Great Lakes drinking water supply for 40 million people in 8 U.S. states, 2 Canadian provinces, and a large number of Native American First Nations.

Re: NRC's statement on Page 3-16, beginning at line 11, that "Commercial mining or quarrying operations are not allowed within nuclear power plant boundaries (NRC 2013a)"—this is odd, because it seems that natural gas fracking is being allowed, by NRC, and other decision making bodies, within a mere ¼ mile from the Beaver Valley nuclear power plant in Shippingport, PA. What are the seismic risks of this? On New Year's Eve, 2011, a nearly 4.0 quake struck Youngstown, OH. Fracking activities were suspected immediately, for Youngstown had never experienced such a quake before in recorded history. The Governor of Ohio acknowledged immediately that fracking activities were likely to blame. This has recently been confirmed to be the case: <http://www.nbcnews.com/science/fracking-practices-blame-ohio-earthquakes-8C11073601>.

Re: NRC's statement, on Page 3-18, lines 33 and following, that "Where shallow aquifers are immediately underlain by thick, impermeable shale or massive, unjointed carbonate strata, there is likely little or no hydraulic connection with deeper, regional groundwater flow systems."—this, of course, is entirely changed, in ways that are difficult to track, by the fracking free for all underway in many parts of the U.S. U.S. hydrogeology is being changed, in a major way, that is little understood, in many regions. NRC has not addressed the interplay between fracking and the new risks to irradiated nuclear fuel storage this represents.

Re: NRC's Section 3.8.3, Wildlife, what about wildlife being attracted to the warmth given off by ISFSIs? What about the risk to the stored irradiated fuel by wildlife nesting in or near ISFSIs, to take advantage of the warmth? Could the convection current flow paths be blocked, as by nesting debris? In North Korea, at the Yongbyon nuclear power plant, frogs and other wildlife were reported to be inhabiting the indoor irradiated fuel pool. Is there a risk of U.S. irradiated fuel storage pools being neglected to such a point during the post-reactor operations timeframe? What risks to wildlife survival, and even genetic damage, could result from such exposures to the radioactive waste facilities, over time?

At Page 3-27, re: Section 3.9.2.5, beginning at line 18, NRC states: "Other important aquatic species include cephalopods (e.g., squid and octopus), marine mammals (e.g., seals and whales), sea turtles, and reptiles. These species may be present near at-reactor storage facilities; however, because of the significantly reduced water demands for spent fuel pool cooling during continued storage, these larger organisms are more likely to avoid being impinged or entrained by the cooling system, and are therefore not discussed in Chapter 4 of this draft GEIS." But besides

risks of impingement or entrainment, what about the ongoing risks from exposure to the radioactive wastes that these species will be subjected to over time, given the coastal locations of nuclear power plants and their radioactive waste storage facilities?

At line 27, NRC wrote “underground” where it meant to write “underwater.”

On Page 3-31, lines 10-11, NRC states “the NRC reviewed historic and cultural resource reviews that were performed for 40 license renewals.” The Don’t Waste MI/NIRS intervention against the 20-year license extension, from 2005 to 2007, featured a Historic and Cultural Resources proposed contention, as well as extensive public comment on the EIS component of the proceeding. Although the ASLB panel refused to grant a hearing on the merits of the contention, NRC staff was pressured to bring in additional expertise to address our allegations of significant cultural resources on-site put at risk for the license extension. NRC claimed to have reached a strict agreement with the nuclear utility to assure protection of the Native American cultural resources already identified, and those that have not yet been, located on the Palisades site. The environmental intervention and comment made a significant difference for the better in that proceeding.

At Page 3-31, line 20, where NRC states “It is unlikely that historic and cultural resources are present within heavily disturbed areas,” they failed to clarify that this is because the damage is already done. Any resources formerly located there have long since been destroyed.

Page 3-32, re: noise that is “otherwise annoying” or irritating—will live gunfire exercises, for security personnel training, continue forevermore into the future at irradiated nuclear fuel storage sites, as they do currently at nuclear power plant sites?

Re: Page 3-36, Section 3.14.4, Nonradioactive, Nonhazardous Waste, at Big Rock Point in MI, radioactive waste was simply treated as if it weren’t, and was dumped in the Waters Twp., MI household trash landfill. Such “clearance level” or “below regulatory concern” exemptions permitted by NRC are unacceptable.

Re: line 31, “Waste minimization techniques employed by the licensees may include source reduction and recycling of materials either onsite or offsite”—This is quite Orwellian – “recycling” hazardous wastes? Into WHAT?! What are the risks to people and the environment of doing that? What is the motivation? To save industry money on disposal costs for toxic waste?

Re: Page 3-37, Section 3.15 Transportation, where NRC admits: “For transportation of radioactive material from a nuclear power plant site, the affected environment includes all rural, suburban, and urban populations living along the transportation routes within range of exposure to radiation emitted from the packaged material during normal transportation activities or that could be exposed in the unlikely event of a severe accident involving release of radioactive material. The affected environment also includes those members of the public that could be exposed to radiation emitted from the packaged material during normal transportation activities including people in vehicles on the same transportation route, people living along transportation routes, and people at truck stops and workers that are involved with the transportation activities”—Given this admission, NRC should have expanded its public comment opportunities, given this important issue of transportation risks more focus and attention, and held public comment meetings along likely transport corridor locations on the roads, rails, and waterways to centralized interim storage, away-from-reactor, parking lot dumpsites. No such focus, attention, or meetings took place in this entire public comment proceeding.

Re: Page 3-38, Section 3.16.1, Radiological Exposure, NRC states: “The Atomic Energy Act of 1954 requires the NRC to promulgate, inspect, and enforce standards that provide an adequate level of protection for public health and safety and the environment”—The highly legalistic phrase, “adequate level of protection for public health and safety and the environment,” seems highly significant. Could NRC please say the phrase in plain English, and explain what it means more clearly to non-lawyers, and a lay public audience? An NRC staffer from ORR, Office of Regulatory Research, Jennifer Uhle, in recent months, at an NRC HQ public meeting held in the Commissioners Conference Room on a parallel matter, Expedited Transfer of Spent Nuclear Fuel from Pools to Dry Casks, shed light on this question. She explained that adequate protection meant that NRC was allowed to increase societal latent cancer fatality rates by a level of one tenth of one percent of latent cancer fatality rates already present in society. Is this true? Could NRC elaborate in this proceeding on this? Re: radiation poisoning deaths in a nuclear accident, Ms. Uhle explained that “adequate protection” still allows NRC to increase societal norms of accidental death by a level of $1/10^{\text{th}}$ of 1 percent, as well. Are auto accident deaths included in the figure for already existing societal norms? What other kinds of accidental deaths are included in that societal norm figure? Could NRC kindly provide the figures for how many additional latent cancer fatalities it is allowed to permit from nuclear power industry approvals? And how many additional radiation poisoning deaths is NRC allowed to add onto our society’s figure for accidental deaths from other causes, in its risk balancing decision making re: safeguards to take against reactor catastrophes, or, in this context, radioactive waste catastrophes?

Re: Page 4-1, at line 10, where NRC states “In the short-term storage timeframe, the NRC evaluates the impacts of continued storage of spent fuel for 60 years beyond the licensed life for operations of a reference reactor.”—60 years as “short-term”? But this is 60 years of pool storage beyond the cessation of reactor operations, which themselves could have gone on not 40 years (initial operating license), not 60 years (including one 20-year license extension), but 80 years (including a second 20-year license extension). That’s up to $80 + 60 = 140$ years of pool storage, referred to by NRC as “short-term.” The Atomic Age has certainly given Orwellian new meanings to words like “short-term,” if 140 years of high-level radioactive waste storage pool risks are included in that definition!

Longer-term, if 200 to 300 years of on-site storage are under consideration, it must be pointed out that this would be longer-term than our country has even had its independence from Great Britain thus far (1776 to 2014 is 238 years).

But of course, NRC has – absurdly -- blessed forever on-site storage as “adequately” safe!

Re: Page 4-2, lines 18-22, “the NRC assumes that the ISFSIs are completely replaced every 100 years. This replacement activity would require separate site-specific authorization from the NRC before the start of any replacement activities. NRC authorization to relicense or replace an ISFSI and NRC authorization to construct, operate, and replace a DTS are separate licensing actions that would require an NRC review. They are considered Federal actions under NEPA and would be undertakings under the National Historic Preservation Act (NHPA).”—NRC’s assumption, that it’ll be around, and these laws still in force, centuries or millennia into the future, is absurd, with so historical, or rationale, basis whatsoever. No government has ever last that long. Few human institutions of any description have even lasted millennia, let alone forever, as NRC is assuming it will do, and the nuclear industry will do.

Re: Page 4-3, beginning at line 1, where NRC states “The TMI–2 ISFSI is a modified NUHOMS spent fuel storage system (designated NUHOMS-12T) with 30 horizontal storage modules (DOE2012). It was licensed by the NRC in March 1999 and contains spent fuel from the damaged TMI-2 reactor (a single reactor core). Although the NUHOMS–12T storage module contents are core debris (not fuel assemblies) and the debris storage canisters could not be treated like fuel cladding, the design of the NUHOMS–12T accounts for these

technical differences. Each NUHOMS–12T module provides for the horizontal dry storage of up to 12 TMI–2 stainless-steel canisters inside a dry shielded canister, which is placed inside a concrete horizontal storage module. The NUHOMS–12T modification includes venting of the dry shielded canister through high-efficiency particulate air grade filters during storage.

The vent system allows for release of hydrogen gas, generated due to radiolysis, and monitoring and/or purging of the system during operation (DOE 2012).” (highlight added)—It is disconcerting to learn that TMI-2 is still generating hydrogen, nearly 35 years since the meltdown! Is the venting required in order to prevent gas pressure damage, or even an explosion, in the container? Is the hydrogen gas tritiated? What radiological impact is tritium releases from TMI-2’s damaged fuel storage having on Idaho residents downwind of the INL storage location? Are other radionuclides being released along with the vented hydrogen gas? Noble gases? What biologically interactive decay products do the escaping radioactive Noble gases convert into?

On Page 4-4, lines 27-28, NRC states “ISFSIs are designed as passive systems that require no power or regular maintenance other than routine visual inspections and checks of the cask ventilation system (e.g., for blockages of ducts).”--But what about when institutional control is lost, and those manual inspections and checks are abandoned, along with the ISFSIs themselves? For a decade, NRC has allowed Big Rock Point personnel to limit “walk by” inspections to once every two weeks. So, an incident could be under at Big Rock Point even now – such as a vent blocked by trash, debris, sand, etc., and Entergy Nuclear would not even know about it for up to two weeks – risking overheating of the irradiated nuclear fuel, its degradation, etc.

Re: Pages 4-4 to 4-6 in the Section on Land Use--this entire Land Use section doesn’t discuss radioactivity, only physical use of land. But of course, the radioactive risks are the real issue. They impair, limit, even preclude the use of the land for other purposes.

Re: Section 4.1.3 Indefinite Storage (page 4-6) – It’s hard to understand how NRC can find SMALL impacts, when even current safety, security, health, and environmental risks due to irradiated nuclear fuel storage preclude the use of the land “hosting” the ISFSIs for any other use, as at Big Rock Point in MI.

Re: footnote #1 on Page 4-7, where NRC states “Typically shutdown units that are co-located with operating units either have a small dedicated staff or have workers from the operating units assigned and dedicated to the shutdown unit (e.g., spent fuel pool maintenance and monitoring activities).”—It was fortuitous, as conveyed in David Lochbaum’s expert witness commentary, that the worker at Dresden 1 in the mid-1990s happened to discover, by sheer luck while walking through the long shuttered Unit 1 building, a flood of leaking service water system water in the basement, due to a frozen pipe. Commonwealth Edison had decided to simply not heat the building, to save money. Had the irradiated nuclear fuel storage pool likewise sprung an unnoticed leak, a catastrophe could have unfolded!

Re: Page 4-9, Section 4.3, Environmental Justice, NRC states “Environmental justice refers to a Federal policy that ensures that minority, low-income, and tribal communities that have historically been excluded from environmental decision-making are given equal opportunities to participate in decision-making processes”—NRC has an odd notion what Environmental Justice means. In 2006, NRC rubberstamped, albeit by a split decision at the ASLB and NRC Commission levels, the PFS, LLC parking lot dump targeted at the Skull Valley Goshutes Indian Reservation in Utah. NRC had approved a nuclear power industry scheme to park 40,000 metric tons of irradiated nuclear fuel on the reservation homeland of a tiny, low income Native American tribe. This, despite the call by 437 environmental and environmental justice groups to “not go there.” See:

<http://www.nirs.org/radwaste/scullvalley/skullvalleygoshutesgroup1tr772005.pdf>. NRC approving PFS, LLC anyway led me to dub the agency the “Nuclear Racism Commission,” for its environmental injustice.

Given PFS, LLC’s inherent violation of EJ, as well as its welcome cancellation a year ago, NRC should not rely upon it as a positive example to point to, as proof that away-from-reactor storage can be licensed!

NRC states on Page 4-10, that “environmental justice, as applied at the NRC, “means that the agency will make an effort under NEPA to become aware of the demographic and economic circumstances of local communities where nuclear facilities are to be sited, and take care to mitigate or avoid special impacts attributable to the special character of the community” (NRC 2002a, 2004b). How ironic then, that NRC approved the PFS, LLC license.

At lines 13-14, NRC states “socioeconomic conditions affected by the continued storage of spent fuel as they relate to minority and low-income populations living near nuclear power plant sites would remain unchanged”—This is a strange logic applied by NRC. So, low income, and/or people of color communities, which already have “hosted” a nuclear power plant for 40 or 80 years, just have to deal with the radioactive waste forever, in addition, so there is no further disproportionate impact on them? This is a “nuclear sacrifice zone” attitude by NRC. It makes a “nuclear sacrifice zone” of a low income or people of color community, doomed forever to suffer radiological impacts, as by radioactive waste storage.

At Page 4-10, lines 24 and following, NRC describes monitoring “releases from the spent fuel pools and at-reactor ISFSI.” But any such talk, in an EJ context like this, is unacceptable. The Prairie Island Indian Community, as but one example, had suffered enough before NSP tricked their way onto the island, promoting the benefits to be gleaned from a “steam generating plant” – careful to keep the word “nuclear” out of the conversation for as long as possible. The two reactors were built against the will, and without the informed consent, of the tribe. And it’s been all downhill since. There should be absolutely no discussion of radiological releases from irradiated nuclear fuel storage facilities at a place like Prairie Island. Enough is enough. NRC makes a mockery of “environmental justice” by attempting to explain how “acceptable” or “permissible” releases from radioactive waste storage at a place like Prairie Island will be “monitored” in order to assure “environmental justice” goals!

Re: Page 4-11, lines 19 to 21, again, NRC is attempting to apply a “nuclear sacrifice zone” or “nuclear sacrifice community” logic here. The community is already negatively impacted by a nuclear power plant, so the relatively similar, albeit additional, impacts from radioactive waste storage are, therefore, no big deal. But another way of looking at it is, this community of color, low income community, etc. has already suffered enough from the nuclear reactors, and shouldn’t be burdened again with the radioactive waste.

At Page 4-14, lines 28 to 29, how can NRC so confidently claim “there would be no increase in emissions during continued storage”? What if an explosion or fire occurs? That would “increase emissions”!

At Page 4-15, line 12, why is it that “testing requirements may be reduced or eliminated for emergency diesel generators once the reactor is permanently shutdown.”?—How smart is it to do away with EDGs when the pool is still full of waste? What if something very serious goes wrong with the primary electric grid, and it would be impossible to restore before significant boiling occurs in the pool? How will the water circulation pumps on the pool be restored before a boil down fire is sparked?

NRC states at lines 18-19 that “dry cask storage systems do not have active systems (e.g., diesel generators), these activities do not involve significant releases of air pollutants.”—But of course, as Dr. Gordon Thompson has warned, a malevolent act could result in a dry cask’s contents going up in flames, in a Zr fire. Or, the cask could simply releases radioactive gases and volatile particles over time due to nothing more dramatic than simple leakage, due to age degradation and decay under the elements. That is an impact on air quality.

At Page 4-15, lines 21-22, NRC describes significant local temperature increases due to dry cask storage: “Thermal releases from the at-reactor ISFSI will cause some local atmospheric heating. Downwind from an ISFSI, ambient temperatures can increase by 2.1°C (3.8°F) at 1 km (0.6 mi) to 0.1°C (0.2°F) at 10 km (6.2 mi) from the site (NRC 1984).” Increasing the local area’s temperature, out to a distance of 0.6 miles, by nearly 4 degrees F, is a significant air quality impact, just from the thermal heat of irradiated nuclear fuel alone! It is the equivalent, on a local level, of the dire global warming impacts that the UN IPCC warn about on a global level. In fact, the two should be considered together. What is the impact of raising a local area’s temperature by nearly 4 degrees F just by storing irradiated nuclear fuel there, combined with another increase of temperature of several degrees F due to global warming? NRC has not carried out any such impact analysis. Such heat output from the dry casks would continue for how long?

Re: Section 4.4.3, Indefinite Storage, Page 4-17 to 18

Leakage of radioactivity from one or more casks in the ISFSI would mean HUGE air impacts over time! But NRC conveniently just assumes they (who are “they”?!) will just keep replacing the casks forever! What’s the price tag on THAT?! Too cheap to meter still? No! But with loss of institutional memory and control, and even societal collapse, how can NRC guarantee that will happen forevermore?! NRC can’t guarantee that!

Re: Pages 4-18 to 19, Section 4.5, Climate Change--what about radioactive C-14 releases from atomic reactor stations, irradiated fuel storage pools, etc. during decommissioning? A climate change causing greenhouse gas, plus a severe radiological hazard, all rolled into one! C-14 is a significant biological hazard. It has a very long half-life, and can integrate into the food chain and human anatomy wherever carbon does, which is just about everywhere!

Re: Page 4-20, Section 4.5.3, Indefinite Storage, indefinite could mean forever. So that rate of CO2 emission X infinity = infinity, which isn’t good for the climate, that much greenhouse gas emission!

Re: Page 4-20, Section 4.6, Geology and Soils, lines 26-28, NRC states “the NRC expects that most soil contamination from spent fuel pool leaks would remain onsite and, therefore, offsite soil contamination is unlikely to occur. Therefore, the NRC concludes that the environmental impact of spent fuel pool leaks to offsite soils

(i.e., outside the power plant’s exclusion area) would be SMALL.” This is preposterous. What about the leaks already documented?! NRC lists such pool leaks in Table E-4 on Page E-20. The leaks at Hatch in GA, Indian Point 1 & 2 in NY, Palo Verde in AZ, Salem 1 & 2 in NJ, San Onofre in CA, Seabrook in NH, and Watts Bar in TN, NRC admits have released radioactive liquid to the environment. Now NRC claims offsite soil contamination is not likely to occur?! As David Lochbaum of UCS points out in his expert witness commentary, the Brookhaven National Lab pool leak should have been included in Table E-4, or at least somewhere else in this DGEIS, rather than being left out. So too should have the Yankee Rowe pool leak. This growing list of pool leaks to the environment across the U.S. has included serious contamination of groundwater, and hence, soil.

At Page 4-22, lines 9-11, NRC states “consumptive water loss per 1,000 MW(e) for different cooling systems used at operating power plants ranges from 8,100 gpm for plants that use once-through cooling system to 14,000 gpm at plants with mechanical draft cooling towers (NRC 2013a).”--I’d have thought cooling towers would mean LESS consumption than once-through? Can NRC explain why this is?

At Page 4-23, NRC states “because surface waters in the vicinity of nuclear power plants are usually large to meet reactor cooling requirements, a large volume of surface water is usually available to dilute groundwater contaminants that flow into the surface waterbody. This dilution ensures that contaminants that may have been present above applicable groundwater-quality standards are diluted well below limits considered safe.” NRC is stating its unacceptable “dilution is the

solution to radioactive pollution” philosophy. This is a delusion, an illusion of a solution. NRC cannot call such dumping of radioactivity into the environment “safe”! “Acceptably risky,” in their opinion, perhaps, but not “safe”! NRC has carried out a cost-benefit analysis, and determined that the levels of harm to human health caused by the radioactivity releases are acceptable in their eyes, given the benefit the industry derives from the practice. For NAS has affirmed for decades that any exposure to radioactivity, no matter how small, still carries a health risk for cancer. There is no such thing as a “safe” dose. NRC cannot and should not say such a thing. NRC is intentionally misleading and deceiving the public by doing so.

On Page 4-23, lines 7 to, NRC remarkably attempts to make the argument that pool leaks are really no big deal, given how much they routinely discharge with a permit anyway:

“The NRC estimated an annual discharge rate for leakage from the spent fuel pool of 380 L/d (100 gpd) with contaminants at certain concentrations assumed to be present at the start of short-term storage. These concentrations were compared to annual effluent ranges for BWRs and PWRs. Even in the unlikely event that spent fuel pool leakage flowed continuously (24 hours per day, 365 days per year) undetected and unimpeded to local surface waters, the quantities of radioactive material discharged to nearby surface waters would be comparable to values associated with permitted, treated effluent discharges from operating nuclear power plants (see Table E-4). Based on the above considerations, the NRC concludes that the impact of spent fuel pool leaks on surface water would be SMALL.”

That is, NRC is so enamored with its own “dilution is the solution” delusion that it flippantly decides here to just double it for good measure. Now “permitted” discharges from the atomic reactor’s operations, and an equal discharge rate by accidental, unintended leak from the pool, can both flow together into local surface waters, double-dosing area residents in drinking water, double-concentrating up the food chain, downstream, and down the generations. According to NAS’s linear, no-threshold model for understanding the cancer risk associated with human exposure to radioactivity, that would simply double the risk that such releases cause cancer in surrounding, exposed populations. NRC’s flippant acceptance of pool leakage is unacceptable.

Please see Beyond Nuclear’s pamphlet about “routine radioactivity releases” from nuclear power plants, which discusses the significant health hazards this creates in the environment.

Re: NRC’s statement on Page 4-23, starting at line 20, “As passive, air-cooled storage systems, ISFSIs do not consume water and they generate minimal liquid effluents that may be discharged to surface waterbodies **during normal operation**. For example, in its consideration of water-use impacts for the renewal of the Calvert Cliffs ISFSI, the NRC determined that both direct and indirect impacts would be SMALL (NRC 2012a).” (emphasis added) What about OFF normal conditions?!

On Page 4-24, line 3, NRC states “During ISFSI demolition, a small amount of water could be sprayed from water trucks to minimize dust clouds.”—What about the radioactivity in the dust, then entering into the runoff, flowing into the soil and groundwater and surface waters?!

Similarly, at lines 16-17, NRC states “During [DTS] operations, water would be brought to the facility by tanker truck or temporary connection to public water supply for general purpose cleaning and **canister decontamination**.” (highlight added)—Again, what about the radioactivity in the dust and runoff?!

Re: Page 4-24, lines 21 to 25, NRC states “The NRC concludes that the potential consumptive use and surface-water quality impacts from continued ISFSI operations would be minimal. Consumptive use of surface water for ISFSI

replacement and DTS construction, operation, and replacement would involve amounts of water that are a small fraction of water use during reactor operations. Therefore, the NRC concludes that the potential impacts on surface-water use and quality for the long-term storage timeframe would be SMALL.”

NRC seems to be attempting to justify future, and ongoing, impacts, by pointing to past impacts that are even larger in magnitude, essentially arguing that long-term and even indefinite impacts are SMALL by comparison. This is an unacceptable attempt to “normalize” radioactivity and other impacts.

And the only way NRC can get away with this paper game is to assume that dry cask storage replacements will happen, and will go smoothly. Those are indefensible assumptions.

Essentially, NRC is making the absurd argument that impacts – whether in the so-called “short,” long, or even forever term – are essentially zero. Zero X forevermore = zero, NRC absurdly reasons. Of course, the impacts are greater than zero. And any value greater than zero X infinity = infinity, unfortunately.

At Page 4-25, starting at line 29, NRC states “in the **very unlikely event** that a leak from a spent fuel pool goes undetected and the resulting groundwater plume reaches the offsite environment, it is possible that the leak could be of sufficient magnitude and duration to contaminate a groundwater source above a regulatory limit (i.e., a maximum contaminant level [MCL] for one or more radionuclides).” (highlight added)--VERY UNLIKELY EVENT?! What about all the leaks listed in this DGEIS’s Table E-4 that NRC admits leaked radioactivity into the environment, sometimes for many years, without detection? What about the pool leaks at Brookhaven National Lab, as David Lochbaum asks, again a years-long, undetected leak?

Re: Page 4-26, beginning at line 5, where NRC states “Further, as discussed in Appendix E, spent fuel pool design (e.g., stainless-steel liners and leakage-collection systems) and operational controls (e.g., monitoring and surveillance of spent fuel pool water levels) make it unlikely that a leak will remain undetected long enough to exceed any regulatory requirement (e.g., the NRC dose limit or EPA-mandated Maximum Contaminant Level) in the offsite environment. Although a small number of spent fuel pool leaks have caused radioactive liquid releases to the environment, based on the available data, none of these releases have affected the health of the public (NRC 2006a).”--Re: health impacts, what about the insights documented in Kelly McMasters’ book *Welcome to Shirley: Memoir from an Atomic Town*?! Shirley, Long Island drank the groundwater contaminated with tritium and other radioactive poisons from the leaking pool at Brookhaven National Lab, which NRC didn’t even bother to include in its Appendix E. As David Lochbaum comments, the Brookhaven National Lab pool leak must be added to this analysis, and its significant impacts on the health of downstream residents, especially children, taken seriously.

Re: Page 4-46’s NRC’s statements, re: NPDES, RCRA, and SDWA, lines 36 to 40, re: nonradiological contaminants, amount to rosy, overly optimistic assumptions. What could possibly go wrong? NRC seems to be saying. It is not a conservative, protective, precautionary approach to the risks.

Casting further doubt on NRC’s over optimism, the diesel spill at Braidwood, IL, eventually led to the discovery of the massive tritium spills there (which had been covered up for a decade, with the complicity of the IL EPA

and NRC). Also, sodium fires and tritium spills have occurred at Fermi 1, as recently as 2008 – remarkably, 42 years post-meltdown, and 36 years post-shut down; in addition; decommissioning continues, after 41 years.

Re: Page 4-28, line 32, NRC's statement "The significance of potential impacts on plants and animals and their habitats depends on the importance or role of the plant or animal within the ecological community that is affected."--There are no insignificant species. (Except perhaps humans. Most other species could get by just fine without us.) But we cannot get by without them, we will find out the hard way. NRC's attitude is anachronistic, belonging (never belonging) to a much earlier phase of the "industrial extinction event" humankind has unleashed on the planet. Whether from a Native American spiritual perspective (which NRC should give serious consideration to in this EIS, as an element of EJ), to a Western scientific ecosystem perspective, no species can be regarded as insignificant.

Alanis Obomsawin, an Abenaki from the Odanak reserve, seventy odd miles northeast of Montreal, has put it well:

"...When the last tree is cut, the last fish is caught, and the last river is polluted; when to breathe the air is sickening, you will realize, too late, that wealth is not in bank accounts and that you can't eat money."

Re: beginning at line 10, Page 4-29, Section 4.9.1, "Spent Fuel Pools," NRC states "Operation of a spent fuel pool and its associated cooling system during short-term storage would require the withdrawal of water and discharge of effluents into a nearby waterbody."—As NAS has long affirmed that any exposure to radioactivity carries a health risk of cancer, NRC's admission that "effluents" are discharged into nearby waterbodies bodes ill for those who live downstream, and up the food chain. Where is NRC's serious analysis re: those discharges' radioactivity content, and their impact on human health?

On Page 2-14, line 6, NRC makes another spelling error: pernitevery.

In Table 4-1 on Page 4-30, NRC shows that a reactor requires 1.152 BILLION gallons per day for once-through cooling:

$800,000 \text{ gallons/minute} \times 60 \text{ mins/hr} \times 24 \text{ hrs/day} = 1.152 \text{ billion gallons/day}$

NRC also reveals that 10 BILLION BTUs per HOUR are discharged to environment, whether once-through cooling, or cooling towers, are used!

These are, on their face, large impacts on the environment.

But NRC yet again tries to present those large reactor impacts as somehow a justification for the smaller irradiated fuel pool impacts, of 2,800 gallons per minute water withdrawals for cooling, and discharge of 35 million BTU/hr of heat. But the pool impacts are in addition to the reactor impacts during operations. And even after the reactor permanently ceases operations, the ongoing pool impacts would be on top of the damage already done to the environment during 40, 60, or even 80 years of reactor (and pool) operations. As accumulative impacts, 60 additional years of pool impacts cannot be justified as "SMALL" by comparison. This is especially so given the radiological and other hazardous releases the pools are all too capable of.

On Page 4-31, NRC continues its arguments that irradiated nuclear fuel storage impacts are small when compared to reactor operations. But exploiting the public's numbed "shock and awe" from by the damage already done by reactors does not justify or excuse additional, cumulative impacts from irradiated nuclear fuel storage. Two wrongs don't make a right.

On Page 4-31, NRC states "Normal operation of an ISFSI does not require water for cooling and the facility would produce minimal gaseous or liquid effluents."--

But, if the ISFSI is attacked, as Dr. Gordon Thompson has commented, or involved in an accident, or simply leaks over time, then disastrous levels of hazardous radioactive gases and liquids could escape out into the environment.

Re: Pages 4-29 to 4-34, "short-term" (60 years post reactor shutdown, after as many as 80 years of operations – at Palisades, for example, 80 years of operations would end in 2051, so 60 years of pool storage beyond that would end in 2111), "long-term" (another 100 years beyond "short-term"—at Palisades, ending in 2211), and "indefinite" (aka forevermore), Nukespeak has given a whole new meaning to the word "temporary"!

On Page 4-32, NRC has stated, beginning at line 16, that "licensees are required to adhere to the protection of eagles and migratory birds under the Federal Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. In addition, coordination with State natural resource agencies may further ensure that power plant operators take appropriate steps to avoid or mitigate impacts on State species of special concern that may not be protected under other Federal statutes."--Has NRC considered the risk of eagles or other species (osprey, birds that nest on human structures) nesting on/near dry casks, given the lure of the warmth?! Loss of institutional control – no humans around – could worsen this risk. NRC has reported that dry cask storage will increase the ambient air temperature several degrees downwind, out to a distance of 0.6 miles. What is to prevent this warmth "island" from attracting wildlife, including endangered migratory birds, especially if their prey species are attracted to the warmth? What would be the impact of such species interacting at such close proximity to the radioactive waste storage. After all, mutagenic gamma radiation is allowed to emanate from dry casks at a rate of 10 mRem/hour at distances 6 feet away – and at a rate 20 times higher at the casks' surface.

Thank you.

Sincerely,

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Beyond Nuclear aims to educate and activate the public about the connections between nuclear power and nuclear weapons and the need to abandon both to safeguard our future. Beyond Nuclear advocates for an energy future that is sustainable, benign and democratic.

Consumers Power Company's and NRC's assurances to the court, under oath and penalty of perjury, that the casks could be safely unloaded misled the judge into denying an injunction against cask loading sought by petitioners Don't Waste Michigan, Lake Michigan Federation, and State of Michigan Attorney General Frank Kelley. However, the 4th cask to be loaded at Palisades, in June 1994, was found by the company two months later to have welding defects. Consumers first announced it would unload the defective cask, then later back pedaled when it discovered serious technical and safety obstacles to unloading the cask. Despite this, NRC allowed Palisades to load 9 additional casks in rapid succession, just 150 yards from the Lake Michigan shoreline. As of July, 2006 the defective cask has still not been unloaded, despite the passage of more than 12 years; in addition, a grand total of 29 dry storage casks have now been loaded at Palisades.

Exhibit A

Midland, MI 48640

Feb. 6, 1997

Dr. Shirley Jackson, Chair
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Dr. Jackson:

I respectfully submit a request that you and your fellow Commissioners personally review the 2.206 petition(10 CFR 2.206) that was filed on Sept. 19, 1995, and amended on Sept. 30, 1996, by Lake Michigan Federation and Don't Waste Michigan. Acting Director Frank Miraglia of the Office of NRR issued a decision on this petition on Jan. 23, 1997. The Federal Register notice of this decision indicates that there are 25 days in which the Commission can institute a review of this decision before it becomes final.

This petition was related to the fact that Consumers Power Co. (CPCo) did not have a workable unloading procedure in place before it loaded the first VSC-24 cask at the Palisades site in May, 1993, as required by the Certificate of Compliance (No. 1907) under 10 CFR 72, Section 1.1.2.

When cask #4 was found to be defective in Aug., '94, CPCo pledged to unload the cask. It claimed that this would be a means of affirming to the public its high standards of safety and of restoring public confidence in the cask loading operations at Palisades. When the task of unloading was actually to be undertaken, the technicians found that there were challenging procedures which had never been considered or anticipated in the initial unloading document. In a public meeting with the NRC in Maryland in late Aug., 1994, the concerns described included: 1) introducing 400 degree F. fuel from the metal basket to 100 degree F. spent fuel pool water which would result in a highly radioactive steam flash and raised concerns about thermal shock to the fuel; 2) cutting through the steel in a window of 50 hours or less, since the cooling process cannot be maintained during cutting; 3) developing a procedure for removing steel shims that were pressure-fit inside the fuel basket below the lid.

Without resolving these grave issues and demonstrating a successful unloading procedure of the defective cask, CPCo proceeded to load 9 more casks 150 yards from the shore of Lake Michigan at Palisades.

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A year later, when defective cask #4 was still not unloaded. Don't Waste Michigan and La : Michigan Federation filed the aforesaid petition 2.206 to demand enforcement proceedings by the NRC, since public confidence not only in CPCo but in the NRC.-- because it allowed continued loading of these casks.--was even further eroded by these actions.

I am enclosing a copy of this 2.206 petition so that you and your fellow Commissioners can readily review it and understand why we strenuously object to NRC's decision in the resolution of these matters and our reasons for doing so.

1) The decisions made by Mr. Miraglia are based on what appears to be a woefully inadequate understanding of all the facts involved. The lack of a factual basis for his decision is due either to ignorance on his part (understandable, perhaps, since he has been in his Acting Director position for only a few months), or is a deliberate evasion of some of the extraordinary issues and events that have transpired in the design, development, certification and implementation of this cask system that are now in the public record. It is possible to review these facts only briefly in this communication, but even this should be enough to convince you and your fellow NRC Commissioners that a hearing is in order to fulfill the requirement of your responsibility in implementing the 2.206 regulation in the Federal Code.

Mr. Miraglia appears to have relied solely on the judgment of the staff and the facts they provided him for his decision. For this reason, the role of the NRC staff must be reevaluated in light of the serious errors in judgment on the part of some staff members that have been made in the past, and the notable lack of comprehension and understanding of some important aspects of this cask system by some leading staff members who are in decision-making positions.

(It should be noted that there are some highly competent staff members who have tried to influence the decisions of the NRC in key areas. For example, Dr. Ross Landsman, an NRC soils expert, visited the Palisades area in Feb., '94, after repeated citizen concerns about placing casks on unstable sand dunes. He pointed out that using the site specific studies that were initially done for the nuclear plant's environmental impact statement as a basis for judging the stability of the cask storage area on site, as is now done under "generic"

Page Three

licensing, was seriously flawed and could lead to "catastrophic consequences." As an example, he showed how a nuclear plant, itself, as at Palisades, usually has a foundation of 8 ft. of concrete that is grounded in bedrock. By contrast, the casks, as at Palisades, are placed on top of a 3 ft. concrete pad with no foundation to bedrock. His concerns and expert advice have been ignored by staff members in decision-making positions, and "generic" licensing continues to be the policy for siting dry cask storage facilities on our fresh water supplies throughout the country).

The few historical events we are limited to describing here will demonstrate how poor judgment and incompetence on the part of some of the staff who have directed policy have had unfortunate consequences for the public.

2) The NRC staff was establishing their "generic" licensing policy with the development of the VSC-24 cask at Palisades. This meant that there was no full environmental impact statement required for an area of the dunes at that site that was, and is, characterized as a "high risk erosion area" by the Michigan Dept. of Natural Resources, and no public adjudicatory hearing was permitted.

For these reasons and other safety concerns brought to him by the public, Attorney General Frank Kelley of Michigan requested such a hearing on the VSC-24 cask. This cask had never been built before and had never been fully tested before it was to be certified for use for dry cask storage of high level nuclear waste at Palisades. Having been refused such a hearing, Attorney General Kelley petitioned for an injunction in May, 1993, against the loading of these casks in the Western Michigan Federal Court at Grand Rapids. (Case No. 4:93 CV 67). Consumers Power Co.'s response to the Court was that the company would unload the casks and place the nuclear waste back in the spent fuel pool if the Court should rule against them and, therefore, an injunction to prevent loading was unnecessary. A supporting position for the utility's action was filed by Charles Haughney of the NRC, in which he assured Judge Robert Holmes Bell that Consumers was able to do this by simply reversing the process of loading, if the Court so ordered. This demonstrates that, not only did Consumers Power Co. mislead the Judge, perhaps out of ignorance, about Consumers' ability to unload these casks, but more importantly, Charles Haughney of the NRC pledged the Agency's credibility in support of this position. His statement is signed,

"Pursuant to 28 U.S.C. sec.1746, I declare under penalty of perjury that the foregoing is true and correct." (Executed and signed on May 5, 1993). Judge Bell, of course, could hardly grant an injunction under those circumstances. This is one of many instances in which the judgment of the staff was flagrantly in error, and helped to compound the problems that have later developed.

3) On May 28, '96, a "hydrogen ignition" event occurred at the Point Beach n-plant in a loaded VSC-24 cask. This "ignition" was of sufficient explosive force to raise a 3 ton lid several inches and tilt it on its side. This event was a complete surprise to the utilities, the vendor, and most significantly, to the NRC. It was discovered that the chemical reaction between the zinc coating inside the metal basket and the boric acid of the spent fuel water released hydrogen causing the explosion when the lid was being welded shut. This is further evidence that the staff was not competent to evaluate all the parts of this cask before it was certified. Yet, Mr. Mirgalia repeatedly relies only on this staff's flawed judgment for his decision-making on our petition without providing any proof through documented data or the testimony of independent qualified experts to support his decisions.

(Such independent evaluations by qualified experts would have surely been a great assistance to the staff if a public hearing and an environmental impact statement had been required in the process of certifying this cask. It would have prevented much of the chaos, confusion and costs that we are now experiencing as remedies are being sought for controlling the generation of explosive hydrogen within these casks.)

4) The NRC staff responded to the explosion at Point Beach by sending inspection teams to Point Beach and to the facilities of the vendor of this cask, Sierra Nuclear, in California, by issuing Confirmatory Action Letters to the utilities using the VSC-24, and by issuing Bulletin 96-04 to all utilities in the country to stop loading procedures and to analyze the casks they were using for chemical, galvanic, or other reactions in the casks. Their findings had to be approved by the NRC before loading could again proceed.

5) The responses prepared for Bulletin 96-04 by the utilities which were using the VSC-24 cask we found to be disturbingly inadequate and unsupported by documentation. For this reason, we retained a

Page Five

highly competent corrosion engineer consultant, Dr. Rudolf Hausler, who had been retained in the past by the Electric Power Research Institute to solve a corrosion problem afflicting all nuclear reactors. He was able to do so and developed a corrosion inhibitor which is now used in all reactors.

Dr. Hausler was able to define a number of serious deficiencies in this cask that had not been found before, and he recommended that they be resolved before any more VSC-24 casks were loaded.

Cari Paperiello, Director of NMSS, wrote an analysis of Dr. Hausler's study and claimed his comments were not sufficient to halt further loading of the casks. (Dec. 10, '96) Dr. Hausler responded (Dec. 29, 1996) by stating that Mr. Paperiello's evaluation was pure speculation, and pointed out in detail the additional data that would have to be a part of this analysis to come to the conclusions that Paperiello did in his analysis. Hausler also pointed out that in certain areas of the chemistry of metals, the staff was "stunningly ignorant."

6) Further evidence of the inadequacy of staff's regulatory performance in whom the public is asked to place its trust came to light when an announced inspection at the Sierra Nuclear Corp. took place a week after the explosion at the Point Beach plant. (Inspection Rept. No. 72-0007/96-204, July 9, 1996). Following are only a few of the serious deficiencies that were found:

a) Retrieval of documents was difficult. Design records for the VSC-24 were mixed with those of the VSC-17. Most of the analyses were performed for the VSC-17, whose testing data the NRC had never accepted, but were used, nevertheless, by Sierra Nuclear for the VSC-24 design. The design calculation package, dated Feb. 14, 1989, did not contain a signature nor proof of verification by either the Project Manager or Project Engineer. Neither the design plan or the design package included reference to the design verification as required. The Project Plan should provide detailed guidance for the design staff but contained neither.

b) The SNC staff indicated that the design was not reviewed by a corrosion engineer, that SNC did not consult an environmental effects specialist, and that SNC did not consider the problem of environmental interactions of components in the SFP.

c) The SNC design team had no well-founded basis to specify Carbo-Zinc 11 for coating the MSB components.

All of these deficiencies should have been identified by staff inspections in 1989 and 1990, long before the cask was certified. The licensees should have been required to provide oversight and corrective actions among their own vendors since NRC regulations state that licensees are responsible for assuring that fabricators and vendors establish and execute appropriate QA programs. But the staff did not do so. Yet we are now asked to accept the judgments of this staff, who did not find these very obvious deficiencies in the critical design phase of this cask, as being able to give us the assurance and the appropriate resolution for the far more complicated safety-related issues we have described in our petition.

7) After the Point Beach explosion, you, the Chairman of the NRC, requested the Office of the Inspector General to evaluate staff actions and the dry cask storage program. A major conclusion was, "NRC staff told us they do not formally approve or validate licensee loading and unloading procedures because the agency does not have sufficient staff or expertise to review each procedure." Yet, that is exactly what the NRC staff has been doing when they halted all loading and unloading procedures at all utilities after the Point Beach explosion. They required responses to Bulletin 96-04 which they had to approve before these procedures could continue at individual plants.

Given this acknowledgement to the Inspector General' Office of the lack of sufficient staff and expertise, it strains the public's credibility to be asked to have the confidence in the judgment of the staff in all the critical areas that we pointed out in our petition, as Mr. Miraglia would have us do.

8) Since the explosion at Point Beach, there is general recognition that unloading these casks may be even more difficult. The problems that were earlier identified when CPCo first pledged to unload the cask are now compounded by the fact that hydrogen may be generated in that process. Here again we are asked to accept the judgment of the staff--now already proved to be incompetent in so many ways--that "the deficiencies in the original unloading procedure would not have challenged the integrity of the cask or the fuel...and that the licensee would have ultimately been able to safely unload a cask." This failure to have an adequate unloading procedure--with all these glaring mistakes and oversights

that are now apparent--is characterized by Miraglia as having "limited safety significance" and therefore, the NRC has refrained from issuing a Notice of Violation or a civil penalty.

The examples of the incompetence of some staff members cited here have become better known to the public since our petition was filed in Sept. 19, 1995. But it is that record of poor judgment on the part of the staff that should have given pause to Mr. Miraglia in relying on them for an adequate response to this petition. Instead, his main reliance for his decision is on judgments by staff that he should be able to realize have been inadequate in the past and, therefore, cannot be relied upon now if the public is to have any confidence in the NRC.

Miraglia should have gone beyond these staff judgments to make a decision on our petition. He should have considered the magnitude of what has been done without adequate deliberation and knowledge--1) that millions of curies of radioactivity have been placed in 13 poorly designed casks on the shores of the Great Lakes, 9 of which the utility continued to load even though grave problems with unloading were known to it and were unresolved; 2) that Consumers failed to monitor the casks vendor's design, fabrication and construction practices, giving the public a cask whose design and function it cannot trust; and 3) that some of this high level nuclear waste on the shores of the Great Lakes will remain highly toxic for thousands of years, and yet the casks are licensed for only twenty years. He should especially have considered the fact that no cask has been successfully unloaded, and that there is no assurance of a federal repository.

In view of these considerations, he should at least have required that a VSC-24 cask be successfully unloaded to begin to restore the confidence of the public in the dry cask storage system in general, and at the Palisades site in particular. This should have been required as a condition for continuing to load these casks, and for not issuing a high level violation and meaningful fine. Instead he is asking us to believe his staff's demonstrated flawed judgment that procedural deficiencies of the initial unloading document were of "limited safety significance" as his decision states.

Mr. Miraglia's decision sends the wrong message to the whole nuclear industry on this most dangerous course for the country--i.e. placing high level nuclear wastes on the shores of our fresh water supplies--with no repository in sight. The message is that no matter how careless and sloppy its procedures are, the NRC is a "paper tiger"--it will cost them nothing--and the sham of regulation will go on as usual.

I hope that you and your fellow Commissioners are beginning to understand the sense of outrage on the part of the public over this cavalier dismissal of the grave issues we have placed before you in this 2.206 petition--and its implications for the safety of the fresh water supplies of this country for all future time.

We hope that you and your fellow Commissioners will institute a review of the decision on this 2.206 petition discussed here.

We deeply appreciate your attention to these grave issues.

Yours sincerely,



Mary P. Sinclair, PhD.

Co-chair, Don't Waste Michigan

cc. NRC Commissioners Kenneth C. Rogers, Greta J. Dicus,

Nils J. Diaz, Edward McGaffigan, Jr.

Vice-President Al Gore

Senator Carl Levin

Senator Spencer Abraham

Attorney General Frank Kelley of Michigan

Carole Browner, Administrator, EPA

Congressman Dave Camp

Congressman Fred Upton

Senator Joseph Biden

[a typed version of a copy of the original hand-written letter, copies of which are available upon request]

2/17/94

Dear [NRC Chairman] Dr. Selin,

I'm glad the Palisades resident got your ear about my concern over the lack of seismic requirements for the spent fuel dry cask storage pad and more importantly, the foundation material. I discovered this while I was investigating an allegation from Mary Sinclair on Palisades. I've discussed this issue with Fritz Sturz, one of the authors of Part 72, the licensing requirements for the casks. Initially, it was ok as is until I requested it in writing. Enclosed is their response to this issue. It's still not addressing the generic issue of lack of seismic requirements in the regulations. It seems that Subpart E, of Part 72, covers this point quite well for storage casks that are not pre-approved. However, if you use NRC-approved casks under Subpart K, the regulations are silent about the foundation material or the pad. Actually, its (sic) the consequences that might occur from an earthquake that I'm concerned about. The casks can either fall into Lake Michigan or be buried in the loose sand because of liquefaction. This event might be in the publics (sic) mind in view of what just happened in Southern California. It is apparent to me that NMSS doesn't realize the catastrophic consequences of their continued reliance on their current ideology. Please call.

/s/ Dr. Ross B. Landsman
R111 708-829-9609

Exhibit B

Exhibit
C

***The Yucca Mountain Dump Plan
Would Launch Up to 453 Barges of
Deadly High-Level Radioactive Waste
Onto the Waters of Lake Michigan***

As part of its plan to transport high-level radioactive waste to Western Shoshone Indian land at Yucca Mountain, Nevada, the U.S. Department of Energy (DOE) proposes up to 453 barges carrying giant high-level radioactive waste containers onto the waters of Lake Michigan. See the second page of this fact sheet for a map of the proposed routes and a breakdown of shipment numbers by port.

Accidents happen. But what if high-level radioactive waste is involved? U.S. Nuclear Regulatory Commission (NRC) design criteria for atomic waste transport containers are woefully inadequate. Rather than full-scale physical safety testing, scale model tests and computer simulations are all that is required. The underwater immersion design criteria are meant to "test" (on paper, at least) the integrity of a slightly damaged container submerged under 3 feet of water for 8 hours. An undamaged cask is "tested" (on computers, at least) for a 1 hour submersion under 656 feet of water.

But if a cask were accidentally immersed under water, or sunk by terrorists, is it reasonable for NRC to assume that the cask would only be slightly damaged, or not damaged at all? Given that barge casks could weigh well over 100 tons (even up to 140 tons), how can NRC assume that they could be recovered from underwater within 1 hour, or even within 8 hours? Special cranes capable of lifting such heavy loads would have to be located, brought in, and set up. And what about the fact that Lake Michigan is deeper than 656 feet at locations not far from DOE's proposed barge shipment routes?

The dangers of nuclear waste cask submersion underwater are two fold. First, radioactivity could leak from the cask into the water. Each container would hold 200 times the long lasting radioactivity released by the Hiroshima atomic bomb. Given high-level atomic waste's deadliness, leakage of even a fraction of a cask's contents could spell unprecedented catastrophe in the source of drinking water for tens of millions of people – Lake Michigan. Second, enough fissile uranium-235 and plutonium is present in high-level atomic waste that water, with its neutron moderating properties, could actually cause a nuclear chain reaction to take place within the cask. Such an inadvertent criticality event in Sept. 1999 at a nuclear fuel factory in Japan led to the deaths of two workers; many hundreds of nearby residents, including children, received radiation doses well above safety standards.

STOP THE ACCIDENT BEFORE IT HAPPENS!

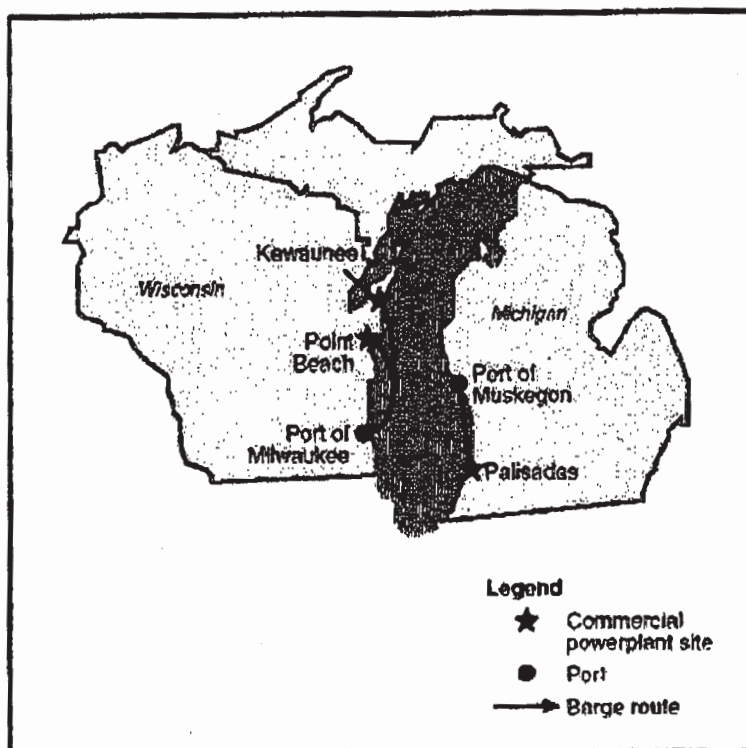
***Don't let D.O.E. and N.R.C. get away with
shipping high-level radioactive wastes on Lake Michigan!***

**Urge Your U.S. Senators and Representative to oppose
the Yucca Mountain dump plan!**

Call their offices via the U.S. Capitol Switchboard: 202.224.3121.

**For more information, contact Nuclear Information & Resource Service, 202.328.0002,
nirsnet@nirs.org, www.nirs.org**

**Barge Shipments of High-Level Radioactive Waste on Lake Michigan
Proposed by U.S. Dept. of Energy under its Yucca Mountain Plan**



Map taken from Figure J-9, Routes analyzed for barge transportation from sites to nearby railheads, page J-80.

<u>Nuclear Plant</u>	<u>Location</u>	<u>Number of Shipments Proposed</u>	<u>Barges offloaded at:</u>
Palisades	Covert, MI	Up to 125	Port of Muskegon, MI
Kewaunee	Carlton, WI	Up to 111	Port of Milwaukee, WI
Point Beach 1/Two Rivers, WI		Up to 215	Port of Milwaukee, WI
Point Beach 2/Two Rivers, WI		Up to 2	Port of Milwaukee, WI
Totals		Up to 453	

Table taken from Table J-27, Barge shipments and ports, page J-83.

Map and table taken from U.S. Department of Energy, "Final Environmental Impact Statement for Yucca Mountain," Appendix J ("Transportation"), Feb. 2002.

Exhibit
D

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of
Nuclear Management Company, LLC
Palisades Nuclear Power Station
Regarding Renewal of Facility Operating
License No. DPR-20 for an Additional 20
Year Period

Docket No. 50-255

**DECLARATION OF Dr. Ross Landsman,
Retired U.S. Nuclear Regulatory Commission
Nuclear Safety Engineer and Palisades Dry Cask Storage Inspector**

Under the penalty of perjury, I, Ross Landsman, declare that the following statements are true and correct to the best of my knowledge and belief:

1. My name is Ross Landsman. I am a retired U.S. Nuclear Regulatory Commission Region III Nuclear Safety Engineer and Palisades Dry Cask Storage Inspector. I live at 9234 North Lowell, Skokie, Illinois.
2. NRC Region III, where I formerly worked before recently retiring, has requested assistance from NRC Headquarters division of Nuclear Reactor Regulation (NRR), in coordination with the division of Nuclear Materials Safety and Safeguards (NMSS) Spent (sic) Fuel Project Office (SFPO), in order to resolve questions involving the licensing basis for the Palisades Nuclear Power Plant and the appropriateness of the licensing basis to the seismic design of the Palisades ISFSI [Independent Spent Fuel Storage Installation, also called "dry cask storage"].
3. On August 4, 2004, on behalf of the NRC, I completed an inspection of design and operational activities associated with the newly constructed Palisades ISFSI pad. The results of this inspection were documented in NRC Inspection Report No. 07200007/2004-002 (DNMS). As a result, I identified two issues, characterized as violations by me in the draft report but changed to unresolved items (URI) by my boss in the final report to allow Palisades to go ahead and load fuel instead of stopping them even though it was not safe. These two issues were associated with the licensee's translation of the safe shutdown earthquake (SSE) from the reactor site to the ISFSI pad (URI 072007/2004-002-1) and its assessment of the sub-surface bearing stability beneath the ISFSI pad (URI 0720007/2004-002-2). After the final report was issued, I wrote a Differing Professional Opinion (DPO) on this issue but the agency (the NRC) would not accept it based on the fact that there was no issue to disagree about since the NRC has not

made a decision on my issues yet because they changed them from violations to unresolved items. I informed them that they did make a decision and let Palisades load casks over my objections. They turned me down again because I was retiring and officially couldn't bother them any more, but the point is, the pad is not safe to hold any loaded casks.

4. During an inspection of the 2004 ISFSI installation, I reviewed the licensee's seismic calculations associated with the ISFSI pad and the irradiated fuel canisters. I determined that the licensee performed the ISFSI pad SSE calculations assuming a seismic horizontal acceleration of 0.2g in the free-field and at the ISFSI pad ground surface elevation of 623 feet. The licensee stated its understanding that the seismic horizontal acceleration value of 0.2g was approved by the NRC at the time of initial reactor plant licensing. The licensee further stated its understanding that the 0.2g horizontal acceleration value was applicable for SSE seismic calculations associated with any location and at any elevation on the plant site. I noted that the licensee performed a soil-structure interaction, seismic assessment for the ISFSI pad using the SSE seismic horizontal acceleration of 0.2g. The soil-structure interaction assessment results indicated that the irradiated fuel canisters would experience 0.25g horizontal acceleration during an SSE. The irradiated fuel canister seismic horizontal acceleration design limit is 0.25g.

5. While reviewing the licensee's calculations, I noted significant differences between the elevation and subsurface soil composition of the reactor plant and the 2004 ISFSI pad. Specifically, the reactor containment building was constructed, following the removal of the soil/sands overburden, at a ground surface elevation of 590 feet on compacted glacial till. The 2004 ISFSI pad was constructed, without the removal of the soils/sands overburden, at a ground surface elevation of 625 feet on sands that the licensee mechanically compacted. The licensee estimated that the compacted glacial till soil layer, at the location of the 2004 ISFSI pad, was at an elevation of 560 to 570 feet.

6. Based upon the subsurface soil composition and elevation differences between the reactor plant site and the 2004 ISFSI site, I determined that the licensee's application of the 0.2g horizontal acceleration value that the ISFSI site was non-conservative. Specifically, the inspectors noted that the calculated SSE seismic horizontal acceleration would likely be larger at the ISFSI compared to the reactor plant site due to the increased site elevation and the approximately 50 to 60 feet of mechanically compacted sands present on top of the compacted glacial till material at the ISFSI site. In addition, I concluded that the soil-structure interaction calculation results were non-conservative, which if revised to incorporate a larger horizontal acceleration value based on the increased ISFSI pad elevation and the soil profile differences, would likely result in a seismic horizontal acceleration value in excess of the irradiated fuel canister design limit.

7. Additionally, correspondence between the NRC and the licensee, dated December 1966, telephone call between R. Maccary (Atomic Energy Commission, AEC) and H. Wahl (Bechtel for the licensee), indicates that the NRC considered SSE to be defined as having a horizontal acceleration, at the bedrock, of 0.15g with an amplification factor of 1.25, producing a 0.2g ground acceleration. This demonstrates the NRC's understanding

of the need for, and an accounting of, an amplification of the horizontal acceleration at the bedrock during a seismic event and the resultant ground surface acceleration.

8. In addition, the NRC's Safety Evaluation for the Palisades Nuclear Power Plant, dated February 7, 1967, indicates that the NRC was aware of the presence of significant sand dunes on the plant site and that those sand dunes would be removed prior to construction. I quote from the document: "[The site] is overlain by a 100 foot sand dune which is being removed prior to construction. Bedrock is about 150 feet below the surface." This demonstrates that the NRC was aware of the licensee's intent to remove the overburden of sand dunes prior to construction of critical plant structures. Therefore, it is unlikely that the NRC accepted the concept of sand dunes being present between the bedrock and foundation of critical plant structures. Removal of the overburden would also be a reasonable basis for using the "ground surface" term to describe calculations referencing the 590 foot elevation, since no other "ground surface" elevation would have any safety or regulatory significance.

9. The NRC's documentation of the design and construction of the reactor plant makes use of the terms "ground surface" and "grade elevation" interchangeably. This may have been appropriate at the time since the overburden sands were removed down to the compacted glacial till level, elevation 590 feet, prior to plant construction.

10. The NRC's evaluation of the seismic design was performed by J.A. Blume and Associates, dated November 28, 1969, and was included as Appendix E to the March 6, 1970 NRC Safety Evaluation Report. The evaluation in the first few paragraphs acknowledges that the plant was built in an area of sand dunes. However, the evaluation also notes that the sand dunes were removed prior to the compacted glacial till level prior to construction. Since the sand dunes were removed prior to construction, it would appear that the only logical reference point for the ground acceleration would be that elevation at which the critical plant structures were to be built, i.e. 590 feet. The evaluation also indicates that the maximum potential earthquake was specified with a maximum horizontal ground acceleration of 0.2g. The wording included here would appear to indicate that the author was neither approving nor commenting on the maximum horizontal acceleration value, merely noting that the value had been prescribed.

11. The June 1966 Palisades Preliminary Safety Analysis Report states, and I quote: "...material above elevation 590 is the area covered by sand dunes [and] should be excavated (sic) to provide adequate foundation for all heavy structures. Such excavation will generally expose the glacial lake deposits which yield higher blow count figures. Foundations of important structures will not be placed on dune sand without special compaction." It should be noted that the licensee did not propose this option and the NRC did not approve the use of this option during the initial licensing of the reactor plant.

12. The June 1966 Palisades Preliminary Safety Analysis Report also states, and I quote: "Primary plant structures utilize the compact glacial deposits, the upper surface of which ranges from about elevation 575 to 590 [feet]..."

13. Revision 0 of the Final Safety Analysis Report indicated that a 0.2g surface acceleration was used for the SSE. Licensee calculations of the seismic adequacy of those structures housing safety-related components were all performed at the grade elevation of 590 feet. This was also the ground surface elevation since the overburden of sand dunes was removed prior to construction.

14. NRR and NMSS have been requested by NRC Region III to respond to each of the following questions:

- a. During initial licensing of the Palisades Nuclear Power Plant, did the NRC anchor the horizontal acceleration for seismic evaluations at the "ground surface" of the reactor building, elevation 590 feet and on top of the compacted glacial till, or the "ground surface" of the general plant site, any elevation and with any combination of soil structures intervening between the "ground surface" and the underlying bedrock?
- b. During Initial licensing of the Palisades Nuclear Power Plant, did the NRC consider that the seismic horizontal acceleration would be amplified from its value at the bedrock to the value used at the "ground" surface due to the type and thickness of the intervening soil between the bedrock and the "ground surface"?
- c. Does the NRC expect, based upon the regulations in 10CFR72.212(b)(2)(i)(B) and 10CFR72.212(b)(3), a licensee to incorporate new information and technology into its assessment of the continued appropriateness and re-application of the previous reactor plant seismic siting and design criteria for the design and construction of an ISFSI pad?
- d. Irrespective of the previous answers, should the NRC require the licensee to demonstrate that the irradiated fuel canister seismic design is appropriate, using ISFSI pad-specific seismic data, given that the calculated ISFSI horizontal acceleration is at the canister design limit without consideration of the increases expected due to the site-specific soil profile and elevation?

15. Regarding intra-NRC coordination on these questions, NRC Region III staff spoke with NRR staff and others on April 29, 2005. NRR agreed to accept this issue as a Task Interface Agreement and to respond to this request 30 days after receipt, but at least prior to the next dry cask loading campaign, because the pad is not safe to hold the irradiated fuel. The Task Force Agreement Number is 2005-06.

16. Upon request, I would be happy to identify the more than one dozen references referred to in the preparation of this declaration.

/s/ Dr. Ross Landsman

[Signature]

Date: 9-15-2005

Exhibit E

**UNITED STATES OF AMERICA
BEFORE THE NUCLEAR REGULATORY COMMISSION
Before the Executive Director for Operations**

_____)	Docket No. 50-255-LR
In the Matter of)	
NUCLEAR MANAGEMENT COMPANY)	
PALISADES NUCLEAR GENERATING)	April 4, 2006
STATION)	
_____)	

**PETITION PURSUANT TO 10 CFR 2.206 FOR ENFORCEMENT ACTION
TO TERMINATE USE OF DRY CASK STORAGE PADS
AT PALISADES NUCLEAR POWER PLANT**

TO: Luis A. Reyes, Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Reyes:

Pursuant to § 2.206 of Title 10 of the Code of Federal Regulations and on behalf of the five (5) organizational and thirty (30) individual Petitioners listed herein, I petition the Nuclear Regulatory Commission to take enforcement action in the form of condemning and forcing a halt to the use of the two (1993 and 2004) concrete pads holding dry casks storing used nuclear fuel at Palisades Nuclear Power Plant, owned by Consumers Energy, operated by Nuclear Management Company and located in Covert Township, Michigan on the eastern shore of Lake Michigan. The pads do not conform with longstanding NRC requirements for earthquake stability standards. Both were built on compacted sand and other subsurface materials, dozens of feet above bedrock and well above the ground elevation of the nearby Palisades Nuclear Power and pose a distinct hazard in the event of earthquake.

A detailed Memorandum in Support of Petition is attached.

/s/ Terry J. Lodge
Terry J. Lodge
316 N. Michigan St., Suite 520
Toledo, OH 43624-1627
(419) 255-7552
Fax (419) 255-8582
tjlodge50@yahoo.com
Counsel for Petitioners

MEMORANDUM IN SUPPORT OF PETITION

A. Factual and Legal Basis for Enforcement Action

Neither the older (1993) nor the more recently-built (2004) concrete pads holding dry casks (which contained highly-radioactive used fuel) at Palisades conform with longstanding NRC requirements for earthquake stability standards. The accompanying Declaration of Dr. Ross Landsman,¹ formerly of the Nuclear Regulatory Commission staff, states that both pads were built on compacted sand and other subsurface materials, dozens of feet above bedrock and well above the ground elevation of the nearby Palisades Nuclear Power Plant. Dr. Landsman has decades of experience and has filled a direct oversight role in the inspection of dry cask storage at Palisades when he worked at NRC Region III during the critical period of dry cask storage installation and operation from 1993 to 2005. He concludes from his personal knowledge of the subsoil conditions that the older, 1993, pad nearer Lake Michigan is in violation of NRC "liquefaction" standards under 10 CFR Part 72.212(b)(2)(i)(B)², while the

¹The Landsman declaration was proffered in 2005 for the record in support of a formal contention filed by these same Petitioners in the ongoing proceedings for a 20-year extension of Palisades' operating license, from 2011 to 2031 (ASLBP No. 05-842-03-LR).

²[The general licensee shall perform written evaluations, prior to use, that establish that]: Cask storage pads and areas have been designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, and soil liquefaction potential or other soil instability due to vibratory ground motion.

newer, 2004, pad further inland violates NRC "amplification" requirements contained within the same regulations.

Neither the older nor newer dry cask storage pads at the Palisades plant were designed in consideration of the factors contained in the cited regulation. See Landsman Declaration, ¶¶ 3-13. Each violation, then, violates 10 CFR 72.212(b)(3).³ This means that the cask storage pads ***have violated NRC regulations since they were constructed, and absent enforcement, they will continue to violate NRC regulations throughout any period of contemplated usage.***

The NRC staff considers the older (1993) pad nearer the lake to be in compliance with regulations and allows NMC to store high-level radioactive waste there, while the NRC is supposedly still trying to resolve through ongoing inspection, investigation, and analysis the status of the newer (2004) pad, which is situated further inland. During this extended period of investigation, the NRC is allowing NMC to store high-level radioactive waste on the new pad, despite the unresolved safety concerns.

Dr. Landsman understands that the 2004 pad was built large enough to accommodate all the dry casks currently stored on the 1993 pad, because, despite public pronouncements to the contrary by Consumers Energy, Nuclear Management Company, and the NRC, the older pad clearly violates regulations, which means that the 18 to 19 casks currently stored on the older pad⁴ must be ultimately be moved to the newer pad. The problem is, moving the casks

³[The general licensee shall]: Review the Safety Analysis Report (SAR) referenced in the Certificate of Compliance and the related NRC Safety Evaluation Report, prior to use of the general license, to determine whether or not the reactor site parameters, including analyses of earthquake intensity and tornado missiles, are enveloped by the cask design bases considered in these reports. The results of this review must be documented in the evaluation made in paragraph (b)(2) of this section.

⁴Including the dangerously, unmovable cask #4 at Palisades, loaded in June 1994 and shortly thereafter admitted by Consumers Power to be defective, having faulty welds. And the configuration of the 18 to 19 dry casks currently stored on the older pad nearer Lake Michigan is such that the casks furthest back cannot be moved or unloaded until all other casks in front of them have been moved out of

from the older pad to the newer one resolves no safety considerations.

Dr. Landsman sought repeatedly while an employee for the NRC to see the unresolved safety issues posed by the noncompliant storage pads corrected. But presently there are 29 casks stored on them.

The NRC has not heeded Dr. Landsman's articulate warnings for more than a decade, contrary to the agency's mission and mandate to protect public health and safety and the environment. On February 17, 1994, Dr. Landsman, then at NRC Region III as a nuclear safety engineer and dry cask storage inspector overseeing Palisades, sent a letter to the then-Commission Chairman, Ivan Selin, warning that:

[I]f you use NRC-approved casks under Subpart K [of 10 CFR Part 72], the regulations are silent about the foundation material or the pad. Actually, it's the consequences that might occur from an earthquake that I'm concerned about. *The casks can either fall into Lake Michigan or be buried in the loose sand because of liquefaction. . . . It is apparent to me that NMSS [sic] doesn't realize the catastrophic consequences of their continued reliance on their current ideology.* (Emphasis added)

Dr. Landsman has never received a meaningful response to this warning from the Commission. His expressed concerns about the older pad - encompassing violations of NRC regulations and of public health and safety and environmental protections - remain inadequately addressed and unresolved to this day.

Perhaps the greatest earthquakes in the known history of North America were three from a much longer series, known as the Great New Madrid quakes of 1811-12. The New Madrid quakes were estimated to be of a magnitude of 8.0 or higher on the Richter Scale. They were felt over the entire United States outside of the Pacific coast. Large areas sank into the earth, new lakes were formed, the course of the Mississippi River was changed, and

the way first. This situation carries considerable risk, making it very difficult to timely deal with any emergencies in certain of the casks in the configuration.

forests were destroyed over an area of 150,000 acres. Many houses at New Madrid were thrown down. "Houses, gardens, and fields were swallowed up" one source notes. Chimneys were toppled in New England. The Great Lakes developed crashing tides, yet there was no significant wind.

According to the U.S. Geological Survey, the probability for an earthquake of magnitude 6.0, 7.0 or greater in the New Madrid zone is higher than 90% by the year 2045. <http://quake.wr.usgs.gov/prepare/factsheets/NewMadrid/>. Measurable, serious tremors could reach into central Michigan. See map at <http://hsv.com/genlintr/newmadrd/>. The largest quake in recent times originating within Michigan registered 4.6 on the Richter scale in August, 1947. http://earthquake.usgs.gov/regional/states/events/1947_08_10_iso.php.

Both ISFSI pads at Palisades have continuously violated NRC earthquake regulations since the day they were built. The NRC must not allow continued high-level radioactive waste storage on pads at Palisades that are in clear violation of NRC earthquake regulations.

B. Petitioners

Organizations.

Nuclear Information and Resource Service is a nonprofit corporation with over 6000 members, a number of whom live in the Great Lakes region of the United States, including over 100 in Michigan and 50 of whom make their residences within fifty (50) miles of the Palisades Nuclear Generating Station (hereinafter "Palisades"). The central office of NIRS is located at 6930 Carroll Avenue, Suite 340, Takoma Park, MD 20912.

Western Michigan Environmental Action Council is a nonprofit, tax-exempt environmental organization started in the mid-1960's. It has 1500 members, most of whom live in Michigan, and an estimated 400 to 500 live within 50 miles of the Palisades nuclear plant. WMEAC is located at 1514 Wealthy St. SE Suite 280, Grand Rapids, MI 49506. WMEAC's

representative in these proceedings is Alice Hirt, who resides at 6677 Summit View Drive, Holland, MI 49423, within 50 miles of the Palisades Nuclear Power Plant.

Don't Waste Michigan is a nonprofit organization begun in the 1980's with about 25 members, nearly all of whom live in Michigan, and of which an estimated 5 currently live within 50 miles of the Palisades nuclear plant.

The Green Party of Van Buren County is a political party and association of persons which came into being around environmental issues. It has a membership of approximately 15 members, all of whom are residents of Van Buren County, Michigan, and all of whom reside within 50 miles of the Palisades nuclear plant.

Michigan Land Trustees (website www.michiganlandtrust.org) was founded in 1976. It is an association of 60 to 70 individuals and families dedicated to preserving and protecting farm land in Michigan. Most of its members reside in southwest Michigan, at least 15 of whom live within the 50-mile zone around the Palisades nuclear reactor.

Individual Petitioners (REDACTED)

/s/ Terry J. Lodge
Terry J. Lodge
Counsel for Petitioners

Exhibit F

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

Jack R. Strosnider, Director

In the Matter of)	Docket Nos. 50-255, 72-7
)	
NUCLEAR MANAGEMENT COMPANY, LLC)	License No. DPR-20
)	
Palisades Nuclear Plant)	

PETITIONERS' COMMENTS AND OBJECTIONS TO PROPOSED
DIRECTOR'S DECISION UNDER 10 CFR 2.206

Now come the Petitioners in this proceeding by and through counsel and set forth their comments on the "Proposed Director's Decision under 10 CFR 2.206." The Petitioners disagree with the Director's analysis, submit that the same is flawed and that the two independent spent fuel storage installation (ISFSI) concrete pads holding dry spent fuel must be disqualified and removed from further usage immediately. Notwithstanding the Director's conclusions, the pads do not conform with NRC regulations for earthquake stability as required by 10 CFR 72.212(b)(2)(i)(B) and 72.212(b)(3) and therefore pose a hazard in case of an earthquake.

1) It is a mischaracterization for the NRC to maintain, as it does at p. 2 of the "Proposed Decision," that the issue of slope stability analysis of the concrete pad constructed in 2003 was under review as an "unresolved item" during a dry-cask storage inspection at the Palisades site in August 2004. In fact, NMC had been *cited for a violation of NRC regulations predicated on a thorough and meaningfully documented investigation by a Ph.D. in engineering following which it was oddly downgraded to a low-priority investigatory item.*

2. The Region III staff has stated (at p. 4 of the "Memorandum to Marc Dapas, RIII from

Edwin Hacket, NRR re Response to Task Interface Agreement 2005-06, Regarding Licensing Basis for, and Seismic Design of, the Palisades Independent Spent Fuel Storage Installation (ISFSI) (TAC No. MC6854)", dated November 7, 2005 - hereinafter referred to as the "November 2005 R-III Memo") as follows:

Specifically, the NRC stated that the seismic acceleration should be considered to be 0.15 g at the bedrock with an amplification factor of 1.25, producing a ground acceleration of 0.2 g. It should be noted, that at the time this information was transmitted to the licensee, the NRC staff was aware of the licensee's intention to remove the sand overburden and to site the safety-related structures on the compacted glacial till. The NRC was also aware of the seismic velocities for the overburden, excluding the sands, between the bedrock and the assumed plant grade at 590 feet.

Therefore, the development of an amplification factor that included a 50 to 100 foot layer of loose sands, that were scheduled to be removed, would not appear consistent.

Finally, the available documentation clearly indicates that both the NRC and the licensee were aware from the beginning, that the overburden of sand would be removed, that an amplification factor between the bedrock and the 'ground' surface would need to be evaluated in order to establish an appropriate seismic horizontal acceleration, and that the point at which the licensee planned to and applied the seismic horizontal acceleration was at the 590 foot elevation.

And in the same document, NRR responded (p. 6):

However, the sand dune materials, which usually have a relatively low shear wave velocity, would have greater potential for liquefaction during a strong seismic event based on observations from earthquake experience. **Therefore, the sand dune materials should have been removed prior to the construction.** (Emphasis supplied)

It has been obvious from 1967 that the seismic horizontal acceleration standard could be met only by construction of pad facilities at the glacial till elevation, and not by allowing construction at higher elevations atop a body of compacted sand or other materials dozens of feet deep, lying above competent glacial till material. The 2004 cask pad is at an elevation of 623 feet, dozens to scores of feet above competent glacial till material. It is specious for the Director to maintain that the horizontal elevation in the event of earthquake would be essentially the same at both elevations.

The Director proposes to allow NMC to proceed with cask storage based on the fiction that the same seismic horizontal calculation applies at *any* elevation at the Palisades site. This is a gross technical falsity. In 1995, the Nuclear Regulatory Commission issued Information Notice 95-28, expressing this wisdom, derived from the Palisades cask pad controversy of that time:

The effects of a postulated earthquake based on the earthquake ground motion used for the plant design-basis SSE is valid for the storage casks without further analysis only if the foundation geology for the cask pad is the same as that for the plant. *A different soil amplification resulting from SSE ground motion at the pad site could result in exceeding the cask design basis.* (Emphasis supplied).

The NRC and NMC are pursuing faith-based engineering, consisting of a passing genuflection at engineering, coupled with a heaping helping of denial of the potential for a massive radioactive waste accident at Palisades leading to a catastrophic radiation (or radioactivity) release.

The dry casks at Palisades are for storage, not transport, and as such they are vented for air flow. An earthquake at Palisades, followed by a tumble of a cask, could conceivably find the cask wholly or partially submerged in Lake Michigan, with its inner containment cracked or breached, in which circumstance it could absorb lake water, providing the neutron moderation needed to spark a chain reaction that would rapidly - and disastrously - overheat the spent fuel contents. Once a chain reaction would start, it would make emergency recovery a suicide mission. And radioactive contamination of Lake Michigan would be dramatically worsened.

3. A review of both the "Palisades Plant - NRC Final Safety Assessment of ISFSI Support Pad," dated September 1, 1994, and the staff commentary on the issue of potential amplification effects from seismic events for the newer pad in NRC Inspection Report 05000255/2006002, dated May 11, 2006 suggests that the weight of the concrete pad, an approximately 195' X 30' X 3' concrete and steel structure, was never considered in rendering

the seismic calculation, nor was the presumed weight of the storage casks which would be placed on it. All of this was omitted from the slope stability calculations, making for a much smaller driving force on the failed slope, and an unearned higher factor of safety as a result.

The Proposed Director's Decision refers to NMC's "re-evaluation of slope stability" to, among other things, "confirm the stability of the newer pad for the possible use of a cask design heavier than that currently in service." Nowhere in the underlying documents nor in the proposed Decision is there any mention or accounting for the weight of the reinforced concrete slab, nor the weight of the casks loaded upon it.

4. The NRC staff concluded that "a minimum acceptable factor of safety of 1.15 is appropriate when considering transient loadings such as a design basis seismic event." But where is the margin of safety? It is not in the casks themselves, set on concrete slabs on below-unity or at-unity soils at Palisades. Dr. Ross Landsman, former NRC engineer with specific experience regarding the Palisades casks pads, stated in a recent declaration (at para. 4):

I noted that the licensee performed a soil-structure interaction, seismic assessment for the ISFSI pad using the SSE seismic horizontal acceleration of 0.2g. ***The soil-structure interaction assessment results indicated that the irradiated fuel canisters would experience 0.25g horizontal acceleration during an SSE. The irradiated fuel canister seismic horizontal acceleration design limit is 0.25g.***

.A copy of the declaration executed by Dr. Landsman and submitted in the recently-completed license extension proceeding for Palisades accompanies these Comments and is incorporated fully herein by reference. Thus the casks are at the outer edge of safety, without a margin, reposing on slabs which rest on soils which at least partially fail, not just below 1.15, but below unity, following calculations which did not account for the dead weight of either the casks or the slabs. In this light, the Director's conclusion that a 1.15 safety factor, faith-based though it be, seems to contradict the lesson of the Sermon on the Mount about building foundations on

sand instead of rock.¹ And the Landsman calculations were based on a lighter cask structure than NMC postulated in its 2006 study.

Moreover, the 1994 Final Safety Assessment states (p. 12) that there are several, perhaps quite large, subterranean zones which produce a factor of safety well below "unity," (1.00) - not 1.15 that the NRC requires:

Therefore, it is conservatively assumed that the SSE ground motion would cause the softer soils at depths of 12.50 meters (41 feet) and 16.15 meters (53 feet) to liquefy. Although average values of SPT blow counts indicate that part of the area under the pad will not liquefy, it is assumed for the purpose of assessing the sensitivity of adjacent slopes to liquefaction of these soils, that the entire zone of soft soils below the pad would liquefy.

The consultant found safety factors well below unity, indicating that the slope would move if the liquefied soil lost all original shear strength and extended uniformly to great distances from the toe of the slope. . . .

The Commission does not mention any numerical factor-of-safety values in its cover report, only that the soils are adequate to support the pad. The consultants whose report appears in the 1994 report had to assume that the liquefiable layer of sand that an NRC inspector found under the old pad was not continuous just to get the number up to 1.00, which is certainly not a conservative, public-safety-oriented regulatory stance such as the Commission purports to take.

Not only is there no rationale stated for the conclusion that there exists a 1.15 factor of safety - coincidentally the NRC minimum - but there is no evidence that factor of safety exists uniformly underneath either pad site.

¹"So, everyone who hears these words of mine and does them, will be like a smart person who built a house upon a solid Rock. And the rain came down and the rivers flood and the winds blew and it did not fall. For it was founded on that solid Rock. And, everyone hearing these words of mine and not doing them will be like a stupid person who built a house on sand. And the rain came down and the rivers flood and the winds blew and struck that house! And it fell! And the fall was great!" [Matthew 7:24-27, Holy Bible, Christian Scriptures 2001].

CONCLUSION

There are other weak assumptions in the Director's analysis. Nowhere in the underlying studies, reports, discussions and computations is there mention of the 1811-12 New Madrid earthquake, the largest in recorded history to hit the American Midwest. There is an asphalt "road" for moving and loading the casks which collars the pad and adds to the unevaluated overall weight concentration among the dunes. The NRC's vaunted conservative protectionism of the public safety takes no account of the incrementally increasing potential for a moderate or severe quake in or near that part of Michigan where Palisades is located. This latter consideration is especially important since assumptions about the "lifetime" operation of the Palisades plant were different in 1994 (40 years) than they are now (60 years with recent 20-year license extension).

Nor has the Commission in this instance departed from a troubling history of prevarication on matters related to spent fuel storage at the Palisades compound. In 1993 the NRC and NMC represented to a federal judge that the spent fuel cask loading was reversible (www.nirs.org/reactorwatch/licensing/sinclairltr020697.pdf). Just a year later, a flawed cask was discovered and that cask has sat there ever since, technologically inaccessible because, in fact, the casks cannot be unloaded without great danger and expense, if at all. Episodes such as this seem entirely consistent with later determinations by the NRC which cite, then freely ignore, regulatory standards and other criteria, which downgrade meticulously-documented violations to administrative work tasks, and which flatly compromise the practical ideal of leaving a margin of safety when handling highly dangerous materials.

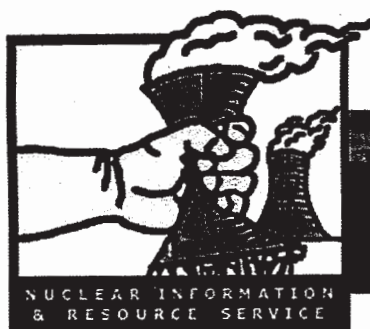
Concerns about the stability of both ISFSI pads during an earthquake remain. Liquefactional lying over the past decade and a half seems only to have protected the wholly-experimental use of an untested dry cask storage system at Palisades under the first

general license permitting it, a cask system (VSC-24) that has experienced a deeply troubled history of design and manufacturing defects and operational mishaps and accidents. The persistent manipulation of truths and data do not satisfy public questions, nor the need for strictest regulation in the interests of public safety.

/s/ Terry J. Lodge

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Nuclear Information and Resource Service

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FOR IMMEDIATE RELEASE

June 28, 2007

CONTACT

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Exhibit G

Citizen Groups Appeal to Federal Court against Palisades Nuclear Plant Charge High-Level Radioactive Waste Storage Violates Safety Regulations

Washington, D.C.—Atomic watchdog groups Nuclear Information and Resource Service (NIRS) and Don't Waste Michigan have filed an appeal to the U.S. Court of Appeals for the District of Columbia Circuit alleging that the high-level radioactive waste dry cask storage pads at Palisades Nuclear Power Plant near South Haven violate U.S. Nuclear Regulatory Commission (NRC) earthquake safety regulations. The three-foot thick concrete pads rest upon loose sand amidst the dunes of the Lake Michigan shoreline, with some containers of irradiated nuclear fuel just 150 yards from the water. This lawsuit marks the 15th continuous year of grassroots citizen resistance against the risks of radioactive waste generation and storage at Palisades.

The groups have exhausted all administrative remedies at NRC, and thus have turned to the federal courts for relief. They are represented, pro bono, by Toledo attorney Terry Lodge. Dr. Ross Landsman, a former NRC Midwest regional dry cask storage inspector, serves as their expert witness.

Dr. Landsman first warned NRC about the risks of earthquakes at Palisades in 1994. He wrote to the NRC chairman at the time: "Actually, it's the consequences that might occur from an earthquake that I'm concerned about. The casks can either fall into Lake Michigan or be buried in the loose sand because of liquefaction...It is apparent to me that [NRC's Nuclear Materials Safety and Safeguards division] doesn't realize the catastrophic consequences of their continued reliance on their current ideology."

Despite repeating his warnings at every opportunity while employed at NRC, Dr. Landsman's official risk assessments were consistently ignored by his superiors until he retired over a decade later in 2005.

Palisades' two pads now hold over 30 concrete and steel casks, each weighing around 150 tons when fully loaded with irradiated nuclear fuel rod assemblies. The pads were built on sand dunes despite reports by the U.S. Army Corps of Engineers and Michigan Department of Natural Resources that the location was a high-risk erosion zone.

"Palisades' older dry cask pad violates the liquefaction section of NRC's earthquake safety regulations, while its newer pad violates the amplification section," said Dr. Landsman.

"Underwater submersion could lead to inadvertent nuclear chain reactions in the fissile materials still present in the wastes," said Kevin Kamps, nuclear waste specialist at NIRS. "Burial under sand could cause the wastes to dangerously overheat. Either way, a disastrous radioactivity release could result."

"Palisades' mounting radioactive wastes put our precious Lake Michigan at risk, and thus the drinking water supply and recreational destination for millions of people downstream," said Alice Hirt of Don't Waste Michigan in Holland.

"Each of the casks contains 240 times the long-lasting radioactivity released by the Hiroshima atomic bomb," said Kamps. "The only solution to the radioactive waste problem is to stop making it in the first place, so Palisades should be shut down for good."

"There will be a multitude of high ticket and absolutely necessary remedial actions required at Palisades," said Michael Keegan of Coalition for a Nuclear-Free Great Lakes in Monroe. "When push comes to shove, and we will, this beleaguered plant will collapse in economic ruin. Our role has been to prevent environmental ruin."

For more information on concerned citizen efforts to address radioactive waste generation and storage risks at Palisades,

including Dr. Landsman's 1994 letter to NRC's chairman, see <http://www.nirs.org/reactorwatch/licensing/palisades.htm>

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Exhibit H

UNITED STATES COURT OF APPEALS
DISTRICT OF COLUMBIA CIRCUIT

Nuclear Information and)	
Resource Service, et al.,)	
Appellants,)	Case No. 07-1212
-vs-)	
U.S. Nuclear Regulatory)	
Commission, et al.,)	
Appellees.)	

* * * * *

APPELLANTS' REPLY TO 'FEDERAL RESPONDENTS'
MOTION TO DISMISS'

Now come the Nuclear Information and Resource Service and all other Appellants, by and through counsel, and respond to the "Federal Respondents' Motion to Dismiss", filed by the Nuclear Regulatory Commission (hereinafter "Appellees" or "NRC").

The NRC has attempted to camouflage a complete regulatory abdication and meltdown in the mundane language of routine, urging that Appellants' 10 CFR § 2.206 petition for enforcement questions the exercise of discretionary authority by the NRC, and that as such it must be summarily dismissed based on *Heckler v. Chaney*, 470 U.S. 821 (1985). By deflecting all reasoned criticism, the NRC thus trivializes the need for maximum protection from earthquake of the high-level radioactive waste storage casks

located a few hundred feet up-slope from Lake Michigan. As the discussion below reveals, the agency has sanctioned storage of ultra-dangerous material on pads which are highly likely to fail during a moderate earthquake which will probably occur during the coming century of high-level radioactive waste storage at Palisades.

SIGNIFICANT FOUNDATIONAL FACTS

The factual allegations must be accepted as true

Since the legal sufficiency of the Court's jurisdiction is being challenged, the Court should take Appellants' factual allegations as true and determine whether they bring the case within the exception to the *Heckler v. Chaney* presumption of unreviewability. See, e.g., *Saudi Arabia v. Nelson*, 507 U.S. 349, 351, 361 (1993) (disputed allegations forming basis for suit presumed true for purposes of deciding motion to dismiss); *Princz v. Federal Republic of Germany*, 26 F.3d 1166, 1172 (D.C. Cir. 1994) (same). Moreover, since the Federal parties are seeking "summary disposition" ("Federal Respondents Motion to Dismiss" p. 11), the Court must construe all facts and inferences from the facts in their light most favorable to the Appellants.

The facts that matter

Appellants' petition challenges the earthquake adequacy of two concrete-with-reinforced steel slabs, each roughly the size of a basketball court and 3' thick, weighing hundreds of tons.

These two slabs were built, one in 1993 and one in 2004, on a 55' to 65'-deep sand dune on the site of the Palisades Nuclear Power Plant on the Lake Michigan shoreline in Covert, Michigan. These two slab facilities are at a higher elevation than the power plant, having been constructed on sand, while the power plant itself was set directly on bedrock after a large area was excavated in the 1960's for its foundation.

The purpose of the slabs is to hold, for perhaps a century or more¹, dozens of concrete-and-steel casks, each weighing more than 250,000 pounds. These casks are designed as onsite repositories for highly-radioactive and dangerous spent nuclear fuel rods which are a waste byproduct of electricity generation. When pulled from the reactor after several years' fissioning, the spent fuel, which is fabricated in long, thin rods of enriched uranium, is initially maintained in a large, constantly-circulating pool of treated water for several years to control and remove "decay heat" which continues to be emitted after nuclear fissioning. The fuel rods, which are in bundles, are then removed from the water and stored on racks inside the spent fuel storage casks. One type of cask stored on the pads, the NUHOMS, is approximately 20 feet long, 15 feet high and 10 feet wide and are constructed at the reactor site. A second type, the VSC-24,

¹The NRC licenses the casks initially for 20 years, allows relicensing up to five (5) times for increments of 20 years, and then allows 20 years for the casks to be removed - for a total of up to 140 years.

stands vertically and is about 11 feet wide and 17 feet tall.

It is potentially dangerous for human beings to be exposed to the radiation from the casks for a prolonged time. While the casks have radiation shields to block some of the most harmful radiation from being absorbed by workers, the NRC regulates exposures. One may be exposed to up to 10 millirem/hour of radiation at 6 feet away (equal to 1 chest x-ray per hour at 6 feet away). At the cask's surface, 200 millirem per hour emission is permitted by the NRC, equal to 20 chest x-rays.

Presently, there are over thirty (30) loaded storage casks on the slabs, including the defective Cask #4, which was loaded in June 1994 and shortly thereafter found to have faulty welds. In 1993 representatives of the NRC and Consumers Power Company, then owner of Palisades, represented to a federal judge that the spent fuel cask loading was reversible², but the technology for unloading these huge cylinders has never been demonstrated, and so Cask #4 has never been unloaded.

The Appellants contend in their § 2.206 petition³ that neither of the two concrete slab facilities were built in conformance with NRC specifications and likely cannot withstand a moderate earthquake such as have historically occurred from time to time within the Great Lakes basin. Appellants' petition was

²www.nirs.org/reactorwatch/licensing/sinclairltr020697.pdf

³Docket No. 50-255, 72-7(2.206), NRC's ADAMS Accession No. ML060960061.

supported before the NRC by the work and the written Declaration of Dr. Ross Landsman, a Ph.D. in engineering and retired former NRC inspector at Palisades. Dr. Landsman set out these expert conclusions in his declaration⁴:

> that both pads were built, impermissibly, on compacted sand and other subsurface materials, several dozen feet above bedrock, instead of being installed in contact with bedrock; this means that in the event of an earthquake, the slabs (and as a result, the casks) will be shaken at a higher intensity than if they were set on bedrock, and probably will shatter;

> The older (1993) pad is in violation of NRC "liquefaction" standards under 10 CFR § 72.212(b)(2)(i)(B)⁵ and the 2004 pad, located somewhat further inland, violates NRC "amplification" requirements contained within the same regulation. See Landsman Declaration, ¶¶ 3-13. Each violation putatively violates 10 CFR § 72.212(b)(3)⁶.

⁴Appended to Docket No. 50-255, 72-7(2.206), NRC's ADAMS Accession No. ML060960061.

⁵[The general licensee shall perform written evaluations, prior to use, that establish that]: Cask storage pads and areas have been designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, and soil liquefaction potential or other soil instability due to vibratory ground motion.

⁶[The general licensee shall]: Review the Safety Analysis Report (SAR) referenced in the Certificate of Compliance and the related NRC Safety Evaluation Report, prior to use of the general license, to determine whether or not the reactor site parameters, including analyses of earthquake intensity and tornado missiles, are enveloped by the cask design bases

> As a nuclear safety engineer and dry cask storage inspector for the NRC, Dr. Landsman proposed to cite the utility owner of the two cask pads for violations of NRC regulations because they could not withstand projected moderate earthquake events postulated by regulation. Landsman's superiors changed the violations to "unresolved safety items", which allowed the utility in 2004 to proceed to load casks onto the new pad, while at the same time blocking Landsman from filing a formal protest called a "differing professional opinion" because open regulatory items are not deemed final agency actions with which one may formally differ. Landsman Declaration ¶ 3.

> Upon reviewing the utility's mathematical computations of the earthquake stability of the slabs, Dr. Landsman discovered that instead of meeting the 0.2 g standard of rapid motion required by NRC regulations, the projected force of a moderate quake would be higher, at 0.25 g. The dry casks are built to withstand a maximum earthquake motion of 0.25 g, at best. Declaration ¶ 4.

> Dr. Landsman further discovered that the calculation of potential earthquake motion up to 0.2g on the slabs was what he (in low-key engineering parlance) called "nonconservative". In the 1960's, Consumers Power Company committed to build all heavy

considered in these reports. The results of this review must be documented in the evaluation made in paragraph (b)(2) of this section.

facilities immediately atop bedrock.⁷ While at that time the contemplation was that there would be no long-term onsite storage of high-level radioactive waste, the storage policy has changed utterly. Palisades' construction of latter-day heavy slab facilities derogates the licensee's clear commitment in the 1960's that all heavy facilities such as storage slabs would be in contact with bedrock. Landsman Declaration ¶¶ 5-13. This is especially disturbing since the stability of the most dangerous nuclear material onsite is involved. Dr. Marvin Resnikoff of Radioactive Waste Management Associates in New York City has calculated that each dry cask at Palisades holds the long-lasting

⁷From p. 4 of the internal NRC "Memorandum to Marc Dapas, RIII from Edwin Hacket, NRR re Response to Task Interface Agreement 2005-06, Regarding Licensing Basis for, and Seismic Design of, the Palisades Independent Spent Fuel Storage Installation (ISFSI) (TAC No. MC6854)", dated November 7, 2005 (Docket No. 50-255, 72-7(2.206), NRC's ADAMS Accession No. ML061110268):

Finally, the available documentation clearly indicates that both the NRC and the licensee were aware from the beginning, that the overburden of sand would be removed, that an amplification factor between the bedrock and the 'ground' surface would need to be evaluated in order to establish an appropriate seismic horizontal acceleration, and that the point at which the licensee planned to and applied the seismic horizontal acceleration was at the 590 foot elevation.

Also from the same document (p. 6):

However, the sand dune materials, which usually have a relatively low shear wave velocity, would have greater potential for liquefaction during a strong seismic event based on observations from earthquake experience. **Therefore, the sand dune materials should have been removed prior to the construction.** (Emphasis supplied).

radiological equivalent of 240 up to 320 Hiroshima-grade atomic bombs in their irradiated fuel assemblies, depending on cask type.

Besides Landsman's information, a review of the administrative record ("Palisades Plant - NRC Final Safety Assessment of ISFSI Support Pad,"⁸ dated September 1, 1994, and NRC staff commentary on the issue of potential amplification effects from seismic events for the newer pad in NRC Inspection Report 05000255/2006002, dated May 11, 2006⁹, that the weight of the concrete pads (including the 2004 structure, 195' X 30' X 3' and weighing hundreds of tons) was never considered in rendering the seismic calculation, nor was the weight of the storage casks which would be placed on them, conservatively estimated at 3,500 tons, nor was the weight of the concrete radiation shields erected around sub-arrays of the casks on the pads contemplated. The exclusion of these weights from the slope stability calculations resulted in a much smaller driving force on the failed slope in the event of earthquake, and an unearned higher factor of safety as a result.

While the NRC considers a 15% safety margin to be adequate, there is none - 0% margin - present. The slabs are generously

⁸Docket No. 50-255, 72-7(2.206), NRC's ADAMS Accession No. ML060480234.

⁹Docket No. 50-255, 72-7(2.206), NRC's ADAMS Accession No. ML061350371.

but unscientifically believed to be exposed only to a projected 0.2 g earth-quake shock (the maximum shaking for which the slabs are supposedly designed), but the conceivable earthquake will shake the casks to the extreme limits of their ability to withstand an earthquake (*i.e.*, 0.25 g).

An official NRC guidance manual, NUREG-0800, sets forth the criterion for earthquake safety of plant facilities. At Section II, Acceptance Criteria, p. 6 of Section 3.7.1 of NUREG-0800 Revision 3 (identified online at www.nrc.gov as ML070640306): "[t]he design basis shall reflect appropriate consideration of the most severe earthquakes that have been historically reported for the site and surrounding area with sufficient margin for the limited accuracy, quantity, and period of time in which historical data have been accumulated."

This criterion, if met, tells NRC license reviewers that General Design Criterion 2 in Appendix A to 10 CFR Part 50 has been satisfied. Criterion 2 of the General Design Criteria for Nuclear Power Plants (found at 10 CFR Part 50, Appendix A, entitled "Design bases for protection against natural phenomena") requires that:

Structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions. The design bases for these structures, systems, and components shall reflect: (1) Appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site

and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena and (3) the importance of the safety functions to be performed. (Emphasis supplied)

Hence the Nuclear Regulatory Commission's acceptance criteria for a safe nuclear power facility call for installations such as spent fuel storage cask pads to be "overbuilt" or "over-engineered" to provide a hedge in case an actual earthquake is worse than projections. The regulations require that a safety margin be built into the facility unless the historical and projected earthquake data are flawless, complete, and utterly perfect. Perfect data, of course, are a mere fictional aspiration in the fields of seismology and engineering.

The NRC has compounded the imperfect data by betting the public's health and safety upon the troubling results of its mathematical computations of the seismological possibilities and inadequate capabilities of the concrete slab pads. In their "Petitioners' Comments and Objections to Proposed Director's Decision Under 10 CFR 2.206¹⁰," Appellants noted that the NRC's own analysis revealed that the ground acceleration caused by an earthquake if the slabs were situated on bedrock instead of on a 50 to 70 foot deep sand dune would be precisely at the outer limit of acceptability - 0.2 g - and that the ground acceleration

¹⁰Docket No. 50-255, 72-7(2.206), NRC's ADAMS Accession No. ML070390210.

would be greater (and exceed the NRC limit for stability) if the slabs were constructed on sand. *Id.* p. 2.¹¹

LEGAL ARGUMENT

For a comparatively paltry amount of utility money the sand dune could have been excavated and public safety better assured by building the slabs on bedrock, lowering the vibrational force from an earthquake. Instead, Palisades' owner and the NRC have indulged the faith-based, *post hoc* rationale that by clinging only tenuously to the frontiers of NRC regulations, they can ignore the Biblical injunction of the Sermon on the Mount¹² and thereby better serve the public. And the NRC has the temerity to insist that it may use the *Heckler v. Chaney* rule to conceal its conscious policy of de-regulation of earthquake safety.

An exception to *Chaney's* unreviewability doctrine appears when an agency has adopted a "general policy ... so extreme as to amount to an abdication of its statutory responsibilities." See

¹¹Quoting from p. 4 of the "Memorandum to Marc Dapas, RIII from Edwin Hackett, NRR re Response to Task Interface Agreement 2005-06, Regarding Licensing Basis for, and Seismic Design of, the Palisades Independent Spent Fuel Storage Installation (ISFSI) (TAC No. MC6854)", dated November 7, 2005.

¹²"So, everyone who hears these words of mine and does them, will be like a smart person who built a house upon a solid Rock. And the rain came down and the rivers flood and the winds blew and it did not fall. For it was founded on that solid Rock. And, everyone hearing these words of mine and not doing them will be like a stupid person who built a house on sand. And the rain came down and the rivers flood and the winds blew and struck that house! And it fell! And the fall was great!" [Matthew 7:24-27, Holy Bible, Christian Scriptures 2001].

Heckler v. Chaney, *supra*, 470 U.S. at 833 n.4. The *Chaney* court cautioned that the presumption of unreviewability was rebuttable:

We of course only list the above concerns to facilitate understanding of our conclusion that an agency's decision not to take enforcement action should be presumed immune from judicial review under 701(a)(2). For good reasons, such a decision has traditionally been 'committed to agency discretion,' and we believe that the Congress enacting the APA did not intend to alter that tradition. Cf. 5 Davis 28:5 (APA did not significantly alter the 'common law' of judicial review of agency action). In so stating, we emphasize that the decision is only presumptively unreviewable; the presumption may be rebutted where the substantive statute has provided guidelines for the agency to follow in exercising its enforcement powers. (Emphasis supplied).

Id. at 832-33. The *Chaney* court also suggested that in a reviewable case, the reviewing court has the power to decide whether the agency's action is contrary to the statute or applied the statute in a manner that was arbitrary or capricious. See *id.* at 833-35.

The D.C. Circuit in *Safe Energy Coal. of Mich. v. NRC*, 866 F.2d 1473 (D.C. Cir. 1989) suggested that it might review an NRC denial of a § 2.206 enforcement petition if the denial amounted to a complete "abdication" of the agency's statutory duty "to ensure adequate protection of the public health and safety." *Id.*, 866 F.2d at 1477; *Union of Concerned Scientists v. NRC*, 824 F.2d 108, 120 (D.C. Cir. 1987).

The NRC must, under the Atomic Energy Act, ensure that "the utilization or production of special nuclear material . . . will provide adequate protection to the health and safety of the

public." 42 U.S.C. § 2232(a). The AEA further authorizes the NRC to regulate in various formats as it "may deem necessary or desirable . . . to protect health or to minimize danger to life or property." 42 U.S.C. § 2201(b); see also *id.* § 2201(i)(3) (NRC authorized to regulate as it finds necessary "to govern any activity authorized pursuant to this chapter, including standards and restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property").

"The NRC is charged under the AEA . . . with primary responsibility to ensure, through its licensing and regulatory functions, that the generation and transmission of nuclear power does not unreasonably threaten the public welfare. Consistent with its administrative mandate, the NRC is empowered to promulgate rules and regulations governing the construction and operation of nuclear power plants." *County of Rockland v. U.S. Nuclear Regulatory Comm'n*, 709 F.2d 766, 769 (2d Cir.), *cert. denied*, 464 U.S. 993 (1983).

The District of Columbia Court of Appeals has observed that 42 U.S.C. § 2232(a) requires the NRC to ensure "adequate protection" of public health and safety, not "absolute" protection. *Union of Concerned Scientists v. U.S. Nuclear Regulatory Comm'n*, 824 F.2d 108, 114 (D.C. Cir. 1987); see also *id.* at 118 ("The level of adequate protection need not, and almost certainly will

not, be the level of 'zero risk.' This court long has held that the adequate-protection standard permits the acceptance of some level of risk"). So collectively, the statutory provisions require that the NRC insure adequate protection of public health and safety from risks associated with nuclear plants. The NRC can be viewed as abdicating its statutory duties, then, if it has established a policy not to protect adequately public health and safety with respect to nuclear plants and associated facilities such as the cask storage pads.

It is not realistic to expect the NRC to admit that it has cynically bypassed its own regulatory requirements to *de facto* de-regulate earthquake safety. Rather, the court must generalize from the anecdotal regulatory failures such as have occurred at Palisades with earthquake protections and the failure to sanction Palisades' owner for the perpetuation of the defective Cask #4. "By definition, expressions of broad policies are abstracted from the particular combinations of facts the agency would encounter in individual enforcement proceedings." *Crowley Caribbean Transp., Inc. v. Peña*, 37 F.3d 671, 677 (D.C. Cir. 1994). And the facts at bar - where the slab facilities only facially comply with regulations because of a sleight-of-hand maneuver to ignore that they are built on sand instead of bedrock - support the conclusion that, per *Heckler v. Chaney*, the agency has adopted a "general policy ... so extreme as to amount to an abdication of

its statutory responsibilities."

The NRC maintains, of course ("Federal Respondents' Motion to Dismiss" pp. 2-3) that "Discretion is the hallmark of this [broad NRC] authority, for the Atomic Energy Act is 'virtually unique in the degree to which broad responsibility is reposed in the administering agency, free of close prescription in its charter as to how it shall proceed in achieving the statutory objectives.'" The agency is actually saying that it has sole discretion to determine what and how to enforce, calling to mind Humpty Dumpty's scornful insistence that "When I use a word it means just what I choose it to mean - neither more nor less."¹³ The NRC's assertion that it is completely above the law and immune from accountability through the courts, in light of its easy trampling of its own safety margins, equals "Humpty Dumpty de-regulation", all the attendant technical rituals of regulation with a result of no regulatory enforcement, where explicit regulations mean only what the NRC intends for them to mean.

CONCLUSION

And so the NRC hopes the Court will agree that a shallow inquest into the facts affords it no jurisdiction.

Appellants suggest, however, that instead of dismissal, the Court should allow further briefing on the merits, to closely scrutinize the NRC's audacious denial of the request to take

¹³http://en.wikipedia.org/wiki/Humpty_Dumpty

serious enforcement steps against the owners of the illegal cask storage slabs. If the Court believes at this juncture it has enough information, on the other hand, then Appellants urge that the Court award summary disposition to them and remand this matter to the NRC with specific orders as to how the agency should proceed.

Beyond the dry talk of computations and engineering projections, it remains that there are no safety margins left in either the cask storage pads or the radioactive waste storage casks at Palisades. Yet according to the U.S. Geological Survey, the probability for an earthquake of magnitude 6.0, 7.0 or greater in the New Madrid zone is higher than 90% by the year 2045.¹⁴ Measurable, serious tremors could reach into central Michigan.¹⁵ The largest quake in recent times originating within Michigan registered 4.6 on the Richter scale in August, 1947.¹⁶

Even in a moderate earthquake, something far less than the (8.0 Richter) New Madrid disaster¹⁷, the storage casks will tumble downslope from the shattered pads into Lake Michigan, or become buried, or will breach. If they do not breach from the

¹⁴<http://quake.wr.usgs.gov/prepare/factsheets/NewMadrid/>.

¹⁵See map at <http://hsv.com/genlintr/newmadrd/>.

¹⁶http://earthquake.usgs.gov/regional/states/events/1947_08_10_iso.php.

¹⁷The New Madrid quake reportedly generated tidal waves on a windless day on the Great Lakes.

tumble, the casks will still pose an enormous threat to public health, safety and the environment. Spent fuel rods could break up and come into contact with one another, threatening the external environment with radiation. If casks roll into Lake Michigan and water seeps into them, there would be the nightmarish spectre of uncontrollable nuclear chain reactions. If they become buried in sand, unacceptable overheating could occur, encouraging damage to the casks and possible breach of containment.

And yet, the NRC requires either no earthquake safety margins, or even less than zero margins, at Palisades - a sharp departure from the NRC's long-standing requirements that there be safety margins by design. The Commission's decision not to enforce is less an exercise of "prosecutorial discretion" than abdication of all pretense to concern for public health and safety. De-regulation sets up the scenario for Humpty's potentially great fall.

If there ever were a *Heckler v. Chaney* footnote-exception to the presumption of agency discretion and judicial nonreviewability, this is it. The Court must intrude here precisely because the regulatory agency has abandoned the role of regulator with its policy and, *de facto*, has de-regulated the storage of spent fuel, all to the detriment of the public health and safety which the NRC is statutorily obliged to protect. The ludicrous

assertion by the NRC (Motion p. 11) that even "[r]eal . . . inadequate enforcement . . . does not constitute a reviewable abdication of duty,"¹⁸ makes the Court's choice quite obvious: it may either duck its lawful responsibility and refuse to intervene in a clear case of illegal de-regulation by an indifferent, rogue regulator, or it may re-establish the rule of law over the handling of the most dangerous substances in the world and require the NRC to fulfill its bright-line obligation to protect the public.

WHEREFORE, Appellants pray the Court *deny* the "Motion to Dismiss," or alternatively, that the Court award Appellants summary disposition predicated on the absence of issues of fact, coupled with the controlling statutes and regulations.

Terry J. Lodge
Counsel for Appellants

CERTIFICATION

I hereby certify that on the 17th day of August, 2007, I sent a copy of the foregoing "Appellants' Reply to 'Federal Respondents' Motion to Dismiss" to the following counsel of record via email (to Molly Barkman) and regular U.S. mail, postage prepaid (to all counsel) as follows:

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¹⁸*Texas v. U.S.*, 106 F.3d 661, 667 (5th Cir. 1997).

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FOR IMMEDIATE RELEASE

August 23, 2007

Exhibit I

CONTACT

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Palisades Nuclear Plant Critics Warn Court about Catastrophic Earthquake Risks

Covert, MI— Atomic watchdog groups have told a federal appeals court that even a moderate earthquake affecting the Palisades atomic reactor could spell radioactive catastrophe for Lake Michigan and communities downwind and downstream.

In the face of a motion filed by the U.S. Nuclear Regulatory Commission (NRC) to dismiss the lawsuit, citizen groups have defended their appeal to the U.S. Court of Appeals for the District of Columbia Circuit. The suit alleges that the high-level radioactive waste storage facilities at Palisades, on the Lake Michigan shore near South Haven, violate governmental earthquake safety regulations. "Palisades' mounting radioactive wastes put our precious Lake Michigan at risk, and thus the drinking water supply and recreational destination for millions of people downstream," said Alice Hirt of Don't Waste Michigan in Holland.

In early August, the U.S. Nuclear Regulatory Commission (NRC) moved to dismiss the citizen groups' appeal to the U.S. Court of Appeals for the District of Columbia Circuit. Earlier this year, NRC rejected the groups' petition urging the agency to enforce its own regulations at Palisades.

Palisades now has over 30 concrete and steel silos holding deadly irradiated nuclear fuel rods. The silos, called dry casks, rest upon two concrete pads. The concrete slabs are located upon loose sand amidst the dunes of the Lake Michigan shoreline. Some containers of radioactive waste are just 150 yards from the water. The environmental coalition's attorney, Terry Lodge of Toledo, said: "The NRC's numbers racket is a big fraud, endangering public health and the Great Lakes. We've exposed the hidden de-regulation of earthquake safety by the NRC. This is not 'inadequate enforcement,' it is zero enforcement."

"The NRC's so-called experts pretend in their calculations that the slabs holding the casks are sitting on relatively stable clay," Lodge added. "But in fact they sit on highly unstable sand dunes, which would amplify the vibrations from an earthquake. NRC didn't count the thousands of tons of steel and concrete represented by the slabs and casks in their number-crunching. As a result, they're denying the very serious risk that these slabs, and possibly even the casks, will shatter in the event of an earthquake and release catastrophic amounts of radioactivity. Earthquakes capable of doing that have hit the Great Lakes region before."

NRC will almost certainly file a rebuttal within the next week. Palisades' owner, Entergy Nuclear of New Orleans, may also seek to have the case dismissed. The federal court will then take the case under advisement, meaning it will review both sides' arguments and then render a decision at some point in the future.

"Each of the casks contains 240 to 320 times the long-lasting radioactivity released by the Hiroshima atomic bomb," said Kevin Kamps of Beyond Nuclear, a national watchdog group. "We must stop Palisades from generating any more of these forever deadly radioactive wastes, and safeguard and secure what's already piled up on the beach against accidents, attacks, and leaks."

The groups' expert witness, Dr. Ross Landsman, can be contacted upon request. Dr. Landsman formerly served as NRC dry cask storage inspector at Palisades. He repeatedly raised warnings within the agency about the earthquake risks for over a decade, until his retirement in 2005.

For more information on concerned citizen efforts to address radioactive waste generation and storage risks at Palisades, including the most recent legal filing as well as Dr. Landsman's original 1994 letter to NRC's chairman, see <http://www.nirs.org>

</reactorwatch/licensing/palisades.htm>

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February 15, 2011

Exhibit J

3 States Challenge Federal Policy on Storing Nuclear Waste

By MATTHEW L. WALD

WASHINGTON — The attorneys general of New York, Connecticut and Vermont sued the Nuclear Regulatory Commission on Tuesday, challenging a new commission policy stating that nuclear waste can be safely stored at a nuclear power plant for 60 years after a reactor goes out of service.

The three states argued that the policy, adopted in December, violated two federal laws requiring that a full environmental review be carried out at each nuclear site before permission for long-term storage could be granted.

“Our communities deserve a thorough review of the environmental, public health and safety risks such a move would present,” New York’s attorney general, Eric T. Schneiderman, said in a statement.

In a phone interview, Attorney General William H. Sorrell of Vermont said “a prudent federal response to the problem of spent fuel storage might be different from one site to the next — that’s what this is about.”

The attorneys general noted that storage of nuclear waste remained a nagging issue for the federal government. After years of work by the Energy Department to prepare Yucca Mountain in Nevada as a permanent repository for nuclear waste, the Obama administration in 2009 ruled out using that site. (State utility regulators have challenged that decision in a lawsuit.)

“It puts more pressure, frankly, on the federal government and the nuclear power industry to come up with long-term — and by that I mean permanent — solutions,” Mr. Sorrell said of the suit. “If we take our feet off the accelerator there, the politics and other considerations of permanent storage will be allowed to go unresolved for a longer period of time.”

Yet the potential impact of the lawsuit filed on Tuesday, and even the commission’s position

on waste, is unclear.

David McIntyre, a spokesman for the Nuclear Regulatory Commission, said the lawsuit by the attorneys general had mischaracterized the nature of the December decision. He described it as a commission “opinion” on how long waste could be safely stored rather than a rule permitting any plant to store spent fuel.

But people who favor building new reactors said the adoption of the policy was important because it helped outline a legal basis for approving the construction of new reactors and long-range plans for handling their spent fuel.

Most of the nuclear plants running today were designed at a time when engineers thought that spent fuel would be stored for a few years in an earthquake-proof pool at the site. Then it would be moved to a different site where it would be chopped up and chemically processed so that some parts could be reused, the thinking went.

But efforts to develop storage and reprocessing sites for nuclear waste stalled, and most nuclear plants ended up with too little storage space in their pools to accommodate the waste.

With no place to send the fuel, nuclear operators have instead built “dry casks,” small steel and concrete silos, filled with inert gas, into which old fuel can be sealed. Most nuclear plants in the United States either store fuel in casks now or have plans to do so.

The Nuclear Regulatory Commission licenses dry casks for 20 or 40 years, and then decides whether the licenses can safely be renewed, or whether additional precautions should be taken. The first casks were initially licensed for 20 years, and some have received 40-year renewals.

Mr. McIntyre said the underlying reason for the commission’s December “opinion” was that such casks were “working really well.”

The commission does not require that an environmental-impact statement be prepared for a site before it grants an extension, he acknowledged, but he said that in some cases there had been public hearings.

The casks require security guards, and at some sites the presence of the waste has made it impractical to reuse the land for any other purpose. At the Connecticut Yankee nuclear power station in Haddam Neck, Conn., torn down in 2007, all of the fuel ever used by the

reactor over its 28 years of operation is now sitting in dry casks.

In announcing in 2009 that it would drop its application for a license for Yucca Mountain, the Obama administration established a commission to pursue other solutions.

The panel is exploring technologies for reuse of some components of the fuel and developing a process for choosing the site for a repository.

In New York, the lawsuit on Tuesday had another political subtext. The licenses of the Indian Point 2 and 3 reactors in Buchanan are nearing expiration, and Gov. Andrew M. Cuomo opposes a 20-year extension sought by the plant's owners.

Exhibit K

COOPER: NRC CAN NO LONGER IGNORE “STAGGERING” COST OF WASTE DISPOSAL AND STORAGE IN REACTOR LICENSING AND RE-LICENSING

Economist Details \$210 to \$350 Billion in Costs That Undercut Case for New Reactors and Extended Life for Old Reactors; True Cost of Nuclear Power is \$10-\$20 Higher Per Megawatt Hour.

WASHINGTON, D.C. – December 19, 2013 – The U.S. Nuclear Regulatory Commission (NRC) must start taking into account the full cost of nuclear waste disposal and storage, which would add up to a third of a trillion dollars to the price tag of nuclear power, according to a declaration filed today with the NRC by economist Mark Cooper of the Vermont Law School. Cooper details how acknowledging the full cost of nuclear power would both dramatically undercut the rationale for relicensing of existing reactors and the licensing of proposed reactors and also make nuclear power far less attractive in comparison to wind, solar, and expanded reliance on energy efficiency.

Cooper presents his latest calculations about the cost of nuclear power in a declaration filed with the NRC as part of the court-ordered Draft Waste Confidence Generic Environmental Impact Statement process. Cooper is a senior fellow for economic analysis at the Institute for Energy and the Environment of the Vermont Law School. In addition to detailing the three dozen most at-risk reactors in the United States in *“Renaissance in Reverse: Competition Pushes Aging U.S. Nuclear Reactors to the Brink of Economic Abandonment”* (2013), Cooper is also the author of *“Policy Challenges of Nuclear Reactor Construction, Cost Escalation and Crowding Out Alternatives”* (2009).

In the NRC filing, Cooper states: “Are the economic costs of at-reactor nuclear waste storage and disposal in a permanent repository large enough to affect the economics of nuclear power and, therefore, should the Nuclear Regulatory Commission consider those costs in its nuclear licensing decisions? The answer is simple and clear – these costs are so large they must be considered. Conservatively estimating these costs, I put the total cost in the range of \$210 to \$350 billion, in real, undiscounted dollars. That is a figure that is certainly large enough to demand consideration by the Nuclear Regulatory Commission.”

Commenting on his analysis, Cooper said: “The economic numbers are crystal clear. Nuclear waste management costs are staggering and should be included in any proper analysis of the economics of nuclear reactors for purposes of issuing new licenses or renewing old ones. Given the substantial scale of these costs, any cost-benefit analysis that ‘hides’ such numbers is simply not credible. The fact that some of these costs have been socialized and taken off the shoulders of the industry does not make them any less expensive, burdensome, or relevant in determining the full and true cost of nuclear power.”

The Cooper declaration looks at a range of scenarios including heavy reliance on on-site reactor storage of nuclear waste in casks (which must be fully replaced at a cost of \$100 billion or more every 100 years) and the use of one or more Yucca Mountain-style repositories. The economist notes that the estimates of nuclear waste storage and disposal are subject to the same kind of runaway cost increases that the industry sees when it comes to projections for construction of new reactors.

In the declaration, Cooper concludes the extra cost per unit of nuclear reactor output with nuclear waste storage and disposal would be “in the range of \$10 to \$20 per megawatt hour (\$0.01 to \$0.02/ kWh) of electricity generated by the reactors that produce the waste. This is equal to 10 to 20 percent of the cost of nuclear power from newly constructed reactors as calculated by the Energy Information Administration. Compared to the cost of the other resources included in the Energy Information Administration analysis, the cost of waste management would make nuclear power much less attractive as a resource.”

Cooper explains that factoring in the extra cost due to waste storage and disposal could be the tipping point for existing older reactors. “... the cost of nuclear waste management is even larger compared to the operating costs and margins of existing reactors. Several operating reactors have recently been abandoned because their operating margins of \$9 per MWh are insufficient to cover their costs and meet the revenue requirements that their owners demand and others may face a similar fate. Waste

management costs of \$10 to \$20 per MWh must be considered very significant in evaluating the economics of aging reactors. The majority of the license renewals that are pending at the Commission, or expected to come before the Commission in the next few years, involve reactors whose operating costs and margins are no better than the margins for reactors that were recently retired before their licenses expired."

The declaration also points out the cost of storing "stranded" nuclear waste – stored at reactors that have been shut down – can be up to five times the cost of maintaining waste at an operating reactor. Given the likelihood of further shutdowns of currently operating reactors, this is a cost-multiplier issue that cannot be ignored, according to Cooper.

Cooper pointed out that his estimate of the cost of nuclear waste storage and disposal would have been even higher if he had included the risk of nuclear reactor accidents and the cost of decommissioning outdated reactors.

Friday is the NRC deadline for comments in the wake of a 2012 U.S. Court of Appeals decision that resulted in suspension of all U.S. reactor licensing and re-licensing decisions until NRC completed a study of the environmental impacts of its failure to site a repository for disposal of spent reactor fuel. The federal government estimates that just over 141,000 metric tons of spent fuel either already has or will be produced under existing reactor licenses and reactors under construction. Meanwhile, after decades of trying to site a repository, Yucca Mountain has been cancelled and no other repository has been proposed.

Cooper prepared his declaration in support of comments on a draft Environmental Impact Statement by the NRC regarding the environmental impacts of spent fuel storage and the feasibility of siting a spent fuel repository. Attorney Diane Curran will submit the comments Friday on behalf of more than 30 environmental organizations. The groups contend that NRC has failed to satisfy the 2012 court decision ordering the EIS, and therefore must continue the current moratorium on reactor licensing and re-licensing that the NRC imposed in response to the court order.

MEDIA CONTACT: Ailis Aaron Wolf, (703) 276-3265 or aawolf@hastingsgroup.com.

EDITOR'S NOTE: A streaming audio replay of a related news event will be available on the Web at <http://216.30.191.148/wasteconfidencerule/> as of 3 p.m. EST on December 19, 2013.



Exhibit L

April 2005

NUCLEAR REGULATORY COMMISSION

NRC Needs to Do More to Ensure that Power Plants Are Effectively Controlling Spent Nuclear Fuel

*Exhibit
M*

**G A O****Accountability * Integrity * Reliability**

GAO
 Accountability • Integrity • Reliability
Highlights

Highlights of GAO-05-339, a report to congressional requesters

Why GAO Did This Study

Spent nuclear fuel—the used fuel periodically removed from reactors in nuclear power plants—is too inefficient to power a nuclear reaction, but is intensely radioactive and continues to generate heat for thousands of years. Potential health and safety implications make the control of spent nuclear fuel of great importance. The discovery, in 2004, that spent fuel rods were missing at the Vermont Yankee plant in Vermont generated public concern and questions about the Nuclear Regulatory Commission's (NRC) regulation and oversight of this material.

GAO reviewed (1) plants' performance in controlling and accounting for their spent nuclear fuel, (2) the effectiveness of NRC's regulations and oversight of the plants' performance, and (3) NRC's actions to respond to plants' problems controlling their spent fuel.

What GAO Recommends

GAO recommends that NRC (1) establish specific requirements for the control and accounting of loose rods and fragments and plants' conduct of their physical inventories and (2) develop and implement appropriate inspection procedures to verify plants' compliance with the requirements.

Commenting on the draft report, NRC generally agreed with GAO's conclusions and recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-05-339.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Jim Wells at (202) 512-3841 or wellsj@gao.gov.

NUCLEAR REGULATORY COMMISSION

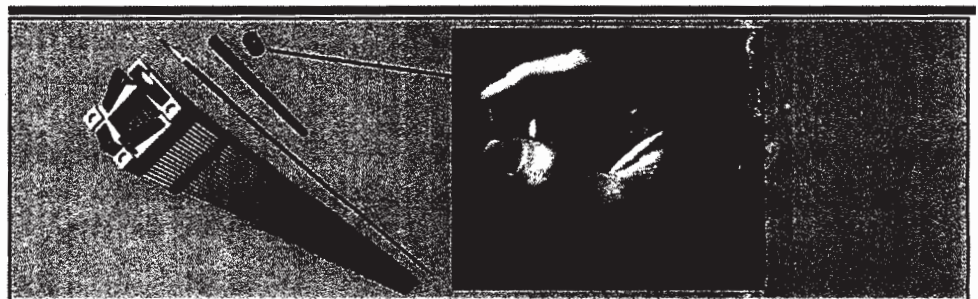
NRC Needs to Do More to Ensure that Power Plants Are Effectively Controlling Spent Nuclear Fuel

What GAO Found

Nuclear power plants' performance in controlling and accounting for their spent fuel has been uneven. Most recently, three plants—Vermont Yankee and Humboldt Bay (California) in 2004 and Millstone (Connecticut) in 2000—have reported missing spent fuel. Earlier, several other plants also had missing or unaccounted for spent fuel rods or rod fragments.

NRC regulations require plants to maintain accurate records of their spent nuclear fuel and to conduct a physical inventory of the material at least once a year. The regulations, however, do not specify how physical inventories are to be done. As a result, plants differ in the regulations' implementation. For example, physical inventories at plants varied from a comprehensive verification of the spent fuel to an office review of the records and paperwork for consistency. Additionally, NRC regulations do not specify how individual fuel rods or segments are to be tracked. As a result, plants employ various methods for storing and accounting for this material. Further, NRC stopped inspecting plants' material control and accounting programs in 1988. According to NRC officials, there was no indication that inspections of these programs were needed until the event at Millstone.

NRC is collecting information on plants' spent fuel programs to decide if it needs to revise its regulations and/or oversight. In addition to reviewing specific instances of missing fuel, NRC has had its inspectors collect basic information on all facilities' programs. It has also contracted with the Department of Energy's Oak Ridge National Laboratory in Tennessee to review NRC's material control and accounting programs for nuclear material, including spent fuel. It further plans to request information from plant sites and visit over a dozen of them for more detailed inspection. These more detailed inspections may not be completed until late 2005, over 5 years after the instance at Millstone that initiated NRC's efforts. However, we believe NRC has already collected considerable information indicating problems or weaknesses in plants' material control and accounting programs for spent fuel.



Source: Nuclear Energy Institute.

Nuclear fuel rods are filled with ceramic pellets of uranium and grouped into fuel assemblies, typically 5 to 10 inches square and 12 to 14 feet long.

The New York Times

June 8, 2012

Exhibit N

Court Forces a Rethinking of Nuclear Fuel Storage

By MATTHEW L. WALD

WASHINGTON — The Nuclear Regulatory Commission acted hastily in concluding that spent fuel can be stored safely at nuclear plants for the next century or so in the absence of a permanent repository, and it must consider what will happen if none are ever established, a federal appeals court ruled on Friday.

In a unanimous opinion, a three-judge panel of the Court of Appeals for the District of Columbia said that in deciding that the fuel would be safe for many decades, the commission did not carry out an analysis of individual storage pools at reactors across the country, treating them generically instead. The commission also did not adequately analyze the risk that cooling water will leak from the pools or that the fuel will ignite, the court wrote.

The commission has relied on its conclusion that spent fuel rods can be safely stored at plants to extend the operating licenses of dozens of power reactors in recent years and to license four new ones.

The plaintiffs — four states, including New York, environmental groups and an American Indian organization — declared victory, although the precise implications were not clear. Still, it appeared that the commission would have to prepare and publicly defend an assessment that storage for many decades or even indefinitely did not entail large risks.

In the 1980s, Congress directed the Department of Energy to prepare a plan for creating a national repository at Yucca Mountain, a volcanic structure in the Nevada desert about 100 miles from Las Vegas. But that plan, decades behind schedule, was shelved in 2010 by President Obama, who had promised in his 2008 campaign to kill it if elected.

Some Republican lawmakers are now hoping to revive the idea of storage at Yucca but would face determined opposition, above all from the leader of the Senate's Democratic majority, Harry Reid of Nevada.

"The commission apparently has no long-term plan other than hoping for a geologic

repository,” the appeals court wrote.

If the federal government “continues to fail in its quest” to find a place for spent nuclear fuel, then the material “will seemingly be stored on site at nuclear plants on a permanent basis,” the court said, and the commission will have to size up the environmental risks of this.

Failing to establish a repository is “a possibility that cannot be ignored,” the judges said.

A spokesman for the regulatory commission said that its lawyers were studying the ruling and that they would have no immediate comment.

New York State officials said they hoped the ruling meant that the commission would have to complete a sweeping analysis of waste storage at reactors before extending the licenses of the Indian Point reactors in Westchester County, which Gov. Andrew M. Cuomo wants shut down. The initial 40-year licenses at the two operating reactors there expire in 2014 and 2016.

John J. Sipos, a state assistant attorney general, said the safety rule that was at issue in the case had effectively taken “the waste issue off the table” in license renewals in recent years.

“We think that at Indian Point and other facilities going through license renewal, those issues will be back on the table,” Mr. Sipos said. He added that the commission’s analysis will have to cover whether waste should be moved out of the spent fuel pools and into sealed steel-and-concrete capsules called dry casks. The analysis will also have to address what the environmental impact of the casks will be if no burial site is built, he said.

A spokesman for Entergy, which owns the reactors at Indian Point, around 40 miles north of Midtown Manhattan, said, “There is no reason to believe this issue will affect the current schedule for license renewal proceedings.”

The industry’s main trade association, the Nuclear Energy Institute, said it was disappointed by the ruling but urged the commission “to act expeditiously to undertake the additional environmental analysis.” It would not comment on whether any licenses would be affected.

Geoffrey H. Fettus, a lawyer at the Natural Resources Defense Council who argued the case, said that because of Friday’s ruling, “this is the first instance where the long-term implications of our nuclear waste disposal policy will have to be given a hard public look.”

Opponents of nuclear power have long cited the lack of a firm plan for a waste burial place in opposing license extensions for reactors. In the meantime, the terrorist attacks of Sept. 11, 2001, and the earthquake and tsunami that hit the Fukushima Daiichi nuclear plant in Japan last year have sharpened a debate about how the fuel is stored now.

Most of it is kept in deep pools made of steel-reinforced concrete and lined with stainless steel, in water that is monitored and filtered. At most plants those pools have been packed full, and some older fuel has been moved into dry casks.

Such casks have survived floods and earthquakes without apparent damage, and some experts have called for thinning out the pools and filling up more casks. The commission has said that either method is acceptable.

The fear is that if a pool leaked or if cooling failed and the pool boiled dry, the fuel could catch fire, although many experts doubt this is possible.

In its ruling on Friday, the court said the commission had reached its conclusions by examining past leaks. But that history "tells us very little about the potential for future leaks or the harm such leaks might portend," it wrote.

Exhibit O

July 7, 2005

Re: Private Fuel Storage, LLC application for commercial irradiated nuclear fuel "interim" storage site at the Skull Valley Goshutes Indian Reservation in Utah

Dear Commissioners Diaz, Jaczko, Lyons, McGaffigan and Merrifield,

On behalf of the millions of members our 437 organizations represent (31 Native American, 26 national, 366 regional/state/local, and 15 international organizations), we urge you not to approve the license application by Private Fuel Storage, LLC (PFS) to open an "interim storage site" for commercial irradiated nuclear fuel at the Skull Valley Goshute Indian Reservation in Utah.

The need for PFS is far from clear, given approvals for on-site dry cask storage at a growing number of reactors, and the fact that true consolidation of waste is not possible as long as nuclear utilities continue to produce it. The proposal is also plagued by many problems, and its location poses unacceptable risks. The facility has no contingency plan for faulty containers, the storage/transport containers are of questionable structural integrity, and there is an increasing risk that PFS could well become de facto permanent storage. The plan also raises serious transportation safety concerns, and is beset with environmental justice violations.

In short, the proposal is neither safe, sound, nor just.

Skull Valley is not an appropriate site for storing irradiated nuclear fuel. The adjacent complex of Hill Air Force Base and the Utah Test and Training Range (UTTR) represents one of the biggest and busiest bombing ranges in the country, with thousands of over-flights annually posing the risk of accidental crashes into PFS. The stray missile which struck the scientific research station on the reservation in the 1990's, and the Genesis satellite crash into the UTTR last September, for instance, show the potential dangers of storing 44,000 tons of highly radioactive waste next to such active military facilities.

PFS also plans no pool or hot cell on-site, and thus would lack any waste repacking capability in the event of an emergency. If storage casks fail for any reason - human error during shipping or handling, natural disaster, accident, act of sabotage, faulty casks, or gradual corrosion - it would be difficult to adequately address the problem and prevent radioactivity from leaking into the soil, water, and air.

Oscar Shirani, former Commonwealth Edison/Exelon lead quality assurance inspector and nuclear safety whistleblower, has questioned the structural integrity of the Holtec casks proposed for PFS. He cites numerous major quality assurance violations in the manufacture of the storage/transport containers. Cask defects would not only raise the risk of irradiated fuel degradation and increased container vulnerability during storage at Skull Valley, but also of a potentially catastrophic radioactivity release during transport due to a severe accident or terrorist attack.

As it is, PFS's transportation plan, or lack thereof, is very disconcerting. PFS would dramatically increase unnecessary transportation and handling of high-level waste. Despite PFS's assurances that it is only "interim" storage, its lack of waste repackaging contingencies and DOE's reluctance to accept PFS wastes at Yucca Mountain, as discussed below, all combine to raise the specter of irradiated nuclear fuel eventually being sent back thousands of miles to the reactors from which it originated. This would multiply the distances high-level waste is shipped, and escalate the risks of public and worker exposure, severe accidents, and terrorist attacks. It would also increase further stress and damage to the irradiated nuclear fuel, making future handling, transport, and long term isolation from the environment much more troublesome.

It is ironic that NRC would consider granting PFS an operating license, and thus permission to begin shipments, even before its Package Performance Study (PPS) is completed, a point raised by a number of our organizations during the public comment period on the PPS. Rushing the process, and using casks with only minimal testing and planning, is of concern to many communities along the transportation routes.

John Parkyn, PFS chairman and CEO, has publicly stated that PFS would train emergency responders along the routes to Skull Valley, however, PFS has not yet demonstrated the financial or technical capability to deliver on that promise. On February 7, at the U.S. Department of Energy's Fiscal Year 2006 budget unveiling, Office of Civilian Radioactive Waste Management director Margaret Chu stated that Nuclear Waste Policy Act section 180(c) funding to states for emergency response preparation would not even begin until five years before high-level radioactive waste shipments to Yucca Mountain. If the U.S. federal government requires such a long advance time, how could PFS privately provide such training before shipments would begin as early as 2007? Given the withdrawal from the PFS consortium by member companies such as American Electric Power/Indiana-Michigan Power, and the reduced investment by Southern California Edison, it is unlikely PFS could meet its basic commitments, let alone pay for emergency responder training and equipment all across the U.S.

The "interim" nature of the project is also questionable. Assurances have been given by PFS (and NRC staff in the proposal's Environmental Impact Statement) that irradiated fuel would remain at Skull Valley for no more than 40 years before transfer to Nevada for permanent burial. Last October, however, U.S. Energy Department Yucca Mountain Project transport director Gary Lanthrum told the Salt Lake Tribune that the Yucca Mountain Project would simply not accept irradiated nuclear fuel from PFS, as that would violate the terms of DOE's Standard Contract for Disposal of Spent Nuclear Fuel, which requires DOE to only accept uncanistered fuel directly from nuclear utilities at reactor sites. Since PFS would not meet these requirements, it could very well lead to de facto permanent "disposal" of 4,000 casks of high-level radioactive waste above ground in Skull Valley.

For NRC to approve PFS at this time by assuming that Yucca Mountain would take the wastes after 40 years contradicts Gary Lanthrum's statement, and also suggests

that NRC is predisposed to approve DOE's Yucca Mountain license application even before the proceedings have begun.

This is very troubling and ignores ongoing, serious uncertainties surrounding the Yucca Mountain Project's future. In addition, even if the Yucca Mountain repository does open, it is technically and legally limited to 63,000 metric tons of commercial irradiated nuclear fuel. DOE projects that the total amount of commercial irradiated nuclear fuel generated in the U.S. will double to over 105,000 metric tons in the decades to come. This means that even if Yucca Mountain opens, PFS could very well turn into the de facto permanent overflow zone for excess waste.

Finally, on its face, the storage or disposal of highly radioactive waste on a tiny, poverty-stricken Native American community that did not even benefit from the nuclear generated electricity also raises significant environmental justice concerns. The existing leadership crisis at Skull Valley only exacerbates such concerns. There is a long-running dispute over the legitimacy of the tribal leadership that supports PFS. The disputed Tribal Chairman, Leon Bear -- the primary proponent for PFS -- has been indicted on federal charges of embezzlement of tribal funds as well as tax evasion. Tribal members who oppose PFS claim they have been severely intimidated and harassed, and allege that irregularities such as bribery and extortion have been used to secure support for PFS within the tribe.

These are very shaky foundations upon which to build dry cask storage for 44,000 tons of commercial irradiated nuclear fuel, nearly 80% of what currently exists in the U.S. The Skull Valley Goshute Indian community seems to have suffered significantly from the PFS proposal long before the first shipment of irradiated nuclear fuel has even arrived.

We urge you to deny the PFS license request. Storing irradiated nuclear fuel at the Skull Valley Goshute Reservation is not a safe, sound, nor just solution to our country's high-level radioactive waste problem.

Sincerely,

NATIVE AMERICAN ORGANIZATIONS:

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Onhgo Guadedh Devia Awareness
Member of the Skull Valley Band of Goshute
Skull Valley Goshute Indian Reservation

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Ian Zabarte
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The rest of the
437 signatory
groups are posted

online:

www.nirs.org/radwaste/skullvalley/skullvalleygashutesgroup1tr772005.pdf