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Please acknowledge, with a return email, receipt of this submission.
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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
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Comment on Waste Confidence Generic Environmental Impact Statement (GEIS)
Draft Report for Comment NUREG 2157 http://pbadupws.nrc.gov/docs/ML1322/ML13224A106.pdf

There is no basis in science, engineering, the behavior of the nuclear industry and the Nuclear Regulatory Commission (NRC) for confidence that high level radioactive withdrawn fuel rods ("spent fuel") can or will be managed with no risk to the biosphere for as long as the radioactivity last . For the NRC and the nuclear industry to assert probabilistic assessments of what will happen to radioactive material over 240,000 (plutonium) to a billion years is a fraud and a con game. There is insufficient data for such probabilistic assessments to have validity. Apart from that, even a small likelihood of the risk of a serious untoward event involving spent fuel could be catastrophic for all life forms, air, water and land. Nuclear accidents cannot be undone.

There is a consensus among the U.S. government and the nuclear industry for more than 60 years that withdrawn spent fuel rods are lethal unless shielded. To continue to produce them and intend to abandon them into the biosphere (deep underground dump) is profoundly immoral and a burden and a curse on future generations into eternity. It is premeditated murder.

No storage facility has yet been designed that can contain radioactive waste for such periods of time. Since spent nuclear fuel contains large quantities of fissile material that can be used to make nuclear weapons, it also must be safeguarded to prevent theft. We are confident that NRC and the waste generators can never contain this waste for as long as it poses a hazard. NRC must abandon its Waste Confidence policy and stop using it to license nuclear power plants.

The NRC addresses the issue of spent fuel for only 160 years---not its full range of the radioactive time period. The NRC considers 3 alternatives: Indefinite storage at reactor sites, regional consolidated storage sites, central repository. In doing so, the NRC expresses confidence that spent fuel will be managed adequately and safely, with no basis for such assertions or conclusions.

No technology has yet been proven capable of containing radioactive waste for the hundreds, thousands, or millions of years necessary to protect people and the environment. We have no experience, beyond 70 years with how highly radioactive spent fuel rods will behave. The U.S. has failed even to identify a viable site for a nuclear waste repository despite two decades, billions of dollars, and a federal mandate to do so.

Radioactive waste cannot be safe, secure, clean or green. It is deadly, very long-lasting, toxic stuff that irradiates cells and damages DNA--causing cancer, birth defects, heart problems, infertility, immune deficiencies, and more. There is no safe dose of radiation, but spent or irradiated nuclear fuel is so radioactive a person near it would receive a lethal dose of radiation in just a few minutes if not seconds.

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The purpose of NRC's Waste Confidence rule is to streamline nuclear plant licensing by ignoring the permanent, multi-billion dollar problem of what to do with radioactive waste. The only problem Waste Confidence solves is how to permit nuclear plants to continue making this waste when there is no solution for it.

Consolidated Storage away from reactor sites creates more problems, not solutions. In order to justify its Waste Confidence policy, NRC is relying on the federal government's plan (Senate bill 1240) that mandates transporting spent fuel away from nuclear reactors to "temporary" storage sites around the country until a central repository is built. This means more communities would be at risk from radioactive waste, more nuclear sites would have to be safeguarded, and reactor owners could continue making waste without responsibility for managing it. Temporary storage sites easily could become de facto permanent dumps if it is not politically feasible to site enough repositories to handle the waste.

The sheer volume of nuclear waste will require thousands of shipments on our roads, rails, and waterways. Due to the risk involved in mass nuclear waste transportation, it should only be undertaken once--and when we know there is a viable solution. That solution ***cannot*** be abandonment in a deep underground dump.

NRC's Waste Confidence policy assumes that all nuclear spent fuel is the same. This is far from the truth. The industry is moving toward new fuel types, such as MOX (mixed oxide) and high-burnup fuels, which are more radioactive, dangerous, thermally hot and difficult to store and transport safely.

High burnup fuel problems: (citations follow)

Dangerously unpredictable and unstable in storage – even short-term.
Over twice as radioactive and over twice as hot. The higher the burnup rate and the higher the uranium enrichment, the more radioactive, hotter and unstable.
Requires a minimum of 7 to 20 years of cooling in spent fuel pools. San Onofre's 1123 high burnup fuel assemblies require at least 15 years to cool in the pools. Years of cooling depend on burnup rate, percent of uranium enrichment and other factors as defined in the dry cask system's technical specifications.3 Lower burnup fuel requires a minimum of 5 years in cooling pool.
Requires more storage space between fuel assemblies due to the higher heat, higher radioactivity, and instability,4 yet the NRC approves higher densities of fuel assemblies in dry casks systems. San Onofre requested use of a new dry cask system that crowds 32 fuel assemblies into the same space that currently holds 24.5 This new system will increases the risks of dangerous radiation releases into the environment.
The NRC should NOT approve the NUHOMS® 32PTH2 cask system for high burnup, but is considering doing so this year. Diablo Canyon now uses a 32 fuel assembly cask system.
No transportation casks for high burnup are approved by the NRC,6 so the waste cannot be relocated.
Approved for only 20 years in dry cask storage and assumptions about how high burnup fuel reacts in the first 20 years of storage are proving incorrect. 7
Insufficient data to approve dry casks for over 20 years, per Dr. Robert Einziger, Senior Materials Scientist, NRC Division of Spent Fuel Storage and Transportation.8

citations:

1 GAO-12-797 SPENT NUCLEAR FUEL Accumulating Quantities at Commercial Reactors Present Storage & Other Challenges, August 2012 http://www.gao.gov/assets/600/593745.pdf Low-enriched uranium = up to 5% of U235

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2 DOE FCRD-NFST-2013-000132, Rev. 1; Fuel Cycle Research & Development-Nuclear Fuel Storage and Transportation-2013-000132, Rev. 1, 6/15/13 http://www.hsdl.org/?abstract&did=739345
3 CoC No. 1029 Technical Specifications for Advanced NUHOMS® System Operating Controls and Limits, Appendix A Tables 2-9 to 2-16 http://pbadupws.nrc.gov/docs/ML0515/ML051520131.pdf
4 RWMA Marvin Resnikoff, PhD: The Hazards of Generation III Reactor Fuel Wastes May 2010 http://bit.ly/19dVRsY
5 Edison request for NUHOMS® 32PTH2 http://pbadupws.nrc.gov/docs/ML1204/ML12046A013.pdf
6 SFPO Interim Staff Guidance 11, Rev 3 Cladding Considerations for the Transportation and Storage of Spent Fuel 11/17/2003 http://www.nrc.gov/reading-rm/doc-collections/isg/isg-11R3.pdf
7 NWTRB Douglas B. Rigby, PhD: The NRC approved the initial 20 year dry cask storage based on assumptions. However, no information was found on inspections conducted on high burnup fuels to confirm the predictions that were made. U.S. Nuclear Waste Technical Review Board

December2010report http://www.nwtrb.gov/reports/eds_rpt.pdf
8 NRC Robert E. Einziger, PhD: insufficient data to support licensing dry casks for >20 years, March 13, 2013. http://1.usa.gov/15E8gX5
The Coalition to Decommission San Onofre 10/18/2013 SanOnofreSafety.org

NRC is treating nuclear waste not as a major human health and an environmental problem, but as a public relations issue. The U.S. has no solution for nuclear waste, and NRC refuses to address the immediate risks it poses. Waste Confidence is simply a policy of false promises, used to promote the industry by pretending its real problems don't exist. The NRC's new Waste Confidence policy is no more credible than the one the Appeals Court in DC vacated in 2012.

In 2012, a Catholic nun and two other non-violent peace activists went through 4 layers of security to the heart of the Y-12 National Security Complex in Oak Ridge, TN to draw attention to the U.S. violations of International Law and the Nuclear Non-Proliferation Treaty and the threat to life on the planet. Four weeks later, the hole in the fence had not been repaired and 2 other persons had inadvertently traveled into prohibited areas. U.S. nuclear facilities should be secure. They are not.

An accounting of the public cost of reactors from uranium mining through shielding and monitoring of nuclear waste forever has not been done and must be included in the GEIS. That will demonstrate the better alternative: energy efficiency, conservation, wind, solar, hydro.

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The following comments address the 2013 Waste Confidence Generic Environmental Impact Statement, Draft NUREG-2157, http://pbadupws.nrc.gov/docs/ML1322/ML13224A106.pdf Pages 2-14, 4-75
Citations follow at the end of this section.

Failure to Address the Impacts of Climate Change:
The NRC has approved on-site storage casks that are not approved for transportation of spent nuclear fuel (SNF). In the event that sea-level or river-level rise threatens the cask site, the fuel would have to be re-casked immediately into approved-for-transportation casks. This would result in an unnecessary radiation exposure to workers, as well as added costs and delays. It is not clear how this transfer would be accomplished since fuel pools will be decommissioned with the reactors. Any additional handling of irradiated fuel increases the odds of an accident and release of radioactivity.

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The GEIS states that a one-meter water rise will not endanger any nuclear power plant, operational or decommissioned, in the U.S. This is simply false. Examples: A less than 1m water rise will completely flood Turkey Point, St. Lucie and Crystal River Nuclear power plants, just to name three near-coastal plants that would be affected by flooding. (Climate Central).

GEIS on page 6-8, section 6.3.1, Table 6-1 summarizes the range of expected temperature rise by 2100 as falling between 1 degree C and 6.5 degrees C. But it fails to connect the dots between rising temperatures and the effects on water sources depended on to cool reactors and their spent fuel pools. During the summer of 2012 high temperatures interfered with the operations of several nuclear plants. (source 2 below) Over time, the warming of bodies of water used for cooling will impact the reliability of nuclear plants and potentially the safety of operations.

Experts report that while it is too soon to say that Climate Chaos is increasing the numbers of weather events, they do report that Climate Change is causing greater severity of them. Whether hurricanes, wind storms, tornadoes, ice storms or drought, NRC has not yet upgraded its computer simulations and accident probability calculations to reflect the greater possibility that the electric power grid will go down. Loss of off-site power is a major contributor to reactor accident scenarios, many of which would also include the fuel pool and its back-logged inventories of waste.

1. Surging seas interactive climate map, Climate Central, 2013.
http://sealevel.climatecentral.org/surgingseas/place/cities/FL/Miami#show=cities&center=12/25.3789/- 80.3118&surge=2 or
http://sealevel.climatecentral.org/
2. http://green.blogs.nytimes.com/2012/08/13/heat-shuts-down-a-coastal-reactor/?_r=0
As climate change makes water scarcity an ever-increasing event, the water necessary to cool spent fuel in pools becomes an unaffordable luxury. Dry casking all spent fuel is the only alternative in a world where the water necessary to sustain life is at a premium.

1. Cooke, Kieran,"Worsening Water Scarcity to Affect 2 Billion Globally", Climate News Network September 21st, 2013.http://www.climatecentral.org/news/worsening-water-scarcity-to-impact-2-billion-globally-16500

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The following comments address the 2013 Waste Confidence Generic Environmental Impact Statement, Draft NUREG-2157 pages xxviii, xxix, xlix, 1-12, 1-13, 1-14, 2-12:

Dry Cask Advantages over Fuel Pools for irradiated spent fuel rods:
Citations follow at the end of this section.

Some irradiated fuel pools in the U.S. currently hold up to 9 times the amount of spent fuel for which they were designed. (Lochbaum)

The pools are **not** protected by redundant emergency makeup and cooling systems or housed within robust containment structures having reinforced concrete walls several feet thick. (Lochbaum)

Irradiated fuel casks can withstand environmental disasters that spent fuel pools cannot, as evidenced by the continued function of the dry casks at Fukushima. The casks survived the 9.0 quake and continue to protect the irradiated fuel, even though the tsunami flooded them. These containers have not exploded; are not on fire; are not catastrophically leaking and do not require ongoing addition of liquid to cool. On the face of it, they are out- performing the pools on the site.

Dry casks have the advantage of passive cooling via airflow, making them less vulnerable to natural disaster and sabotage.

Spent fuel pools are attractive targets for terrorists. (Physicians for Social Responsibility, National Academy of Sciences, 9-11 Commission Report, Alvarez)

Dry casks are less promising targets for terrorists because one would have to trigger failure in several casks to accomplish the same amount of radiation release as an attack on a spent fuel pool. Casking spent fuel should be expedited as a national security top priority.

Transfer of irradiated fuel to casks should be done sooner rather than later. Since irradiated fuel will have to be put into dry containers to remove it from the reactor site when a repository is available, this process is not an "if" it is a "when." Public health will be protected better if the fuel is transferred now from cooling pools to casks.

On-site storage of irradiated fuel rods in dry casks should be made safer and more secure by adoption by NRC of regulations to mandate HOSS (Hardened On-Site Storage). HOSS is a system whereby more space between the containers increases security, and earth mounds or berms form a barrier between the containers and any public-access points such as roads, delivery areas and water-front. HOSS also mandates real-time heat and radiation monitoring and would also provide for local community over-sight of the waste installation such as a citizen advisory board.

On the other hand, there is a limit to the at-reactor dry storage concept. Under its "indefinite storage" scenario, NRC has assumed that dry cask storage--cask pads, inner canisters, and the dry casks themselves--will be replaced once every 100 years, indefinitely into the future. NRC assumes that Dry Transfer Systems will be built (and also replaced every 100 years), since pools will have been dismantled during decommissioning by at most 60 years after permanent reactor shutdown. But NRC has not dealt with the very real risk that the irradiated nuclear fuel will so degrade with age that such transfer operations could not be carried out safely or smoothly. This is especially a risk with "high burn-up fuel," that has spent more time in an operating reactor core, and is thus significantly more radioactive and thermally hot. NRC also has not provided the price tag for such future transfer and replacement operations.

Casking the spent fuel would prevent much of the hazard associated with transportation of high-level nuclear waste. However, locations where HOSS (Hardened On-Site Storage) is not safe (places vulnerable to flooding, for example), hardened dry cask storage should be done as close to the point of generation as possible. HOSS cannot be a permanent measure on the seacoasts and fresh water sources (rivers, lakes, reservoirs) of our country, due to rising sea levels and risk of leakage into our vital drinking water supplies.

Another major appeal of HOSS is that it is currently an interim storage choice that is safer and endorsed by the bulk of public interest groups concerned with nuclear issues. Over 170 groups in all 50 states have endorsed the concept of HOSS, including most groups near reactor sites. (NIRS)

The advantages of dry cask storage over pool storage is further documented by a team of experts on the hazards of spent fuel pools which includes the current chair of the Nuclear Regulatory Commission, Allison Macfarlane.(Alvarez)

There is a substantial reduction in the risk to the population if the spent fuel is transferred to casks:

“The risk reduction is undeniable: the contaminated land area is reduced from 9,400 square miles to 170 square miles and the number of people displaced from their communities for a long time drops from 4,100,000 to 81,000.” (Lochbaum)

NRC GEIS Documents are posted here: http://www.nrc.gov/waste/spent-fuel- storage/wcd/documents.html

1. Robert Alvarez, Jan Beyea, Klaus Janberg, Jungmin Kang, Ed Lyman, Allison Macfarlane, Gordon Thompson, and Frank N. von Hippel, Reducing the Hazards from Stored Spent Power-Reactor Fuel in the UnitedStates,Science and Global Security, 11:1–51, 2003
http://mothersforpeace.org/data/20030122ReducingTheHazards?searchterm=spent+fuel+pools
2. “Safer Storage of Spent Nuclear Fuel”, Union of Concerned Scientists, 2012.
http://www.ucsusa.org/nuclear_power/nuclear_power_risk/safety/safer-storage-of-spent-fuel.html
4. Lochbaum, David, Director, Nuclear Safety Project, testimony Before the Senate Committee on Energy and Natural Resources, July 20, 2013.http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=89dbc888-171c-4f77-8ecf-83a0055fcfb9 5. Principles of Safeguarding Nuclear Waste at Reactors or Hardened On-Site Storage (HOSS)
http://www.nirs.org/radwaste/policy/hossprinciples3232010.pdf

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Spent Fuel Pool Fires

The following comments address the 2013 Waste Confidence Generic Environmental Impact Statement, Draft NUREG-2157, Pages F-1, F-6, F-9, F-10, F-12, F-13; Essentially all of appendix F. Citations following each point are linked / listed at the end of this document.

NRC Staff dismiss ALL of the following points (one way or another) on the basis that it finds the probability of a fuel pool fire to be so low that it concludes that such an event is "inconsequential." The odds cited are about 1 in 60,000...but that is for any one year, at only one reactor. Meanwhile there are still 99 reactors operational in the USA, and each will continue operating for more than one year. The odds rise to 1 a few thousand. NRC

dismissing an enormous hazard solely because it is a "low-probability" event does not constitute **protection** of the public health and safety as it is charged by law to provide. The following factors MUST be considered:

As of 2012, spent fuel pools are overcrowded, packed beyond their originally engineered capacity by as much as 9 times. (Union of Concerned Scientists), (Lochbaum).

Water loss in the spent fuel pool could lead to a catastrophic spent fuel pool fire. "Water could be lost from a spent-fuel pool through leakage, boiling, siphoning, pumping, displacement by objects falling into the pool, or overturning of the pool. These modes of water loss could arise from events, alone or in combination, that include: (i) acts of malice by persons within or outside the plant boundary; (ii) an accidental aircraft impact; (iii) an earthquake; (iv) dropping of a fuel cask; (v) accidental fires or explosions; and (vi) a severe accident at an adjacent reactor that, through the spread of radioactive material and other influences, precludes the ongoing provision of cooling and/or water makeup to the pool."(Thompson).

NRC downplays the risks of pool fires by assuming that surrounding populations will be successfully evacuated. But nuclear utilities are allowed to store high level radioactive withdrawn fuel rods in pools
for decades after reactors permanently shutdown, in order to defer the costs of dry cask storage as

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far off into the future as possible, despite the inherent risks. At the same time, NRC allows utilities, via exemptions from regulations, to do away with 10-mile radius emergency planning zones (EPZs) as soon as 12-18 months post-reactor shutdown despite the lingering risk of storing high level nuclear waste in pools at such shutdown reactor sites. How can populations be evacuated if EPZs have been dismantled?! Moreover, a 10 mile evacuation is inadequate and misleading. It hides or obfuscates the seriousness of the risk---effectively a denial of the risk level.

Spent fuel is highly flammable as well as radioactive, yet is primarily stored in densely packed pools of water that contain several times more fuel than the nuclear reactor itself. If a fuel pool is damaged or loses its cooling system, fuel rods could be exposed, overheat, and catch fire, releasing massive quantities of radioactive material. NRC refuses to address the incredible risks these facilities pose, pretending the low likelihood of an accident makes the extreme consequences irrelevant. Hardened On-Site Storage systems (HOSS) should be used to store spent fuel more safely and securely at or near nuclear plants. HOSS reduces the immediate dangers spent fuel poses, without creating unnecessary risks. http://ieer.org/wp/wp-content/uploads/2010/03/HOSS_PRINCIPLES_3-23-10x.pdf

75% of the total (72,000 metric tons, plus 2,000 tons more per year) of spent fuel is in fuel pools and allowed to remain there for as much as 60 years beyond licensed life of reactor operations. The GEIS underestimates the risk of fuel pool fires and ignores the safer alternative of hardened on site storage at the nuclear plant sites. Dry cast storage at Dai-ichi survived the number 9 earth quake, tsunami, loss of the electrical grid, and loss of back up diesel generators much better than the reactors themselves and their fuel pools.

The NRC assumes that surrounding populations will be successfully evacuated in the event of a fuel pool fire. After the Dai-ichi explosions, the U.S. advised any Americans within 50 miles to leave:
Statement by U.S. Ambassador John V. Roos on March 16, 2011:
"The United States Nuclear Regulatory Commission (NRC), the Department of Energy and other technical experts in the U.S. Government have reviewed the scientific and technical information they have collected from assets in country, as well as what the Government of Japan has disseminated, in response to the deteriorating situation at the Fukushima Nuclear Power Plant. Consistent with the NRC guidelines that apply to such a situation in the United States, we are recommending, as a precaution, that American citizens who live within 50 miles (80 kilometers) of the Fukushima Nuclear Power Plant evacuate the area or to take shelter indoors if safe evacuation is not practical."
http://www.whitehouse.gov/issues/foreign-policy/japan-earthquake-tsunami

Bob Alvarez of Institute for Policy Studies has calculated that Fukushima Daiichi Unit 4's pool contains ten times the amount of hazardous radioactive Cesium-137 than was released by the Chernobyl catastrophe. Dai-ichi fuel pool number 4 is an ongoing catastrophic risk in an ongoing tragedy in which many are exposed to continuing radiation, loss of their homes, safe food and water, etc.:
"As of April 2013, more than 150,000 people are still forced to remain evacuated from their communities in the restricted zones. Tens of thousands of other people, especially concerned mothers with small children, had to seek voluntary refuge away from their home towns outside contaminated zones. Many of them still live in exile with poor official support...Health concerns are increasing....What if the already severely- damaged (and, as it seems, slightly leaning) reactor building collapses and the spent fuel pool {no. 4} crashes down, perhaps triggering a spent fuel fire? This could lead to a worst case scenario that was drawn up in March 2011 by Prof. Kondo, Chairman of the Japan Atomic Energy Commission (JAEC), would still apply. Evacuation of over 10 million residents in the wider Tokyo megalopolis within a 250-km radius of Fukushima Daiichi, depending on wind direction, may be required." page 62. http://www.worldnuclearreport.org.

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In fact, Japan weighed evacuating Tokyo's 35 million people even as they downplayed the risks in public. "...The report quotes the chief cabinet secretary at the time, Yukio Edano, as having warned that such a "demonic chain reaction" of plant meltdowns could result in the evacuation of Tokyo, 150 miles to the south. "We would lose Fukushima Daini, then we would lose Tokai," Mr. Edano is quoted as saying, naming two other nuclear plants. "If that happened, it was only logical to conclude that we would also lose Tokyo itself." The report also describes the panic within the Kan administration at the prospect of large radiation releases from the more than 10,000 spent fuel rods that were stored in relatively unprotected pools near the damaged reactors." http://www.nytimes.com/2012/02/28/world/asia/japan-considered-tokyo-evacuation-during-the-nuclear-crisis-report-says.html?_r=2&hp

If Dai-ichi fuel cooling pool number 4 collapsed---that risk continues today---and evacuation of 10 million people within 250 kilometers was undertaken in Japan, or a similar large population evacuation was necessary at Indian Point in New York, Fermi 2 in Michigan, or anywhere else in the U.S., it would be impossible to achieve in a ***necessary timely*** manner. Furthermore, we would need an evacuation plan with routes, destinations, immediate notification, long term housing facilities, competent medical care for radiation exposures, funding for large displaced populations and

full disclosure of real time radioactive release measurements. None of that is or has ever been available anywhere in the U.S. The de facto plan of the nuclear industry and the NRC for the public is shelter in place and suck it up.

Fermi 2 has an over crowded fuel pool with 600 tons of spent fuel. It is the largest GE Mark 1 reactor. It is at risk for weather events, loss of coolant, or terrorist attack. Like Dai-ichi reactors and all 23 GE Mark 1 reactors in the U.S., it's cooling pool does not have back up cooling. It has no diesel generators for cooling pool water circulation to rely on in loss of electrical grid emergency. There are 1,331 highly radioactive irradiated spent nuclear fuel assemblies in Fukushima Daiichi Unit 4's storage pool. Fermi 2's high-level radioactive waste storage pool contained 2,898 irradiated nuclear fuel assemblies by spring 2010, according to U.S. Department of Energy projections documented in the Yucca Mountain Final Environmental Impact Statement (Feb. 2002, Table A-7, Proposed Action spent nuclear fuel inventory). Fermi 2 could generate another 443 irradiated nuclear fuel assemblies between spring 2010 and spring 2014, meaning by next spring, a total of 2,898 + 443 = 3,341 irradiated nuclear fuel assemblies. So, by next spring, Fermi 2's storage pool could hold 2.5 times as much high-level radioactive withdrawn fuel rods than Fukushima Daiichi Unit 4's pool! A cooling pool fire at Fermi 2 would be worse than a meltdown of the Fermi 2 reactor itself in its release of a larger dose of radiation into the environment, resulting in widespread illness, deaths, and genetic mutations. If the radioactivity releases from either location (the reactor, or the irradiated nuclear fuel storage pool) are bad enough, the entire site might have to be evacuated. No intervention would then be possible. Not only could reactor meltdowns proceed out of control, but high-level radioactive spent fuel storage pool fires could result -- emitting orders of magnitude more hazardous radioactivity into the environment than even a reactor meltdown, as the pools are not contained within a radiological containment structure. Fermi 2 is lacking hundreds of structural welds on various floors of the reactor building, never put in place like they were supposed to have been some 40 years ago. This has meant that it could not safely withstand the weight of the crane and cask necessary to move the sufficiently cooled spent fuel to Hardened Onsite Storage (HOSS).

Building the proposed Fermi 3, and its high-level radioactive waste storage pool, right next to Fermi 2, and its high-level radioactive waste storage pool, is akin to the multi-unit Fukushima Daiichi site, where the meltdown and hydrogen gas generation at Unit 3 contributed directly to the explosion at Unit 4 which now imperils the Unit 4 high-level radioactive waste storage pool.

Thus, Fermi 3's combined Construction and Operations License Application (COLA) should be

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rejected by NRC. So should Fermi 2's bid for a 20-year license extension, which Detroit Edison is

poised to apply for next year. (NRC has rubberstamped 73 of 73 reactor 20-year license extensions applied for across the U.S. thus far!)

The risks, and inevitable environmental impacts over time, of the high-level radioactive wastes that would be generated at Fermi 3, and at Fermi 2 during a 20-year license extension, are just too great, and therefore should be deemed unacceptable under the National Environmental Policy Act.

NRC also downplays the risks of pool fires by assuming that a pool drain down accident (or attack) involves the complete drain down of the pool. As Dr. Gordon Thompson of the Institute for Resource and Security Studies (IRSS) has pointed out, any technically competent person paying attention to the issue should have known since 1979 that a partial drain down of the pool is actually a worse-case scenario, for the leftover water in the bottom of the pool would block convection current air flow which would help cool the irradiated nuclear fuel, leading to faster heat up to the ignition point.

The evaluation of the spent fuel pool fire risk in the GEIS relies on the spent fuel pools having only 3.5 spent fuel cores. Currently, spent fuel pools contain as many as 9 cores. (Lochbaum). The NRC estimates the spent fuel pool capacity for some reactors to be as high as 16.7 cores. (DGEIS G-4).The ACTUAL over-loading of the fuel pools renders the probabilistic risk assessment invalid.

The health risk assessment for a spent fuel fire was done using only three different nuclear power plants (Ginna, Surry and Zion), ignoring the idiosyncratic nature of each reactor in the US. Reactor sites all have different amounts of irradiated fuel that gives off different amounts of radioactivity. Fermi 2 has 600 tons of spent fuel in one overcrowded pool. The surrounding human populations are not equal nor are they distributed in the same way-- the dose calculations couldn't possibly be the same for all reactors. Realistic recognition of population numbers, local infrastructure, access roads, possible destinations, facilities for displaced populations, vary with each location of reactors.

The seismic risks for the spent fuel pools in highly earthquake-prone areas are ignored. The seismic risk for Diablo Canyon, San Onofre and Columbia fuel pools were deliberately glossed over, by the NRC's own admission, since the one reactor used in the NRC's "Consequences Study" is in Pennsylvania (Peach Bottom).

The risk and consequences of a collapse of a spent fuel pool was explicitly ignored in the GEIS. No attempt was made to incorporate this type of possible accident into the risk assessment for spent fuel pool fires. The current, ongoing situation at Fukushima Dai-ichi unit #4 tells us that this particular hypothetical scenario is a very real possibility.

The 2013 GEIS references a seriously out-dated spent fuel pool study: "Regulatory Analysis for the Resolution of Generic Issue 82, 'Beyond Design Basis Accidents in Spent Fuel Pools'" (NRC 1989). The information in this report is at least 24 years old. A new regulatory analysis should be done, with the inclusion of the experience from Fukushima, and should include a risk analysis of spent fuel pools containing irradiated MOX (mixed oxide) fuel rods.

The NRC's Office of Nuclear Security and Incidence Response uses a predictive tool to aid emergency responders during nuclear accidents which indicates that the radiological release from a pool fire following an earthquake could dwarf that of a reactor meltdown. It also indicates that the consequence of the breach of a dry cask is thousands of times less severe. (U.S. Nuclear Regulatory Commission, Office of Nuclear Security and Incidence Response, RASCAL 3.0.05 Workbook,

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NUREG-1889, September 2007). (Curran).

The Draft Consequence Study lacks scientific integrity because it examines only complete drainage of a pool and ignores the more severe case of partial drainage. Based on the canard that complete drainage is the worst case, the NRC ignored spent fuel pool accident risks for decades. Then in 2001, in NUREG-1738, the NRC admitted that the most severe accident risk is posed by prolonged disruption of air or water circulation over the spent fuel assemblies. The point was confirmed by a panel of the National Academy of Science in 2004. By reverting to the discredited assumption that complete pool drainage is the worst case, the NRC fatally undermines the integrity and credibility of the Study. (Curran), (NAS).

The Study is too narrow because it significantly underestimates risk by considering only one type of initiating event--an earthquake--and ignoring other credible initiating events that are at least as probable. For instance, the Study ignores the impacts of aging and the potential for an attack on a pool and/or adjacent reactor to initiate a pool fire. Vulnerability of spent fuel storage pools to terrorist attack is perhaps the greatest risk of all. Further, the Study does not analyze the potential for a core melt accident to cause or contribute to a pool fire. For instance, radiation released during a core melt accident could preclude access to the pool to supply emergency cooling. (Curran)

The Study is misleading and biased because it only pretends to consider the relative merits of low-density storage. The Study purports to evaluate whether low-density pool storage of irradiated fuel would be cost-effective and safer than high-density storage. But NRC misleadingly uses the phrase "low-density" to refer to closed high-density racks that contain fewer fuel assemblies, not true low-density fuel storage in open-frame racks. The NRC decided not to consider true open-rack low-density storage because it was assumed to be too expensive (see page 23). The Draft Consequence Study shows an appalling lack of scientific integrity by including the result of the study as an assumption: the question of whether a return to open-frame low-density storage is justified is the very question the NRC set out to answer in the Study. (Curran).

Ignoring real world multiple risk factors. The draft NRC study has been done in a vacuum that excludes the hazards of a concurrent reactor accident that are known to impact the safety of spent fuel pool systems. Dr. Thompson correctly points out, "the physical proximity of spent-fuel pools to operating reactors, and their sharing of safety systems, means that the use of high-density racks creates strong linkages between reactor risk and pool risk." This fact is underscored in a 1990 NRC-sponsored study that points out that a long-term station blackout at the Peach Bottom nuclear station would cause "deflagrations to occur in the reactor building and refueling bay.." This is exactly what occurred at the Fukushima reactors, which caused significant damage to the spent fuel pools. (Thompson, 2013)

Aging and deterioration of Spent Fuel Pool Systems. The NRC staff dismisses this problem by ignoring a 2011 NRC-sponsored study that concludes, "as nuclear plants age, degradations of spent fuel pools (SFPs), reactor refueling cavities...are occurring at an increasing rate, primarily due to environment-related factors. During the last decade, a number of NPPs (nuclear power plants) have experienced water leakage from the SFPs [spent fuel pools] and reactor refueling cavities." Instead the NRC staff points to a study done 25 years ago, before aging effects were being observed. (NRC, 2011).

Failure to meet the NRC's Technical Safety Information Standard for Final Safety Analysis Reports (10 CFR 52.157). The draft study does not comport with the NRC's own technical information safety analysis standard for reactor operators. According to this regulation, safety analyses must incorporate all key reactor station components including the reactor operations and spent fuel handling and

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storage functions.

Failure to compare the risks of high density versus open rack configurations: The draft study examines a reduction of spent fuel assemblies while allowing racking configurations that allow for high density storage to remain. Specifically, the study does not address the removal of neutron-absorbing panels that allow for closer spacing. It's been noted in a previous study that these panels can interfere with air convection during a pool drainage event and thus can enhance the heat-up of the nuclear fuel. In effect, they could become de facto "thermos bottles." Open rack storage would allow for free convection cooling and thus reduce the risk of ignition. (Alvarez)

Failure to compare relative hazards of high-density pool storage with dry cask storage:
Instead the authors pick a scenario which may not even reflect real world situations relative to the different storage configurations at U.S. nuclear power stations. According to estimates developed in 2007 for the Nuclear Regulatory Commission's Emergency Operation Center, for purposes of emergency planning and response, a major earthquake near the San Onofre Nuclear Generating Station in California might cause a spent fuel cladding fire releasing approximately 40 million curies of Cs-137 and causing life- threatening radiation doses to people within a 10-mile radius. By contrast, according to the same NRC document, a cask rupture would result in the release of 2,500 times less radioactivity. This is underscored by real world experience at the Fukushima Daiichi site where all the nine dry spent fuel casks were unscathed by the earthquake and tsunami. (NRC, 2007), (Talbot).

What should be done? The draft study should be withdrawn and efforts to incorporate it into the NRCs regulatory framework should be halted. NRC should start with a clean slate and sponsor a proper investigation of the physics and chemistry of pool fires. Given that NRC lacks the in-house credibility to do this work, the agency should reach out to a broader pool of expertise and follow scientific principles.

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http://www.ucsusa.org/nuclear_power/nuclear_power_risk/safety/safer-storage-of-spent-fuel.html
2. Thompson, Gordon. "Risk-Related Impacts from Continued Operation of the Indian Point Nuclear Power Plants", INSTITUTE FOR RESOURCE AND SECURITY STUDIES, Cambridge, Mass, 2007. http://www.riverkeeper.org/wp- content/uploads/2011/05/Risk-related-to-impacts-from-Continued-operations-of-IndianPoint.pdf
3. Lochbaum, David, Director, Nuclear Safety Project, testimony Before the Senate Committee on Energy and Natural Resources, July 20, 2013.http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=89dbc888-171c-4f77-8ecf-83a0055fcfb9
4. Curran, Diane." Mothers for Peace Attorney Diane Curran urges public participation in Sept. 18 NRC meeting", San Luis Obispo Mothers for Peace, http://mothersforpeace.org/data/mothers-for-peace-attorney-diane-curran-urges- public-participation-in-sept.-18-nrc-meeting
5. National Academy of Sciences (NAS), "Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report" (2006).
http://www.nap.edu/download.php?record_id=11263

6. Thompson, Gordon. Comments on the US Nuclear Regulatory Commission's Draft Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a US Mark I Boiling Water Reactor, August 2013.

1. U.S. Nuclear regulatory Commission (NRC), A summary of Aging Effects and Their Management in Reactor Spent Fuel Pools, Refueling Cavities, TORI and Safety-Related Concrete Structures, NUREG/CR-7111 (2011). P. vxiii.http://pbadupws.nrc.gov/docs/ML1204/ML12047A184.pdf

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8. U.S. Nuclear Regulatory Commission, Office of Nuclear Security and Incidence Response, RASCAL 3.0.5 Descriptions of Models and Methods, NUREG-1887, August 2007

9. Talbot, David, "The Case for Moving U.S. Nuclear Fuel to Dry Storage", MIT Technology Review, April 14, 2011.

10. Robert Alvarez, Jan Beyea, Klaus Janberg, Jungmin Kang, Ed Lyman, Allison Macfarlane, Gordon Thompson, and Frank N. von Hippel, Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States,Science and Global Security, 11:1–51, 2003 NRC Documents are posted here:
http://www.nrc.gov/waste/spent-fuel-storage/wcd/documents.html

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Reactor owners and the NRC are not credible sources for protection of the public safety and health with respect to management and oversight of nuclear waste and reactor vulnerabilities that impact the safety of onsite withdrawn spent fuel. Risks are not/can not be eliminated as demonstrated over the years.

NRC blocks implementation of its own staff recommendations for post Fukushima safety upgrades:
NRC's Post-Fukushima Response: Going in Circles? Ed Lyman, Union of Concerned Scientists http://allthingsnuclear.org/post/14624150915/nrcs-post-fukushima-response-going-in-circles
Also New York Times May 7, 2011Nuclear Agency Is Criticized as Too Close to Its Industry
By TOM ZELLER Jr.

Inadequate seismic protection: NRC Commissioners voted to delay safety improvements after Fukushima. ".... the August 23 earthquake in Mineral, Virginia should be a further call to action for NRC. That magnitude 5.8 earthquake caused ground motion that exceeded the "design basis" at the nearby North Anna nuclear plant, even though Dominion, the plant operator, originally had said the plant was designed to withstand an earthquake of magnitude 5.9-6.2.
This event highlights the knowledge gaps in seismic protection at US nuclear plants and supports the Task Force's recommendation that the NRC should "order licensees to reevaluate the seismic and flooding hazards at their sites against current NRC requirements and guidance, and if necessary, update the design basis and SSCs [structures, systems, and components] important to safety to protect against the updated hazards."
http://allthingsnuclear.org/post/9622364770/nrcs-path-after-fukushima-still-lined-with-pitfalls

Vulnerabilities to Reactor Operation that weren't or can't be designed out: See Fission Stories at
http://allthingsnuclear.org/tagged/fission-stories

The NRC and Nuclear Power Plant Safety 2012 Report: Tolerating the Intolerable
"The U.S. Nuclear Regulatory Commission (NRC) is tolerating the intolerable: a ripped nuclear safety net. Granted, nuclear reactors do not fall into the net every day. And so far the United States has been lucky— with limited and notable exceptions, reactors that have fallen have avoided the ripped portion of the safety net. The more often the net is used and the more the net itself is abused, however, the more likely it becomes that someday workers or the public will be harmed by a nuclear reactor accident. In 2012, the NRC reported 14 "near-misses" at nuclear plants. Just to be clear about the gravity of the situation, a near-miss is an event that increases the chance of core meltdown by at least a factor of 10, thus prompting the NRC to dispatch some level of special inspection team to investigate the event. Over the past three years, 40 of the nation's 104 nuclear reactors experienced

12.

one or more near-misses. That is a rate greater than one near-miss per month..... First, the NRC already investigates each near-miss to determine what happened and why. The NRC should formally evaluate all safety violations identified during its near-miss inspections to determine whether the agency's baseline inspections could have, and should have, found these safety problems sooner. Such insights from the near-misses may enable the NRC to make adjustments in what its inspectors examine, how they examine it, and how often they examine it, so no violation can go undetected. Second, the NRC must require that individual plant owners find and fix problems in their testing and inspection procedures. Many of the near-misses last year involved design and operational problems that had already existed for years—sometimes even decades—prior to the incidents in question.
http://www.ucsusa.org/nuclear_power/nuclear_power_risk/safety/nrc-and-nuclear-power-safety-annual.html

"Fire non-protection. After a 1975 fire at the Browns Ferry plant, the NRC adopted a new set of fire protection regulations, issued in 1980 and revised in 2004. In 2012, the NRC granted an extension to the Tennessee Valley Authority (TVA), giving the TVA more time to prepare a fire regulation compliance plan—for that very same Browns Ferry plant. For over 30 years, the plant has been allowed to operate out of compliance with the regulations its own accident prompted."

"Recurring reactor cooling water leaks. The near-miss at the Palisades plant, in which cooling water leakage was allowed to continue for nearly a month, even though the leak was in an area where NRC regulations require the plant to be shut down within six hours, points to an ongoing problem: the NRC routinely allows violations of this type to go unpenalized, thus "enabling poor decision-making by plant owners." In a similar incident at the Davis-Besse plant in 2002, the leakage problem was allowed to continue for years; a study later concluded that the reactor vessel head was less than a year from failure, which could have caused a serious accident, when the problem was finally detected and the plant shut down for repair."

“Three-year trends
Analysis of the near-miss data for the three years covered by UCS reports shows that 40 of the nation's 104 operating commercial reactors experienced a near miss between 2010 and 2012, with 12 reactors experiencing at least two near-miss events, and three—at Fort Calhoun, Palisades, and Wolf Creek—experiencing three or more. The three-year data indicate that the average U.S. reactor is likely to experience seven near misses over its 40-year license period (increasing to about ten if the license is extended by 20 years, as most have been).
While none of the near misses UCS has studied have resulted in harm to nuclear plant workers or the public, the "safety pyramid" principle used by industrial safety experts suggests that reducing the frequency of near misses will also reduce the likelihood of a major accident that could cause serious harm.”

NUCLEAR NEAR-MISSES IN 2012 THAT PUT AT RISK THE REACTORS AS WELL AS ONSITE STORED HIGHLY RADIOACTIVE SPENT FUEL: Reactor & Location; Owner; Highlights

SIT=10x increase in risk of reactor core damage
AIT=100x increase in risk of reactor core damage
Brunswick Steam Electric Plant, Unit 2
Southport, NC
Progress Energy

13.

SIT: Excessive leakage of cooling water from the reactor vessel, determined to have been caused by the improper installation of the reactor vessel’s head, led to an emergency being declared and the reactor being shut down.
Byron Station, Unit 2
Byron, IL
Exelon Generation Co., LLC
SIT: Equipment failure in the switchyard triggered an automatic shut-down of the reactor. A design deficiency caused emergency equipment to be de-energized until workers took steps to isolate the problem and restore power from the emergency diesel generators.
Catawba Nuclear Station, Unit 1
York, SC
Duke Energy Corp.
SIT: After an age-related problem caused one of four reactor coolant pumps to fail, the Unit 1 reactor and turbine automatically shut down as designed. Due to a design error in a recent modification, the decreasing voltage output by the main generator caused electrical breakers to open that disconnected Units 1 and 2 from the offsite power grid. One of the emergency diesel generators started but failed to supply electricity to safety equipment due to another design error when it was installed in 1984.
Farley Nuclear Plant, Units 1 and 2
Dothan, AL
Southern Nuclear Operating Company, Inc.
SIT: Security problems prompted the NRC to conduct a special inspection. Details of the problems, their causes, and their fixes are not publicly available.
Fort Calhoun Station
Omaha, NE
Omaha Public Power District
SIT: The NRC investigated a fire that disabled half of the 4160 volt and two-thirds of the 480 volt power supplies for emergency equipment at the plant and triggered the declaration of an Alert—the third most serious of the NRC’s four emergency classifications.
Fort Calhoun Station
Omaha, NE
Omaha Public Power District
SIT: Security problems prompted the NRC to conduct a special inspection. Details of the problems, their causes, and their fixes are not publicly available.
Harris Nuclear Power Plant
Raleigh, NC
Progress Energy
SIT: As the reactor was being shut down for a scheduled refueling outage, workers tested the closing time of the three main steam isolation valves. These valves are designed to close within five seconds during an accident to limit the amount of radioactivity released to the atmosphere. The NRC dispatched an SIT after it took one valve 37 minutes to close and another 4 hours and 7 minutes.
Palisades Nuclear Plant,
South Haven, MI
Entergy Nuclear Operations, Inc.
SIT: Workers shut down the reactor about a month after they detected a small cooling water leak. The NRC sent an SIT to the site after the source of the leak was determined to be a location where any leakage required the plant to be shut down within six hours.
Palo Verde Nuclear Generating Station, Units 1, 2, and 3
Wintersburg, AZ
Arizona Public Service Company

14.

SIT: Security problems prompted the NRC to conduct a special inspection. Details of the problems, their causes, and their fixes are not publicly available.
Perry Nuclear Power Plant

Perry, OH
FirstEnergy Nuclear Operating Company
SIT: Security problems involving failures to prevent unauthorized individuals from entering secure areas of the plant prompted the NRC to conduct a special inspection.
River Bend Station
St. Francisville, LA
Entergy Operations, Inc.
AIT: The operators manually shut down the reactor on May 24 after an electrical fault on the motor of a feedwater pump caused it to stop running. A failed relay prevented the electrical breaker for the motor from opening to isolate the electrical fault. The fault propagated through the electrical distribution system, causing the breaker supplying power to the 13,800 volt electrical bus to open. Due to another electrical cable problem on May 21, all of the plant's circulating water pumps and non-emergency cooling water pumps were being powered from this single electrical bus. Its loss caused the plant's normal heat sink to be lost and stopped the supply of cooling water to equipment in the turbine building and to some emergency equipment.
San Onofre Nuclear Generating Station, Units 2 and 3
San Clemente, CA
Southern California Edison Company
AIT: Operators shut down the Unit 3 reactor following a leak inside a steam generator replaced less than a year earlier. The NRC dispatched an AIT after eight steam generators tubes failed pressure testing and inspections identified extensive and unusual degradation in the steam generators of both units.
Wolf Creek Generating Station
Burlington, KS
Wolf Creek Nuclear Operating Corporation
SIT: Erratic performance of an emergency diesel generator during a routine test prompted the NRC's special inspection. The SIT determined that an improper fix to another problem four months earlier impaired the emergency diesel generator's control system.

Wolf Creek Generating Station
Burlington, KS
Wolf Creek Nuclear Operating Corporation
AIT: After one electrical fault in the switchyard caused the main generator to shut down automatically, a second electrical fault disconnected the plant from its offsite electrical grid.

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THE NRC HAS APPROVED UNSAFE HOLTEC STORAGE/TRANSPORT CASTS THAT ARE NOW DEPLOYED AND IN USE

"Holtec storage/transport casks are the first dual purpose container for irradiated nuclear fuel certified by the U.S. Nuclear Regulatory Commission (NRC). According to Holtec International's website (http://www.holtecinternational.com), Holtec casks are already deployed at 33 U.S. nuclear power plants. Up to 4,000 rail-sized Holtec storage/transport casks would also be used at the proposed Private Fuel Storage interim storage facility in Utah. Given the U.S. Department of Energy's (DOE) recent decision to use "mostly rail" transport to the proposed Yucca Mountain repository, Holtec casks could very well become among the most used shipping containers for highly radioactive waste.

Exelon, the largest nuclear utility in U.S., uses Holtec casks for irradiated fuel storage at its reactor sites. In 1999 and 2000, Oscar Shirani, as a lead quality assurance (QA) auditor for Exelon, identified numerous "major design and fabrication issues" during a QA inspection of Holtec International (the cask designer), Omni Fabrication, and U.S. Tool & Die (the subcontractors responsible for manufacturing the casks). In fact, he identified a "major breakdown" in the QA program itself. The problems were so severe that Shirani sought a Stop Work Order against the manufacturer of the casks until the problems were addressed. Instead, he was run out of Exelon. According to Shirani, these design and manufacturing flaws mean that the structural integrity of the Holtec casks is indeterminate and unreliable, especially under heat-related stress such as during a severe transportation accident.
Although NRC has dismissed Shirani's concerns, NRC Region III (Chicago office) dry cask inspector Ross Landsman refused to sign and approve the NRC's resolution of Shirani's concerns, concluding that this same kind of thinking led to NASA's Space Shuttle disasters.[1] He stated in September 2003, "Holtec, as far as I'm concerned, has a non-effective QA program, and U.S. Tool & Die has no QA program whatsoever."[2] Landsman added that NRC's Nuclear Reactor Regulation division did a poor follow-up on the significant issues identified, and pre-maturely closed them...."
http://www.nirs.org/radwaste//atreactorstorage/shiranialleg04.htm

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The United States Government Accountability Office, Report to Congressional Requesters, August 2012, ***Spent Nuclear Fuel; Accumulating Quantities at Commercial Reactors Present Storage and Other Challenges*** http://www.gao.gov/assets/600/593745.pdf describes complex unresolved issues regarding dry cask storage, unresolved issues regarding storage of high burn up spent fuel, dismantled cooling pools leaving no way to transfer spent fuel to new casks, casks used that are not suitable for transportation, spent fuel that can be stranded in deteriorating casks without provision for transfer to new casks, expectation of deteriorated spent fuel rods and no provision for management of such degraded spent fuel rods, and has no data base of its studies, etc. **Also, the NRC has "classified" studies that are not available to the GAO, the National Academy of Sciences or the public!!! Why?? What is it that the NRC knows that they refuse to tell us??**
How can the NRC move forward with this GEIS without resolving those issues?
Why is it that the NRC does not have access to its own data base of past studies?
How is it that the NRC could not/did not make available to the GAO that data base of past studies? How can the NRC function in the public interest without access to its own archive of studies?
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There is a consensus nationally and internationally among government agencies, the nuclear industry, and those who opposes it that spent reactor fuel rods are lethal if not adequately shielded and that that risk continues up to millions of years. The opposition is to the government/industry continuing to produce spent fuel; not adequately and safely managing it; deferring to the financial interest of the nuclear industry, not the safety of the public; and intending to abandon spent fuel into the biosphere instead of shielding it and monitoring it forever. The struggle is also over who pays for this debacle: *the public* not the industry. Humans are the only species that would fatally soil its own nest and seems determined to do so for the right short term profit.

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NUCLEAR WASTE
STOP MAKING IT

Vic and Gail Macks
16.

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December 19, 2013

U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Rulemaking.Comments@nrc.gov

Docket ID No. NRC–2012–0246

Comment on Waste Confidence Generic Environmental Impact Statement (GEIS)
Draft Report for Comment NUREG 2157 http://pbadupws.nrc.gov/docs/ML1322/ML13224A106.pdf

There is no basis in science, engineering, the behavior of the nuclear industry and the Nuclear Regulatory Commission (NRC) for confidence that high level radioactive withdrawn fuel rods ("spent fuel") can or will be managed with no risk to the biosphere for as long as the radioactivity last . For the NRC and the nuclear industry to assert probabilistic assessments of what will happen to radioactive material over 240,000 (plutonium) to a billion years is a fraud and a con game. There is insufficient data for such probabilistic assessments to have validity. Apart from that, even a small likelihood of the risk of a serious untoward event involving spent fuel could be catastrophic for all life forms, air, water and land. Nuclear accidents cannot be undone.

There is a consensus among the U.S. government and the nuclear industry for more than 60 years that withdrawn spent fuel rods are lethal unless shielded. To continue to produce them and intend to abandon them into the biosphere (deep underground dump) is profoundly immoral and a burden and a curse on future generations into eternity. It is premeditated murder.

No storage facility has yet been designed that can contain radioactive waste for such periods of time. Since spent nuclear fuel contains large quantities of fissile material that can be used to make nuclear weapons, it also must be safeguarded to prevent theft. We are confident that NRC and the waste generators can never contain this waste for as long as it poses a hazard. NRC must abandon its Waste Confidence policy and stop using it to license nuclear power plants.

The NRC addresses the issue of spent fuel for only 160 years---not its full range of the radioactive time period. The NRC considers 3 alternatives: Indefinite storage at reactor sites, regional consolidated storage sites, central repository. In doing so, the NRC expresses confidence that spent fuel will be managed adequately and safely, with no basis for such assertions or conclusions.

No technology has yet been proven capable of containing radioactive waste for the hundreds, thousands, or millions of years necessary to protect people and the environment. We have no experience, beyond 70 years with how highly radioactive spent fuel rods will behave. The U.S. has failed even to identify a viable site for a nuclear waste repository despite two decades, billions of dollars, and a federal mandate to do so.

Radioactive waste cannot be safe, secure, clean or green. It is deadly, very long-lasting, toxic stuff that irradiates cells and damages DNA--causing cancer, birth defects, heart problems, infertility, immune deficiencies, and more. There is no safe dose of radiation, but spent or irradiated nuclear fuel is so radioactive a person near it would receive a lethal dose of radiation in just a few minutes if not seconds.

The purpose of NRC's Waste Confidence rule is to streamline nuclear plant licensing by ignoring the permanent, multi-billion dollar problem of what to do with radioactive waste. The only problem Waste Confidence solves is how to permit nuclear plants to continue making this waste when there is no solution for it.

Consolidated Storage away from reactor sites creates more problems, not solutions. In order to justify its Waste Confidence policy, NRC is relying on the federal government's plan (Senate bill 1240) that mandates transporting spent fuel away from nuclear reactors to "temporary" storage sites around the country until a central repository is built. This means more communities would be at risk from radioactive waste, more nuclear sites would have to be safeguarded, and reactor owners could continue making waste without responsibility for managing it. Temporary storage sites easily could become de facto permanent dumps if it is not politically feasible to site enough repositories to handle the waste.

The sheer volume of nuclear waste will require thousands of shipments on our roads, rails, and waterways. Due to the risk involved in mass nuclear waste transportation, it should only be undertaken once--and when we know there is a viable solution. That solution ***cannot*** be abandonment in a deep underground dump.

NRC's Waste Confidence policy assumes that all nuclear spent fuel is the same. This is far from the truth. The industry is moving toward new fuel types, such as MOX (mixed oxide) and high-burnup fuels, which are more radioactive, dangerous, thermally hot and difficult to store and transport safely.

High burnup fuel problems:____ (citations follow)_____

Dangerously unpredictable and unstable in storage – even short-term.

Over twice as radioactive and over twice as hot. The higher the burnup rate and the higher the uranium enrichment, the more radioactive, hotter and unstable.

Requires a minimum of 7 to 20 years of cooling in spent fuel pools. San Onofre's 1123 high burnup fuel assemblies require at least 15 years to cool in the pools. Years of cooling depend on burnup rate, percent of uranium enrichment and other factors as defined in the dry cask system's technical specifications.3 Lower burnup fuel requires a minimum of 5 years in cooling pool.

Requires more storage space between fuel assemblies due to the higher heat, higher radioactivity, and instability,4 yet the NRC approves higher densities of fuel assemblies in dry casks systems. San Onofre requested use of a new dry cask system that crowds 32 fuel assemblies into the same space that currently holds 24.5 This new system will increases the risks of dangerous radiation releases into the environment. The NRC should NOT approve the NUHOMS® 32PTH2 cask system for high burnup, but is considering doing so this year. Diablo Canyon now uses a 32 fuel assembly cask system.

No transportation casks for high burnup are approved by the NRC,6 so the waste cannot be relocated.

Approved for only 20 years in dry cask storage and assumptions about how high burnup fuel reacts in the first 20 years of storage are proving incorrect. 7

Insufficient data to approve dry casks for over 20 years, per Dr. Robert Einziger, Senior Materials Scientist, NRC Division of Spent Fuel Storage and Transportation.8

citations:

1 GAO-12-797 SPENT NUCLEAR FUEL Accumulating Quantities at Commercial Reactors Present Storage & Other Challenges, August 2012 http://www.gao.gov/assets/600/593745.pdf Low-enriched uranium = up to 5% of U235

2 DOE FCRD-NFST-2013-000132, Rev. 1; Fuel Cycle Research & Development-Nuclear Fuel Storage and Transportation-2013-000132, Rev. 1,
6/15/13 http://www.hsdl.org/?abstract&did=739345
3 CoC No. 1029 Technical Specifications for Advanced NUHOMS® System Operating Controls and Limits, Appendix A Tables 2-9 to 2-16
http://pbadupws.nrc.gov/docs/ML0515/ML051520131.pdf
4 RWMA Marvin Resnikoff, PhD: The Hazards of Generation III Reactor Fuel Wastes May 2010 http://bit.ly/19dVRsY
5 Edison request for NUHOMS® 32PTH2 http://pbadupws.nrc.gov/docs/ML1204/ML12046A013.pdf
6 SFPO Interim Staff Guidance 11, Rev 3 Cladding Considerations for the Transportation and Storage of Spent Fuel 11/17/2003 http://www.nrc.gov/reading-rm/doc-collections/isg/isg-11R3.pdf
7 NWTRB Douglas B. Rigby, PhD: The NRC approved the initial 20 year dry cask storage based on assumptions. However, no information was found on inspections conducted on high burnup fuels to confirm the predictions that were made. U.S. Nuclear Waste Technical Review Board December2010report http://www.nwtrb.gov/reports/eds_rpt.pdf
8 NRC Robert E. Einziger, PhD: insufficient data to support licensing dry casks for >20 years, March 13, 2013. http://1.usa.gov/15E8gX5

NRC is treating nuclear waste not as a major human health and an environmental problem, but as a public relations issue. The U.S. has no solution for nuclear waste, and NRC refuses to address the immediate risks it poses. Waste Confidence is simply a policy of false promises, used to promote the industry by pretending its real problems don't exist. The NRC's new Waste Confidence policy is no more credible than the one the Appeals Court in DC vacated in 2012.

In 2012, a Catholic nun and two other non-violent peace activists went through 4 layers of security to the heart of the Y-12 National Security Complex in Oak Ridge, TN to draw attention to the U.S. violations of International Law and the Nuclear Non-Proliferation Treaty and the threat to life on the planet. Four weeks later, the hole in the fence had not been repaired and 2 other persons had inadvertently traveled into prohibited areas. U.S. nuclear facilities should be secure. They are not.

An accounting of the public cost of reactors from uranium mining through shielding and monitoring of nuclear waste forever has not been done and must be included in the GEIS. That will demonstrate the better alternative: energy efficiency, conservation, wind, solar, hydro.

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The following comments address the 2013 Waste Confidence Generic Environmental Impact Statement, Draft NUREG-2157, http://pbadupws.nrc.gov/docs/ML1322/ML13224A106.pdf Pages 2-14, 4-75
Citations follow at the end of this section.

Failure to Address the Impacts of Climate Change:
The NRC has approved on-site storage casks that are not approved for transportation of spent nuclear fuel (SNF). In the event that sea-level or river-level rise threatens the cask site, the fuel would have to be re-casked immediately into approved-for-transportation casks. This would result in an unnecessary radiation exposure to workers, as well as added costs and delays. It is not clear how this transfer would be accomplished since fuel pools will be decommissioned with the reactors. Any additional handling of irradiated fuel increases the odds of an accident and release of radioactivity.

The GEIS states that a one-meter water rise will not endanger any nuclear power plant, operational or decommissioned, in the U.S. This is simply false. Examples: A less than 1m water rise will completely flood Turkey Point, St. Lucie and Crystal River Nuclear power plants, just to name three near-coastal plants that would be affected by flooding. (Climate Central).

GEIS on page 6-8, section 6.3.1, Table 6-1 summarizes the range of expected temperature rise by 2100 as falling between 1 degree C and 6.5 degrees C. But it fails to connect the dots between rising temperatures and the effects on water sources depended on to cool reactors and their spent fuel pools. During the summer of 2012 high temperatures interfered with the operations of several nuclear plants. (source 2 below) Over time, the warming of bodies of water used for cooling will impact the reliability of nuclear plants and potentially the safety of operations.

Experts report that while it is too soon to say that Climate Chaos is increasing the numbers of weather events, they do report that Climate Change is causing greater severity of them. Whether hurricanes, wind storms, tornadoes, ice storms or drought, NRC has not yet upgraded its computer simulations and accident probability calculations to reflect the greater possibility that the electric power grid will go down. Loss of off-site power is a major contributor to reactor accident scenarios, many of which would also include the fuel pool and its back-logged inventories of waste.

1. Surging seas interactive climate map, Climate Central, 2013.
http://sealevel.climatecentral.org/surgingseas/place/cities/FL/Miami#show=cities&center=12/25.3789/- 80.3118&surge=2 or http://sealevel.climatecentral.org/
2. http://green.blogs.nytimes.com/2012/08/13/heat-shuts-down-a-coastal-reactor/?_r=0
As climate change makes water scarcity an ever-increasing event, the water necessary to cool spent fuel in pools becomes an unaffordable luxury. Dry casking all spent fuel is the only alternative in a world where the water necessary to sustain life is at a premium.

3. Cooke, Kieran,"Worsening Water Scarcity to Affect 2 Billion Globally", Climate News Network September 21st, 2013.http://www.climatecentral.org/news/worsening-water-scarcity-to-impact-2-billion-globally-16500

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The following comments address the 2013 Waste Confidence Generic Environmental Impact Statement, Draft NUREG-2157 pages xxviii, xxix, xlix, 1-12, 1-13, 1-14, 2-12:

Dry Cask Advantages over Fuel Pools for irradiated spent fuel rods:
Citations follow at the end of this section.

Some irradiated fuel pools in the U.S. currently hold up to 9 times the amount of spent fuel for which they were designed. (Lochbaum)

The pools are **not** protected by redundant emergency makeup and cooling systems or housed within robust containment structures having reinforced concrete walls several feet thick. (Lochbaum)

Irradiated fuel casks can withstand environmental disasters that spent fuel pools cannot, as evidenced by the continued function of the dry casks at Fukushima. The casks survived the 9.0 quake and continue to protect the irradiated fuel, even though the tsunami flooded them. These containers have not exploded; are not on fire; are not catastrophically leaking and do not require ongoing addition of liquid to cool. On the face of it, they are out- performing the pools on the site.

Dry casks have the advantage of passive cooling via airflow, making them less vulnerable to natural disaster and sabotage.

Spent fuel pools are attractive targets for terrorists. (Physicians for Social Responsibility, National Academy of Sciences, 9-11 Commission Report, Alvarez)

Dry casks are less promising targets for terrorists because one would have to trigger failure in several casks to accomplish the same amount of radiation release as an attack on a spent fuel pool. Casking spent fuel should be expedited as a national security top priority.

Transfer of irradiated fuel to casks should be done sooner rather than later. Since irradiated fuel will have to be put into dry containers to remove it from the reactor site when a repository is available, this process is not an "if" it is a "when." Public health will be protected better if the fuel is transferred now from cooling pools to casks.

On-site storage of irradiated fuel rods in dry casks should be made safer and more secure by adoption by NRC of regulations to mandate HOSS (Hardened On-Site Storage). HOSS is a system whereby more space between the containers increases security, and earth mounds or berms form a barrier between the containers and any public-access points such as roads, delivery areas and water-front. HOSS also mandates real-time heat and radiation monitoring and would also provide for local community over-sight of the waste installation such as a citizen advisory board.

On the other hand, there is a limit to the at-reactor dry storage concept. Under its "indefinite storage" scenario, NRC has assumed that dry cask storage--cask pads, inner canisters, and the dry casks themselves--will be replaced once every 100 years, indefinitely into the future. NRC assumes that Dry Transfer Systems will be built (and also replaced every 100 years), since pools will have been dismantled during decommissioning by at most 60 years after permanent reactor shutdown. But NRC has not dealt with the very real risk that the irradiated nuclear fuel will so degrade with age that such transfer operations could not be carried out safely or smoothly. This is especially a risk with "high burn-up fuel," that has spent more time in an operating reactor core, and is thus significantly more radioactive and thermally hot. NRC also has not provided the price tag for such future transfer and replacement operations.

Casking the spent fuel would prevent much of the hazard associated with transportation of high-level nuclear waste. However, locations where HOSS (Hardened On-Site Storage) is not safe (places vulnerable to flooding, for example), hardened dry cask storage should be done as close to the point of generation as possible. HOSS cannot be a permanent measure on the seacoasts and fresh water sources (rivers, lakes, reservoirs) of our country, due to rising sea levels and risk of leakage into our vital drinking water supplies.

Another major appeal of HOSS is that it is currently an interim storage choice that is safer and endorsed by the bulk of public interest groups concerned with nuclear issues. Over 170 groups in all 50 states have endorsed the concept of HOSS, including most groups near reactor sites. (NIRS)

The advantages of dry cask storage over pool storage is further documented by a team of experts on the hazards of spent fuel pools which includes the current chair of the Nuclear Regulatory Commission, Allison Macfarlane.(Alvarez)

There is a substantial reduction in the risk to the population if the spent fuel is transferred to casks:

“The risk reduction is undeniable: the contaminated land area is reduced from 9,400 square miles to 170 square miles and the number of people displaced from their communities for a long time drops from 4,100,000 to 81,000.” (Lochbaum)

NRC GEIS Documents are posted here: http://www.nrc.gov/waste/spent-fuel- storage/wcd/documents.html

1. Robert Alvarez, Jan Beyea, Klaus Janberg, Jungmin Kang, Ed Lyman, Allison Macfarlane, Gordon Thompson, and Frank N. von Hippel, Reducing the Hazards from Stored Spent Power-Reactor Fuel in the UnitedStates,Science and Global Security, 11:1–51, 2003 http://mothersforpeace.org/data/20030122ReducingTheHazards?searchterm=spent+fuel+pools
2. “Safer Storage of Spent Nuclear Fuel”, Union of Concerned Scientists, 2012. http://www.ucsusa.org/nuclear_power/nuclear_power_risk/safety/safer-storage-of-spent-fuel.html
4. Lochbaum, David, Director, Nuclear Safety Project, testimony Before the Senate Committee on Energy and Natural Resources, July 20, 2013.http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=89dbc888-171c-4f77-8ecf-83a0055fcfb9 5. Principles of Safeguarding Nuclear Waste at Reactors or Hardened On-Site Storage (HOSS) http://www.nirs.org/radwaste/policy/hossprinciples3232010.pdf

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Spent Fuel Pool Fires

The following comments address the 2013 Waste Confidence Generic Environmental Impact Statement, Draft NUREG-2157, Pages F-1, F-6, F-9, F-10, F-12, F-13; Essentially all of appendix F. Citations following each point are linked / listed at the end of this document.

NRC Staff dismiss ALL of the following points (one way or another) on the basis that it finds the probability of a fuel pool fire to be so low that it concludes that such an event is "inconsequential." The odds cited are about 1 in 60,000...but that is for any one year, at only one reactor. Meanwhile there are still 99 reactors operational in the USA, and each will continue operating for more than one year. The odds rise to 1 a few thousand. NRC dismissing an enormous hazard solely because it is a "low-probability" event does not constitute **protection** of the public health and safety as it is charged by law to provide. The following factors MUST be considered:

As of 2012, spent fuel pools are overcrowded, packed beyond their originally engineered capacity by as much as 9 times. (Union of Concerned Scientists), (Lochbaum).

Water loss in the spent fuel pool could lead to a catastrophic spent fuel pool fire. “Water could be lost from a spent-fuel pool through leakage, boiling, siphoning, pumping, displacement by objects falling into the pool, or overturning of the pool. These modes of water loss could arise from events, alone or in combination, that include: (i) acts of malice by persons within or outside the plant boundary; (ii) an accidental aircraft impact; (iii) an earthquake; (iv) dropping of a fuel cask; (v) accidental fires or explosions; and (vi) a severe accident at an adjacent reactor that, through the spread of radioactive material and other influences, precludes the ongoing provision of cooling and/or water makeup to the pool.”(Thompson).

NRC downplays the risks of pool fires by assuming that surrounding populations will be successfully evacuated. But nuclear utilities are allowed to store high level radioactive withdrawn fuel rods in pools for decades after reactors permanently shutdown, in order to defer the costs of dry cask storage as

far off into the future as possible, despite the inherent risks. At the same time, NRC allows utilities, via exemptions from regulations, to do away with 10-mile radius emergency planning zones (EPZs) as soon as 12-18 months post-reactor shutdown despite the lingering risk of storing high level nuclear waste in pools at such shutdown reactor sites. How can populations be evacuated if EPZs have been dismantled?! Moreover, a 10 mile evacuation is inadequate and misleading. It hides or obfuscates the seriousness of the risk---effectively a denial of the risk level.

Spent fuel is highly flammable as well as radioactive, yet is primarily stored in densely packed pools of water that contain several times more fuel than the nuclear reactor itself. If a fuel pool is damaged or loses its cooling system, fuel rods could be exposed, overheat, and catch fire, releasing massive quantities of radioactive material. NRC refuses to address the incredible risks these facilities pose, pretending the low likelihood of an accident makes the extreme consequences irrelevant. Hardened On-Site Storage systems (HOSS) should be used to store spent fuel more safely and securely at or near nuclear plants. HOSS reduces the immediate dangers spent fuel poses, without creating unnecessary risks. http://ieer.org/wp/wp-content/uploads/2010/03/HOSS_PRINCIPLES_3-23-10x.pdf

75% of the total (72,000 metric tons, plus 2,000 tons more per year) of spent fuel is in fuel pools and allowed to remain there for as much as 60 years beyond licensed life of reactor operations. The GEIS underestimates the risk of fuel pool fires and ignores the safer alternative of hardened on site storage at the nuclear plant sites. Dry cast storage at Dai-ichi survived the number 9 earth quake, tsunami, loss of the electrical grid, and loss of back up diesel generators much better than the reactors themselves and their fuel pools.

The NRC assumes that surrounding populations will be successfully evacuated in the event of a fuel pool fire. After the Dai-ichi explosions, the U.S. advised any Americans within 50 miles to leave:
Statement by U.S. Ambassador John V. Roos on March 16, 2011:
“The United States Nuclear Regulatory Commission (NRC), the Department of Energy and other technical experts in the U.S. Government have reviewed the scientific and technical information they have collected from assets in country, as well as what the Government of Japan has disseminated, in response to the deteriorating situation at the Fukushima Nuclear Power Plant. Consistent with the NRC guidelines that apply to such a situation in the United States, we are recommending, as a precaution, that American citizens who live within 50 miles (80 kilometers) of the Fukushima Nuclear Power Plant evacuate the area or to take shelter indoors if safe evacuation is not practical.”
http://www.whitehouse.gov/issues/foreign-policy/japan-earthquake-tsunami

Bob Alvarez of Institute for Policy Studies has calculated that Fukushima Daiichi Unit 4's pool contains ten times the amount of hazardous radioactive Cesium-137 than was released by the Chernobyl catastrophe. Dai-ichi fuel pool number 4 is an ongoing catastrophic risk in an ongoing tragedy in which many are exposed to continuing radiation, loss of their homes, safe food and water, etc.:
“As of April 2013, more than 150,000 people are still forced to remain evacuated from their communities in the restricted zones. Tens of thousands of other people, especially concerned mothers with small children, had to seek voluntary refuge away from their home towns outside contaminated zones. Many of them still live in exile with poor official support...Health concerns are increasing....What if the already severely- damaged (and, as it seems, slightly leaning) reactor building collapses and the spent fuel pool {no. 4} crashes down, perhaps triggering a spent fuel fire? This could lead to a worst case scenario that was drawn up in March 2011 by Prof. Kondo, Chairman of the Japan Atomic Energy Commission (JAEC), would still apply. Evacuation of over 10 million residents in the wider Tokyo megalopolis within a 250-km radius of Fukushima Daiichi, depending on wind direction, may be required.” page 62. http://www.worldnuclearreport.org.

In fact, Japan weighed evacuating Tokyo's 35 million people even as they downplayed the risks in public. "...The report quotes the chief cabinet secretary at the time, Yukio Edano, as having warned that such a "demonic chain reaction" of plant meltdowns could result in the evacuation of Tokyo, 150 miles to the south. "We would lose Fukushima Daini, then we would lose Tokai," Mr. Edano is quoted as saying, naming two other nuclear plants. "If that happened, it was only logical to conclude that we would also lose Tokyo itself." The report also describes the panic within the Kan administration at the prospect of large radiation releases from the more than 10,000 spent fuel rods that were stored in relatively unprotected pools near the damaged reactors." http://www.nytimes.com/2012/02/28/world/asia/japan-considered-tokyo-evacuation-during-the-nuclear-crisis-report-says.html?_r=2&hp

If Dai-ichi fuel cooling pool number 4 collapsed---that risk continues today---and evacuation of 10 million people within 250 kilometers was undertaken in Japan, or a similar large population evacuation was necessary at Indian Point in New York, Fermi 2 in Michigan, or anywhere else in the U.S., it would be impossible to achieve in a *necessary timely* manner. Furthermore, we would need an evacuation plan with routes, destinations, immediate notification, long term housing facilities, competent medical care for radiation exposures, funding for large displaced populations and full disclosure of real time radioactive release measurements. None of that is or has ever been available anywhere in the U.S. The de facto plan of the nuclear industry and the NRC for the public is shelter in place and suck it up.

Fermi 2 has an over crowded fuel pool with 600 tons of spent fuel. It is the largest GE Mark 1 reactor. It is at risk for weather events, loss of coolant, or terrorist attack. Like Dai-ichi reactors and all 23 GE Mark 1 reactors in the U.S., it's cooling pool does not have back up cooling. It has no diesel generators for cooling pool water circulation to rely on in loss of electrical grid emergency. There are 1,331 highly radioactive irradiated spent nuclear fuel assemblies in Fukushima Daiichi Unit 4's storage pool. Fermi 2's high-level radioactive waste storage pool contained 2,898 irradiated nuclear fuel assemblies by spring 2010, according to U.S. Department of Energy projections documented in the Yucca Mountain Final Environmental Impact Statement (Feb. 2002, Table A-7, Proposed Action spent nuclear fuel inventory). Fermi 2 could generate another 443 irradiated nuclear fuel assemblies between spring 2010 and spring 2014, meaning by next spring, a total of 2,898 + 443 = 3,341 irradiated nuclear fuel assemblies. So, by next spring, Fermi 2's storage pool could hold 2.5 times as much high-level radioactive withdrawn fuel rods than Fukushima Daiichi Unit 4's pool! A cooling pool fire at Fermi 2 would be worse than a meltdown of the Fermi 2 reactor itself in its release of a larger dose of radiation into the environment, resulting in widespread illness, deaths, and genetic mutations. If the radioactivity releases from either location (the reactor, or the irradiated nuclear fuel storage pool) are bad enough, the entire site might have to be evacuated. No intervention would then be possible. Not only could reactor meltdowns proceed out of control, but high-level radioactive spent fuel storage pool fires could result -- emitting orders of magnitude more hazardous radioactivity into the environment than even a reactor meltdown, as the pools are not contained within a radiological containment structure. Fermi 2 is lacking hundreds of structural welds on various floors of the reactor building, never put in place like they were supposed to have been some 40 years ago. This has meant that it could not safely withstand the weight of the crane and cask necessary to move the sufficiently cooled spent fuel to Hardened Onsite Storage (HOSS).

Building the proposed Fermi 3, and its high-level radioactive waste storage pool, right next to Fermi 2, and its high-level radioactive waste storage pool, is akin to the multi-unit Fukushima Daiichi site, where the meltdown and hydrogen gas generation at Unit 3 contributed directly to the explosion at Unit 4 which now imperils the Unit 4 high-level radioactive waste storage pool.

Thus, Fermi 3's combined Construction and Operations License Application (COLA) should be

rejected by NRC. So should Fermi 2's bid for a 20-year license extension, which Detroit Edison is

poised to apply for next year. (NRC has rubberstamped 73 of 73 reactor 20-year license extensions applied for across the U.S. thus far!)

The risks, and inevitable environmental impacts over time, of the high-level radioactive wastes that would be generated at Fermi 3, and at Fermi 2 during a 20-year license extension, are just too great, and therefore should be deemed unacceptable under the National Environmental Policy Act.

NRC also downplays the risks of pool fires by assuming that a pool drain down accident (or attack) involves the complete drain down of the pool. As Dr. Gordon Thompson of the Institute for Resource and Security Studies (IRSS) has pointed out, any technically competent person paying attention to the issue should have known since 1979 that a partial drain down of the pool is actually a worse-case scenario, for the leftover water in the bottom of the pool would block convection current air flow which would help cool the irradiated nuclear fuel, leading to faster heat up to the ignition point.

The evaluation of the spent fuel pool fire risk in the GEIS relies on the spent fuel pools having only 3.5 spent fuel cores. Currently, spent fuel pools contain as many as 9 cores. (Lochbaum). The NRC estimates the spent fuel pool capacity for some reactors to be as high as 16.7 cores. (DGEIS G-4).The ACTUAL over-loading of the fuel pools renders the probabilistic risk assessment invalid.

The health risk assessment for a spent fuel fire was done using only three different nuclear power plants (Ginna, Surry and Zion), ignoring the idiosyncratic nature of each reactor in the US. Reactor sites all have different amounts of irradiated fuel that gives off different amounts of radioactivity. Fermi 2 has 600 tons of spent fuel in one overcrowded pool. The surrounding human populations are not equal nor are they distributed in the same way-- the dose calculations couldn't possibly be the same for all reactors. Realistic recognition of population numbers, local infrastructure, access roads, possible destinations, facilities for displaced populations, vary with each location of reactors.

The seismic risks for the spent fuel pools in highly earthquake-prone areas are ignored. The seismic risk for Diablo Canyon, San Onofre and Columbia fuel pools were deliberately glossed over, by the NRC's own admission, since the one reactor used in the NRC's "Consequences Study" is in Pennsylvania (Peach Bottom).

The risk and consequences of a collapse of a spent fuel pool was explicitly ignored in the GEIS. No attempt was made to incorporate this type of possible accident into the risk assessment for spent fuel pool fires. The current, ongoing situation at Fukushima Dai-ichi unit #4 tells us that this particular hypothetical scenario is a very real possibility.

The 2013 GEIS references a seriously out-dated spent fuel pool study: "Regulatory Analysis for the Resolution of Generic Issue 82, 'Beyond Design Basis Accidents in Spent Fuel Pools'" (NRC 1989). The information in this report is at least 24 years old. A new regulatory analysis should be done, with the inclusion of the experience from Fukushima, and should include a risk analysis of spent fuel pools containing irradiated MOX (mixed oxide) fuel rods.

The NRC's Office of Nuclear Security and Incidence Response uses a predictive tool to aid emergency responders during nuclear accidents which indicates that the radiological release from a pool fire following an earthquake could dwarf that of a reactor meltdown. It also indicates that the consequence of the breach of a dry cask is thousands of times less severe. (U.S. Nuclear Regulatory Commission, Office of Nuclear Security and Incidence Response, RASCAL 3.0.05 Workbook,

NUREG-1889, September 2007). (Curran).

The Draft Consequence Study lacks scientific integrity because it examines only complete drainage of a pool and ignores the more severe case of partial drainage. Based on the canard that complete drainage is the worst case, the NRC ignored spent fuel pool accident risks for decades. Then in 2001, in NUREG-1738, the NRC admitted that the most severe accident risk is posed by prolonged disruption of air or water circulation over the spent fuel assemblies. The point was confirmed by a panel of the National Academy of Science in 2004. By reverting to the discredited assumption that complete pool drainage is the worst case, the NRC fatally undermines the integrity and credibility of the Study. (Curran), (NAS).

The Study is too narrow because it significantly underestimates risk by considering only one type of initiating event--an earthquake--and ignoring other credible initiating events that are at least as probable. For instance, the Study ignores the impacts of aging and the potential for an attack on a pool and/or adjacent reactor to initiate a pool fire. Vulnerability of spent fuel storage pools to terrorist attack is perhaps the greatest risk of all. Further, the Study does not analyze the potential for a core melt accident to cause or contribute to a pool fire. For instance, radiation released during a core melt accident could preclude access to the pool to supply emergency cooling. (Curran)

The Study is misleading and biased because it only pretends to consider the relative merits of low-density storage. The Study purports to evaluate whether low-density pool storage of irradiated fuel would be cost-effective and safer than high-density storage. But NRC misleadingly uses the phrase “low-density” to refer to closed high-density racks that contain fewer fuel assemblies, not true low-density fuel storage in open-frame racks. The NRC decided not to consider true open-rack low-density storage because it was assumed to be too expensive (see page 23). The Draft Consequence Study shows an appalling lack of scientific integrity by including the result of the study as an assumption: the question of whether a return to open-frame low-density storage is justified is the very question the NRC set out to answer in the Study. (Curran).

Ignoring real world multiple risk factors. The draft NRC study has been done in a vacuum that excludes the hazards of a concurrent reactor accident that are known to impact the safety of spent fuel pool systems. Dr. Thompson correctly points out, “the physical proximity of spent-fuel pools to operating reactors, and their sharing of safety systems, means that the use of high-density racks creates strong linkages between reactor risk and pool risk.” This fact is underscored in a 1990 NRC-sponsored study that points out that a long-term station blackout at the Peach Bottom nuclear station would cause “deflagrations to occur in the reactor building and refueling bay..” This is exactly what occurred at the Fukushima reactors, which caused significant damage to the spent fuel pools. (Thompson, 2013)

Aging and deterioration of Spent Fuel Pool Systems. The NRC staff dismisses this problem by ignoring a 2011 NRC-sponsored study that concludes, “as nuclear plants age, degradations of spent fuel pools (SFPs), reactor refueling cavities...are occurring at an increasing rate, primarily due to environment-related factors. During the last decade, a number of NPPs (nuclear power plants) have experienced water leakage from the SFPs [spent fuel pools] and reactor refueling cavities.” Instead the NRC staff points to a study done 25 years ago, before aging effects were being observed. (NRC, 2011).

Failure to meet the NRC’s Technical Safety Information Standard for Final Safety Analysis Reports (10 CFR 52.157). The draft study does not comport with the NRC’s own technical information safety analysis standard for reactor operators. According to this regulation, safety analyses must incorporate all key reactor station components including the reactor operations and spent fuel handling and

storage functions.

Failure to compare the risks of high density versus open rack configurations: The draft study examines a reduction of spent fuel assemblies while allowing racking configurations that allow for high density storage to remain. Specifically, the study does not address the removal of neutron-absorbing panels that allow for closer spacing. It's been noted in a previous study that these panels can interfere with air convection during a pool drainage event and thus can enhance the heat-up of the nuclear fuel. In effect, they could become de facto "thermos bottles." Open rack storage would allow for free convection cooling and thus reduce the risk of ignition. (Alvarez)

Failure to compare relative hazards of high-density pool storage with dry cask storage: Instead the authors pick a scenario which may not even reflect real world situations relative to the different storage configurations at U.S. nuclear power stations. According to estimates developed in 2007 for the Nuclear Regulatory Commission's Emergency Operation Center, for purposes of emergency planning and response, a major earthquake near the San Onofre Nuclear Generating Station in California might cause a spent fuel cladding fire releasing approximately 40 million curies of Cs-137 and causing life- threatening radiation doses to people within a 10-mile radius. By contrast, according to the same NRC document, a cask rupture would result in the release of 2,500 times less radioactivity. This is underscored by real world experience at the Fukushima Daiichi site where all the nine dry spent fuel casks were unscathed by the earthquake and tsunami. (NRC, 2007), (Talbot).

What should be done? The draft study should be withdrawn and efforts to incorporate it into the NRCs regulatory framework should be halted. NRC should start with a clean slate and sponsor a proper investigation of the physics and chemistry of pool fires. Given that NRC lacks the in-house credibility to do this work, the agency should reach out to a broader pool of expertise and follow scientific principles.

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9. Talbot, David, "The Case for Moving U.S. Nuclear Fuel to Dry Storage", MIT Technology Review, April 14, 2011.

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Reactor owners and the NRC are not credible sources for protection of the public safety and health with respect to management and oversight of nuclear waste and reactor vulnerabilities that impact the safety of onsite withdrawn spent fuel. Risks are not/can not be eliminated as demonstrated over the years.

NRC blocks implementation of its own staff recommendations for post Fukushima safety upgrades:
NRC's Post-Fukushima Response: Going in Circles? Ed Lyman, Union of Concerned Scientists http://allthingsnuclear.org/post/14624150915/nrcs-post-fukushima-response-going-in-circles
Also New York Times May 7, 2011Nuclear Agency Is Criticized as Too Close to Its Industry
By TOM ZELLER Jr.

Inadequate seismic protection: NRC Commissioners voted to delay safety improvements after Fukushima. ".... the August 23 earthquake in Mineral, Virginia should be a further call to action for NRC. That magnitude 5.8 earthquake caused ground motion that exceeded the "design basis" at the nearby North Anna nuclear plant, even though Dominion, the plant operator, originally had said the plant was designed to withstand an earthquake of magnitude 5.9-6.2.
This event highlights the knowledge gaps in seismic protection at US nuclear plants and supports the Task Force's recommendation that the NRC should "order licensees to reevaluate the seismic and flooding hazards at their sites against current NRC requirements and guidance, and if necessary, update the design basis and SSCs [structures, systems, and components] important to safety to protect against the updated hazards."
http://allthingsnuclear.org/post/9622364770/nrcs-path-after-fukushima-still-lined-with-pitfalls

Vulnerabilities to Reactor Operation that weren't or can't be designed out: See Fission Stories at http://allthingsnuclear.org/tagged/fission-stories

The NRC and Nuclear Power Plant Safety 2012 Report: Tolerating the Intolerable
"The U.S. Nuclear Regulatory Commission (NRC) is tolerating the intolerable: a ripped nuclear safety net. Granted, nuclear reactors do not fall into the net every day. And so far the United States has been lucky— with limited and notable exceptions, reactors that have fallen have avoided the ripped portion of the safety net. The more often the net is used and the more the net itself is abused, however, the more likely it becomes that someday workers or the public will be harmed by a nuclear reactor accident. In 2012, the NRC reported 14 "near-misses" at nuclear plants. Just to be clear about the gravity of the situation, a near-miss is an event that increases the chance of core meltdown by at least a factor of 10, thus prompting the NRC to dispatch some level of special inspection team to investigate the event. Over the past three years, 40 of the nation's 104 nuclear reactors experienced

one or more near-misses. That is a rate greater than one near-miss per month..... First, the NRC already investigates each near-miss to determine what happened and why. The NRC should formally evaluate all safety violations identified during its near-miss inspections to determine whether the agency's baseline inspections could have, and should have, found these safety problems sooner. Such insights from the near-misses may enable the NRC to make adjustments in what its inspectors examine, how they examine it, and how often they examine it, so no violation can go undetected. Second, the NRC must require that individual plant owners find and fix problems in their testing and inspection procedures. Many of the near-misses last year involved design and operational problems that had already existed for years—sometimes even decades—prior to the incidents in question.
http://www.ucsusa.org/nuclear_power/nuclear_power_risk/safety/nrc-and-nuclear-power-safety-annual.html

"Fire non-protection. After a 1975 fire at the Browns Ferry plant, the NRC adopted a new set of fire protection regulations, issued in 1980 and revised in 2004. In 2012, the NRC granted an extension to the Tennessee Valley Authority (TVA), giving the TVA more time to prepare a fire regulation compliance plan—for that very same Browns Ferry plant. For over 30 years, the plant has been allowed to operate out of compliance with the regulations its own accident prompted."

"Recurring reactor cooling water leaks. The near-miss at the Palisades plant, in which cooling water leakage was allowed to continue for nearly a month, even though the leak was in an area where NRC regulations require the plant to be shut down within six hours, points to an ongoing problem: the NRC routinely allows violations of this type to go unpenalized, thus "enabling poor decision-making by plant owners." In a similar incident at the Davis-Besse plant in 2002, the leakage problem was allowed to continue for years; a study later concluded that the reactor vessel head was less than a year from failure, which could have caused a serious accident, when the problem was finally detected and the plant shut down for repair."

"Three-year trends
Analysis of the near-miss data for the three years covered by UCS reports shows that 40 of the nation's 104 operating commercial reactors experienced a near miss between 2010 and 2012, with 12 reactors experiencing at least two near-miss events, and three—at Fort Calhoun, Palisades, and Wolf Creek—experiencing three or more. The three-year data indicate that the average U.S. reactor is likely to experience seven near misses over its 40-year license period (increasing to about ten if the license is extended by 20 years, as most have been).
While none of the near misses UCS has studied have resulted in harm to nuclear plant workers or the public, the "safety pyramid" principle used by industrial safety experts suggests that reducing the frequency of near misses will also reduce the likelihood of a major accident that could cause serious harm."

NUCLEAR NEAR-MISSES IN 2012 THAT PUT AT RISK THE REACTORS AS WELL AS ONSITE STORED HIGHLY RADIOACTIVE SPENT FUEL: Reactor & Location; Owner; Highlights

SIT=10x increase in risk of reactor core damage
AIT=100x increase in risk of reactor core damage
Brunswick Steam Electric Plant, Unit 2
Southport, NC
Progress Energy

SIT: Excessive leakage of cooling water from the reactor vessel, determined to have been caused by the improper installation of the reactor vessel's head, led to an emergency being declared and the reactor being shut down.

Byron Station, Unit 2
Byron, IL
Exelon Generation Co., LLC
SIT: Equipment failure in the switchyard triggered an automatic shut-down of the reactor. A design deficiency caused emergency equipment to be de-energized until workers took steps to isolate the problem and restore power from the emergency diesel generators.

Catawba Nuclear Station, Unit 1
York, SC
Duke Energy Corp.
SIT: After an age-related problem caused one of four reactor coolant pumps to fail, the Unit 1 reactor and turbine automatically shut down as designed. Due to a design error in a recent modification, the decreasing voltage output by the main generator caused electrical breakers to open that disconnected Units 1 and 2 from the offsite power grid. One of the emergency diesel generators started but failed to supply electricity to safety equipment due to another design error when it was installed in 1984.

Farley Nuclear Plant, Units 1 and 2
Dothan, AL
Southern Nuclear Operating Company, Inc.
SIT: Security problems prompted the NRC to conduct a special inspection. Details of the problems, their causes, and their fixes are not publicly available.

Fort Calhoun Station
Omaha, NE
Omaha Public Power District
SIT: The NRC investigated a fire that disabled half of the 4160 volt and two-thirds of the 480 volt power supplies for emergency equipment at the plant and triggered the declaration of an Alert—the third most serious of the NRC's four emergency classifications.

Fort Calhoun Station
Omaha, NE
Omaha Public Power District
SIT: Security problems prompted the NRC to conduct a special inspection. Details of the problems, their causes, and their fixes are not publicly available.

Harris Nuclear Power Plant
Raleigh, NC
Progress Energy
SIT: As the reactor was being shut down for a scheduled refueling outage, workers tested the closing time of the three main steam isolation valves. These valves are designed to close within five seconds during an accident to limit the amount of radioactivity released to the atmosphere. The NRC dispatched an SIT after it took one valve 37 minutes to close and another 4 hours and 7 minutes.

Palisades Nuclear Plant,
South Haven, MI
Entergy Nuclear Operations, Inc.
SIT: Workers shut down the reactor about a month after they detected a small cooling water leak. The NRC sent an SIT to the site after the source of the leak was determined to be a location where any leakage required the plant to be shut down within six hours.

Palo Verde Nuclear Generating Station, Units 1, 2, and 3
Wintersburg, AZ
Arizona Public Service Company

SIT: Security problems prompted the NRC to conduct a special inspection. Details of the problems, their causes, and their fixes are not publicly available.

Perry Nuclear Power Plant
Perry, OH
FirstEnergy Nuclear Operating Company
SIT: Security problems involving failures to prevent unauthorized individuals from entering secure areas of the plant prompted the NRC to conduct a special inspection.

River Bend Station
St. Francisville, LA
Entergy Operations, Inc.
AIT: The operators manually shut down the reactor on May 24 after an electrical fault on the motor of a feedwater pump caused it to stop running. A failed relay prevented the electrical breaker for the motor from opening to isolate the electrical fault. The fault propagated through the electrical distribution system, causing the breaker supplying power to the 13,800 volt electrical bus to open. Due to another electrical cable problem on May 21, all of the plant's circulating water pumps and non-emergency cooling water pumps were being powered from this single electrical bus. Its loss caused the plant's normal heat sink to be lost and stopped the supply of cooling water to equipment in the turbine building and to some emergency equipment.

San Onofre Nuclear Generating Station, Units 2 and 3
San Clemente, CA
Southern California Edison Company
AIT: Operators shut down the Unit 3 reactor following a leak inside a steam generator replaced less than a year earlier. The NRC dispatched an AIT after eight steam generators tubes failed pressure testing and inspections identified extensive and unusual degradation in the steam generators of both units.

Wolf Creek Generating Station
Burlington, KS
Wolf Creek Nuclear Operating Corporation
SIT: Erratic performance of an emergency diesel generator during a routine test prompted the NRC's special inspection. The SIT determined that an improper fix to another problem four months earlier impaired the emergency diesel generator's control system.

Wolf Creek Generating Station
Burlington, KS
Wolf Creek Nuclear Operating Corporation
AIT: After one electrical fault in the switchyard caused the main generator to shut down automatically, a second electrical fault disconnected the plant from its offsite electrical grid.

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THE NRC HAS APPROVED UNSAFE HOLTEC STORAGE/TRANSPORT CASTS THAT ARE NOW DEPLOYED AND IN USE

"Holtec storage/transport casks are the first dual purpose container for irradiated nuclear fuel certified by the U.S. Nuclear Regulatory Commission (NRC). According to Holtec International's website (http://www.holtecinternational.com), Holtec casks are already deployed at 33 U.S. nuclear power plants. Up to 4,000 rail-sized Holtec storage/transport casks would also be used at the proposed Private Fuel Storage interim storage facility in Utah. Given the U.S. Department of Energy's (DOE) recent decision to use "mostly rail" transport to the proposed Yucca Mountain repository, Holtec casks could very well become among the most used shipping containers for highly radioactive waste.

Exelon, the largest nuclear utility in U.S., uses Holtec casks for irradiated fuel storage at its reactor sites. In 1999 and 2000, Oscar Shirani, as a lead quality assurance (QA) auditor for Exelon, identified numerous “major design and fabrication issues” during a QA inspection of Holtec International (the cask designer), Omni Fabrication, and U.S. Tool & Die (the subcontractors responsible for manufacturing the casks). In fact, he identified a “major breakdown” in the QA program itself. The problems were so severe that Shirani sought a Stop Work Order against the manufacturer of the casks until the problems were addressed. Instead, he was run out of Exelon. According to Shirani, these design and manufacturing flaws mean that the structural integrity of the Holtec casks is indeterminate and unreliable, especially under heat-related stress such as during a severe transportation accident.
Although NRC has dismissed Shirani’s concerns, NRC Region III (Chicago office) dry cask inspector Ross Landsman refused to sign and approve the NRC’s resolution of Shirani’s concerns, concluding that this same kind of thinking led to NASA’s Space Shuttle disasters.[1] He stated in September 2003, “Holtec, as far as I’m concerned, has a non-effective QA program, and U.S. Tool & Die has no QA program whatsoever.”[2] Landsman added that NRC’s Nuclear Reactor Regulation division did a poor follow-up on the significant issues identified, and pre-maturely closed them....”
http://www.nirs.org/radwaste//atreactorstorage/shiranialleg04.htm

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The United States Government Accountability Office, Report to Congressional Requesters, August 2012, ***Spent Nuclear Fuel; Accumulating Quantities at Commercial Reactors Present Storage and Other Challenges*** http://www.gao.gov/assets/600/593745.pdf describes complex unresolved issues regarding dry cask storage, unresolved issues regarding storage of high burn up spent fuel, dismantled cooling pools leaving no way to transfer spent fuel to new casks, casks used that are not suitable for transportation, spent fuel that can be stranded in deteriorating casks without provision for transfer to new casks, expectation of deteriorated spent fuel rods and no provision for management of such degraded spent fuel rods, and has no data base of its studies, etc. **Also, the NRC has “classified” studies that are not available to the GAO, the National Academy of Sciences or the public!!! Why?? What is it that the NRC knows that they refuse to tell us??**
How can the NRC move forward with this GEIS without resolving those issues?
Why is it that the NRC does not have access to its own data base of past studies?
How is it that the NRC could not/did not make available to the GAO that data base of past studies?
How can the NRC function in the public interest without access to its own archive of studies?

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There is a consensus nationally and internationally among government agencies, the nuclear industry, and those who opposes it that spent reactor fuel rods are lethal if not adequately shielded and that that risk continues up to millions of years. The opposition is to the government/industry continuing to produce spent fuel; not adequately and safely managing it; deferring to the financial interest of the nuclear industry, not the safety of the public; and intending to abandon spent fuel into the biosphere instead of shielding it and monitoring it forever. The struggle is also over who pays for this debacle: *the public* not the industry. Humans are the only species that would fatally soil its own nest and seems determined to do so for the right short term profit.

Vic and Gail Macks