

Comments: U.S. Nuclear Regulatory Commission (NRC) Generic "Environmental Impact" Statement" (GEIS) on Waste Confidence" NUREG 2157 and Draft "Waste Confidence" Rule *
Docket ID No. NRC-2012-0246

These comments in some cases augment other contributions to the NRC comment record made by the undersigned groups via oral comment, email, or additional written documents. An attachment to this comment listing questions that we want answered is part of our comment.

Our organizations are composed of and represent individuals in the United States of America who are impacted by NRC licensing of nuclear fission for commercial purposes, and the wastes that result (both antecedent to and byproduct from fission). We are located near reactors with existing waste storage both wet and often dry, near proposed and possible nuclear waste storage and repository sites, nuclear waste dumps, along routes that would be used if this waste is moved via water, rail and highway.

NRC is responsible for having created an environmental problem: nuclear licenses it granted have resulted in 50+ years of highly radioactive spent (irradiated) nuclear fuel that has accumulated at the nuclear reactor sites. This is a problem. We offer broad comments here because this waste problem impacts us, our members, families and friends, and children and grandchildren...indeed, some of us have been focused on this matter so long that it now impacts our great grand children, and generations to come.

We groups, composed of and representing people impacted by NRC licensing, fundamentally oppose being treated as a "cost" to be systematically "reduced" for the nuclear industry "benefit". If there is a nuclear disaster or any environmental contamination (fast or slow, planned or accidental) we all lose, future generations too.

The GEIS on "Waste Confidence" (NUREG 2157) does not pass the laugh test: the federal court ordered NRC to assess the environmental impact of extended waste storage, not environmental impact of writing a GENERIC document; yet NRC focuses on the cost of writing one document vs many. Even if a summary is in a report, there is zero rational basis to exclude highly radioactive waste storage impacts from specific licensing actions. We reject the Generic approach whole-cloth. Use of a "reference" site has further reduced the public's confidence in the NRC, if that was possible.

A final decision from NRC that it "has confidence" in a generic approach to the existing waste or confidence in continued generation, management and storage of highly radioactive spent nuclear fuel by energy corporations, will confirm our conclusion that this is nothing more than a "Waste CON;" as in a "CON game." ¹ Radioactive waste is far from a "game;" and NRC's failure to fully engage with the site-specific and technical bases of this problem is potentially fatal to us and our progeny.

The GEIS is premature. There are many fundamental questions that have never been adequately addressed in radioactive waste management, storage and eventual isolation. NRC should use this opportunity to put resources (and time) into answering those questions rather than ignoring, dismissing, or using incomplete, out-dated, partial and in some cases inappropriate and unreliable information. It is particularly egregious that NRC has recently started studies on high burnup waste that are not complete, but it is proceeding with this EIS. See the "Questions" attachment to these comments for a partial list of questions that should be answered (and published as a resource for all) before any kind of EIS is issued.

* Strong consensus among impacted communities that there cannot be a rational concept of "confidence" in conjunction with highly irradiated nuclear fuel rods. Instead of changing the name of the NRC document and proposed rule, in this document we add quotation marks though out to indicate lack of subscription to the term.

Laws that created NRC and enable licensing of atomic fission to energy corporations were passed in error by a body that was either sorely misled, delusional, or had no care for the future. Production of massive quantities of radioactivity was legalized while there is no possible way to ensure that this radioactivity could, or would be isolated from the living systems of our planet. Even though it is clear that there is no safe dose of radiation, the production of massive amounts from radioactivity from 24 / 7 fission has not stopped, and today more than 95% of the radioactivity in radioactive waste in the USA is from the licenses that NRC issues. The court ordered moratorium on licensing of nuclear fission is the first rational step in curing this situation. The NRC has the option to join in correcting this situation: the nuclear licensing moratorium should be maintained and further expanded to a phase-out of operating reactors. We should, as a society, stop making more radioactive waste. NUREG 2157 declares the "need for nuclear energy" outside its scope; the "need" for this waste is not outside scope: we don't need any more radioactive waste.

Statutes and Principles

We make these comments under the National Environmental Policy Act, the regulations of the NRC and the laws that empower the NRC to propose the "Waste Confidence" rule (78 Fed. Reg. 56,776 (Sept. 13, 2013)) and the Draft "Waste Confidence" Generic Environmental Impact Statement (Draft GEIS, NUREG 2157). Since these federal statutes and regulations as currently interpreted do not adequately protect our health and security, or that of future generations, we also make these comments under the authority of principles established by The Permanent People's Tribunal on Chernobylⁱⁱ, The Universal Declaration of Human Rights,ⁱⁱⁱ The United Nations Declaration on the Rights of Indigenous People^{iv}, and most importantly the Principle of Precaution.^v

Further we support the Principles invoked at the NRC GEIS comment meeting in Perrysburg OH, hard won in the 20th Century: it is not sufficient to say "it was my job description" or "I was following orders."^{vi} A sustainable future does not include production (or authorization of production) of any more radioactive waste. The impacts NRC is dismissing as SMALL and "insignificant" from waste generation, management, storage, transport are financially and environmentally costly, and potentially deadly.

Radiation

There would be far less concern about waste from NRC license activities if radiation were not harmful; there is no safe dose of radiation. This is not controversial to anyone except those for whom it is a real or potential liability, and/or loss of profit.

"No safe dose" or "no threshold" is also not merely a "conservatism" in regulation of radiation, as mistakenly stated by many. The classic reviews of harm, disease and death from radiation, the National Academy of Science Biological Effects of Ionizing Radiation reports (BEIR 1--7^{vii}) all affirm that there is no dose of radiation with zero risk. In addition, the European Commission on Radiation Risk^{viii} documents that internal radioactivity may result in very high doses since radioactive emissions from radionuclides that get into the body deposit energy directly into surrounding tissue. Another survey of a large number of peer-reviewed published studies on the impact of radiation focused on naturally occurring radioactivity, finding that even in evolutionary timeframes, organisms are never helped by radiation exposure; always harmed (Moeller and Mousseau, 2012^{ix}).

It is sad to think that NRC staff might be subject to the popularized junk science that holds that large distribution of radioactivity including the Chernobyl and Fukushima Daiichi nuclear disasters can be dismissed as low to no impact. While there is a range of discussion as to how many cancers over time will be attributable to these mass contaminations of our environment even the low end of official analysis projects thousands of cancer deaths from each. Anyone who justifies thousands of deaths resulting from a licensed industrial activity as a "low" or SMALL impact needs to reread our comment on "impact" and "significance" and the Principles section, and take a course in ethics. Further, the legal projections of

health consequences completely and deliberately ignore impacts other than cancer in humans and ignore all impacts to other species and biosystems or in rare cases claim to assess impacts on a reference mammal or fish or bird. Nonetheless, these estimates of effects on humans from Chernobyl and Fukushima have been criticized by world class experts,^x some of whom have documented why the impacts of large-scale environmental contamination are much higher. See for instance the 2006 TORCH Report.^{xi} The findings include for Chernobyl:

about 30,000 to 60,000 excess cancer deaths are predicted, 7 to 15 times greater than IAEA/WHO's published estimate of 4,000; predictions of excess cancer deaths strongly depend on the risk factor used; predicted excess cases of thyroid cancer range between 18,000 and 66,000 depending on the risk projection model; other solid cancers with long latency periods are beginning to appear 20 years after the accident; Belarus, Ukraine and Russia were heavily contaminated, but more than half of Chernobyl's fallout was deposited outside these countries; fallout from Chernobyl contaminated about 40% of Europe's surface area; collective dose is estimated to be about 600,000 person Sv, more than 10 times greater than official estimates; about 2/3rds of Chernobyl's collective dose was distributed to populations outside Belarus, Ukraine and Russia, especially to western Europe; Caesium-137 released from Chernobyl is estimated to be about a third higher than official estimates

All of these findings are relevant to the assumptions underpinning the finding of SMALL impact in GEIS/NUREG 2157. It is also worth noting that even the low estimates of cancer deaths from Chernobyl likely exceed, by a large factor the dose--risk tables published by NRC in 1990.^{xii}

None of these reports factor disproportionate level of harm to females; particularly in the 0--5 age group (BEIR VII data shows 10 times more cancer developing in girls exposed 0--5 than in boys at the dose), but the data also shows a 50% greater impact (cancer) over the entire lifespan.^{xiii}

Mischaracterization of the Waste

NRC fails to adequately consider all the waste generated producing the fuel that has become this waste. We also believe that NRC has underestimated the waste that is generated in waste management and storage. NRC also assumes that all the highly radioactive spent nuclear fuel is homogeneous.

NRC mistakenly projects uniformity in parameters such as heat and rate of heat generation, aging and rate of aging, fissile material content and overall "biological effectiveness" (one of the most offensive technical terms for "likeliness to cause disease and death") for different types of fuel with different levels of burn-up, decay and damage. This mistake is unacceptable. If it is not a mistake, the wholesale incompetence it reflects is stunning and if it persists will undermine any remaining ability to ensure that this highly varied material is not released to our biosphere.

In addition, NRC fails to factor the changing characteristics of this waste over time. The dominance (heat and high-surface radiation dose) of the intense fission products in the several centuries give way; later the access to the plutonium and other fissile materials will become easier. NRC fails to factor this shift.

High Burn-up

How can the NRC GEIS have confidence in extended storage of high burn-up (>45 GWd/MTU) highly radioactive spent nuclear fuel when the NRC currently will not approve dry cask storage beyond 20 years^{xiv} for high burn-up waste and has not approved transportation casks^{xv} for high burnup waste? The fuel is over twice as radioactive as lower burnup fuel and is hotter, requiring up to a minimum 20 years cooling in spent fuel pools.^{xvi} The fuel is proving unstable in storage and there are no current solutions to

these problems. The NRC GEIS^{xvii} even quotes one study (Pages B-13 and B-23) regarding the problems of fuel cladding embrittlement with high burn-up waste, yet ignores the potential consequences of this – shattering of the embrittled, fragile fuel cladding, which could release radiation into the environment. (GEIS Pages B-12 and B-23)

So-Called "Low-Level" Waste

NRC makes unrealistic, inadequate and highly speculative assumptions to dismiss potential environmental and health impacts from the so-called “low-level” radioactive generated along with and a result of the generation, storage, treatment and disposal of irradiated/spent fuel and high level radioactive waste. It can contain all the same long lasting radionuclides as irradiated fuel and high level waste, sometimes even in higher concentrations, but NRC assumes without calculations or analysis that impacts will be “SMALL” under all three scenarios--short term, long term and indefinite storage.

On page xxix of the GEIS, NUREG 2157, NRC describes “low-level” radioactive waste as “a wide range of items that have become contaminated with radioactive material or have become radioactive through exposure to neutron radiation. The radioactivity in these wastes can range from just above natural background levels to much higher levels, such as seen in parts from inside the reactor vessel in a nuclear power reactor.”

The U.S. General Accounting Office on pages 49-52 of GAO RCED-98-40R (B-278691 , May 1998) confirmed that

- “low-level” radioactive waste includes virtually everything from a nuclear reactor except the spent fuel
- “low-level” radioactive waste can contain every radionuclide found in “high-level” waste
- when plutonium, cesium-137, strontium-90 and similar materials are inside the fuel, they are high-level; and that when they leak out of the fuel, as happens during reactor operations, and are collected in filters and ion-exchange resins, these same materials are considered “low-level”
- at a maximum Class C (“low level”) waste limit of 4,600 curies, unshielded cesium-137 would yield a lethal dose to 50 percent of a hypothetically exposed population at a 1-meter distance in approximately 20 minutes...

The point is that “low-level” radioactive waste is not low risk and its impact should not be considered SMALL.

NRC unjustifiably concludes that the amount of “low-level” radioactive waste generated in the short and long term scenarios is less than the amount already being generated by reactor operations and decommissioning thus its impact is SMALL, not significant. NRC is irresponsibly saying that because there is already some amount of waste, additional waste can be added to it without consequence. This ignores that (1) the vast majority of the radioactivity is from the irradiated fuel in the first place and (2) there very likely could be no disposal site for it. It further ignores the failed history of “low-level” radioactive waste disposal sites in the US, most if not all of which have leaked or are leaking. There is no data provided in the GEIS to conclude that sufficient capacity will be available when needed—at least if we still live in a democracy at that time.

One of the irresponsible consequences of not being able to permanently isolate so called “low-level” radioactive waste is the pressure by generators and government agencies to release the less concentrated portions from radioactive controls in essence dispersing the radioactivity into the marketplace, populace and biosphere. These consequences are potentially very significant to those exposed but are completely ignored in the GEIS.

Fuel Pool Fires

Tons of highly radioactive “spent” fuel are building up at every nuclear reactor site in the country, stored at high density in water-filled pools in buildings that could not withstand a hostile action and also offer no containment of radioactivity in the event of a procedural accident or natural disaster. If pools are even partially drained they pose a risk of catastrophic fire.

NRC staff have not addressed the realities implied in the short statement above. By choosing to take a "reference" reactor approach, by failing to apply the full extent to which multiple factors may influence outcomes, and also failing to re-contextualize the calculations to include the over 100 existing sites and how this changes probability, we reject the work offered in NUREG 2157 on fuel pool fires completely. We offer questions on this in the QUESTIONS attachment. NRC appears to have avoided the court’s order to assess the consequences of fuel pool fires; we do not accept the idea that low probability is the same as no consequence.

Financial Costs of Nuclear Waste Storage

Due to the absence of a viable repository program, the "Waste Confidence" GEIS assumes that irradiated fuel may be stored in temporary storage facilities indefinitely (or, in lay terms, possibly forever) and that “institutional controls” will remain in place to manage the waste safely for as long as that happens to be. NRC routinely justifies its institutional controls assumption by asserting that, to assume otherwise (i.e., that a similar waste management regime would not be maintained at some point in the future), amounts to wild speculation. However, not to even analyze the environmental impact of a different course of events is simply an exercise in constructing the study to support pre-determined conclusions. Despite this incredible confidence in the ability to manage waste in temporary storage facilities forever, NRC does not even bother to estimate the cost of doing so. Such costs are not trivial, even in the present-day United States of America, which is the wealthiest and most powerful nation-state in world history. Recent events demonstrate the folly of NRC assumptions, and the capriciousness of failing to analyze the costs of maintaining the presumed waste management regime.

During the public comment period, the government was shut down due to political conflict over the nation’s finances, and in addition a federal court blocked the ability of the government to generate revenue via the Waste Fund Fee to pay for the high-level waste storage program.

In the first instance, the willingness of a political faction to bring the very operation of the government to a halt over disagreements about the cost of its operations, the legitimacy of certain of those operations, and the levying of taxes to fund them is directly relevant to the reliability of institutional controls throughout the timeframes necessary to assure safe management of irradiated fuel without a repository or other permanent storage method. NRC's assumption that the repackaging and maintenance of irradiated fuel in dry storage facilities, indefinitely, forever, will not be subject to political conflicts – or will even be seen as politically relevant – one-hundred years or more in the future is wildly speculative and a manifestly unscientific assumption.

On November 19, 2013, the U.S. District Court for the District of Columbia ruled that the Department of Energy must discontinue the collection of fees from nuclear power reactor licensees for the purposes of funding the federal repository program. The court’s ruling was based on the department’s termination of the Yucca Mountain project and the lack of a credible cost assessment for the long-term management of commercial irradiated fuel without a viable repository project. This is, quite literally, the very situation envisioned in the Waste Confidence GEIS: the lack of a repository in which to permanently store irradiated fuel, forcing waste to be actively managed in temporary storage facilities indefinitely, forever.

The government presently has no statutory basis on which to generate funds for such a program, which means that the existing High-Level Waste Fund would continue to be expended until it is exhausted. It is irresponsible for NRC to neglect to acknowledge that the “institutional controls” necessary to manage irradiated fuel in temporary storage facilities indefinitely would require statutory funding throughout that time, and to fail to offer an explanation of the amount of those funds and where they would come from. The GEIS does not, could not and must address the impacts of the D.C. Court’s November 19th ruling, which included setting the Waste Fund Fee at zero, creating a significantly changed circumstance that was not considered by the GEIS.

This Generic Environmental Impact Statement is (as stated on page xxiii) on the “safety and environmental impact of storing spent nuclear fuel beyond the operating life for operations of a nuclear power plant.” NRC’s economic analysis is inadequate. The only economic analysis NRC carried out was a comparison of NRC’s cost of doing ONE generic EIS versus the cost of doing numerous site specific EISs at each location that applies for a license or license extension. Those analyses did not consider the consequences of contamination at the sites. Even more egregious is the fact NRC did not even estimate how much the actual waste management would cost yet assumed that there will be institutional control and recontainerization every hundred years into the future. No assessment is made about the likelihood and costs of institutional controls existing, of basic costs of the new casks, presence of necessary facilities for carrying out recontainerization, or the remedial action needed based on the condition of the fuel as it deteriorates over time. No assessment is done of the consequences of NOT recontainerizing into the future.

Water

The NRC contemplates that these pools may remain in use for 60 years after reactor operation ceases, where they will remain vulnerable to fires and also to leakage of tritium and other radioactive materials to soil and groundwater. The Union of Concerned Scientists has documented that 100 reactors in the USA already have leaks that threaten or have already caused ground water contamination. See: http://www.ucsusa.org/nuclear_power/reactor-map/embedded-flash-map.html .

While we appreciate the ground water disclosures in GEIS Section 3.7 (pages 3-16--3-20) there is no recognition in the that discussion of the long-term issues associated with locating 70,000 metric tonnes (and growing) of highly radioactive spent nuclear fuel on top of ground water for an unbounded period of time. Every site has ground water.

It is a violation of the National Environmental Policy to fail to answer these basic questions both generically and at each specific site. Adopting a generic waste confidence rule could prohibit in specific licensing proceedings, the opportunity to address groundwater contamination questions due to irradiated fuel. This is even more egregious when the generic draft EIS fails to even consider them, which is the case with this one.

Plutonium

NRC expressly excludes reprocessing of commercial nuclear waste and the reprocessing waste that results from this GEIS.^{xviii} Nonetheless, NRC has engaged in meetings considering new regulations specifically for licensing of reprocessing factories. NRC should not foster plutonium separation as a waste "management" option. NRC says it does not set policy, so NRC should stay out of the geopolitics of plutonium. We reject any promotion of the idea (by any party) that increasing the volume and destabilizing its form further in order to separate plutonium improves the confidence that this waste will not pose a threat to public health and safety. Plutonium separation is a direct threat to global stability and

liquid, caustic forms of this waste are worse than fragile fuel rods. We reject the idea that corporations should be allowed to use fission, or generate new or extract plutonium at all.

NRC Fails to Address, Communicate or Mitigate Real Hazards

NRC staff uses the GEIS to merely dismiss risks associated with the clear--and--present--dangers associated with the waste that has resulted from the licenses it has granted as "insignificant" or not "cost effective" to mitigate.

NRC has a long-term historical pattern of protecting its licensees rather than the public. In addition, the notion of "The Public" misses impacts to real people that occur on a daily basis. NRC must stop the policy of protecting its licensees from the outcomes of nuclear failures.

In addition to "risk" there is the matter of "significance." It is time that the significance of the impact of nuclear events be understood from the perspective of our communities. After the impacts and consequences of a potential event (like a fuel pool fire) are assessed, they should be disclosed, in full, without a risk or probability "factor" or modifier. Once a clear statement of the potential impacts and consequences (it may be a range) is done--and communicated, then it would be appropriate to communicate the probability / risk factors including the assumptions used, choices made, how the analysis was generated, how it would be applied. All of this should be fully disclosed in lay-person's terms so a that baby's mother can understand it. She may still not agree to accept the plan, but elected and appointed decision-makers have a right to know what, exactly, they are "signing-off" on if they choose to accept NRC staff's mortal calculations and assurances. If the terms "risk," "acceptance" and "significant" are defined solely by the NRC staff and its licensees, the so-called "protection" NRC offers will not be for the planet we live on; it will be pure fiction.

[The list of groups supporting these comments are below, and after that are a list of questions-- part of this official comment--that we want answered. End notes to the text above appear on the last page.]

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ATTACHMENT to be considered part of the group comment.

Questions We Want Answered

As stated in the text of our comments, the Draft GEIS violates NEPA and NRC regulations as well as UN principles and higher moral laws, such as the precautionary principle, and basic logic. To comply with these, NRC should answer the following questions.

Does NRC as an institution, and the NRC staff as an individual recognize the very real situation that it has created: material that would not be on this planet but for the licenses to engage in atomic fission that will persist as a hazard for hundreds of thousands of years, capable of causing cancers, deformities and other genetically--regulated malfunctions?

Do you understand that if there is a future reactor, the purpose of this GEIS is to ensure that the people who would be impacted by any fuel pool fire if their "number came up" will have no right to raise any concerns about that possibility during the licensing of that reactor?

What do you think your granddaughter would do? Go along with that?

Where has US NRC considered incorporation of the Principles of Precaution in its regulatory role?

Why does NRC report radiation risk based on documents that are not supported by real-world data?

What does NRC do to factor in disproportionate impact of radiation to various parts of the human life-cycle? Children? Unborn? Female? Elders?

How can the NRC GEIS have confidence in extended storage when the NRC and Department of Energy (DOE) have not completed their research on extended storage and transportation? The NRC does not have the research data (let alone the solutions) to analyze and validate the draft Generic EIS conclusions. The DOE has identified 94 critical technical data gaps in knowledge of "used" nuclear/irradiated fuel storage and transportation.[†] NRC and DOE extended storage and transportation research should be completed before the NRC completes their EIS.

How can the NRC GEIS have confidence in extended storage of high burn-up (>45 GWd/MTU) highly radioactive spent nuclear fuel when the NRC currently will not approve dry cask storage beyond 20 years[‡] for high burnup waste and won't approve transportation casks[§] for high burnup waste?

How long does high burn-up fuel have to be actively cooled in liquid?

How does burn-up impact the amount, rate and percentage of plutonium generated?

How about burn-up and the other transuranics (amount, rate, percentage)?

[†] DOE Review of Used Nuclear Fuel Storage and Transportation Technical Gap Analyses, 7/31/2012

<http://1.usa.gov/1bQr5xO>

[‡] Status of NRC Research on High Burnup Fuel Issues (Slide 7) Dr. Robert E. Einziger <http://1.usa.gov/15E8gX5>

[§] NRC Interim Staff Guidance 11, rev 3, Cladding Considerations for the Transportation and Storage of Spent Fuel <http://www.nrc.gov/reading-rm/doc-collections/isg/isg-11R3.pdf>

How does burn-up change the "biological effectiveness" (dose) of exposure to fuel particles?

How does a larger fraction of transuranics impact hazard (calculated for cancer and cancer death) from a major reactor, fuel pool, transport or storage accident?

How long do pyrophoric properties persist?

Are pyrophoric properties a function of time?

Are pyrophoric properties a function of burn-up?

What is the (total) probability in any given year of a fuel pool fire in the USA with 100 operable reactors? In the world?

What is the profile of hydride generation in dry storage?

Is there a correlation between hydride generation and burnup?

Is there a correlation between hydride generation and time?

Where is the analysis of the potential for groundwater impacts over time?

The GEIS discloses that tritium moves quickly, and other radionuclides more slowly, where is the analysis of the existing soil contamination over time?

Where is the projection for additional soil contamination?

Even if all reactors close, decommissioning has the possibility of creating more soil contamination. If reactor operations continue, likely the activities that created existing contamination will also continue. Where is that analysis?

How much so-called "Low-Level" radioactive waste is generated during changing dry casks over time?

If dry casks + recontainerization are used for the entire period that this waste will be a hazard, how long is that?

If dry storage and recontainerization is used, what is the likelihood that it will exceed the viability of our species?

How many reactor sites will be under water within the next 100 years using the current (credible) prediction for sea level rise?

How high would a "reference" artificial surface for waste storage have to be to be above a typical storm surge at that sea level given existing US reactor sites?

If you apply reactor-years to the probability assessment for fuel pool fire, what is the projected probability of a fuel pool fire SOMEWHERE in the USA during the period of existing nuclear licenses?

how will they babysit the wastes after the fossil fuels are gone?

and with a nod to the memory of Senator Joe McCarthy, do they have any shame?

ⁱ From Wikipedia: A **confidence trick** (synonyms: **confidence scheme** and **scam**) is an attempt to defraud a person or group after first gaining their confidence, in the classical sense of trust. A **confidence artist** (or **con artist**) is an individual, operating alone or in concert with others, who exploits characteristics of the human psyche such as dishonesty, honesty, vanity, compassion, credulity, irresponsibility, naïveté, or greed... A confidence trick is also known as a con game, a con, a scam, a grift, a hustle, a bunko (or bunco), a swindle, a flimflam, a gaffle or a bamboozle. The intended victims are known as "marks" or "suckers", and when accomplices are employed, they are known as **shills**.

ⁱⁱ Chernobyl: Environmental, Health And Human Rights Implications, Vienna, Austria, 12 - 15 April 1996 (Permanent People's Tribunal Session) January 1, 1999. Solange Fernex (Editor)

ⁱⁱⁱ Articles 3 and 6 in particular. http://www.ohchr.org/EN/UDHR/Documents/UDHR_Translations/eng.pdf

^{iv} See: http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf, particularly Articles 19 and 29 and 32.

^v See: <http://www.sehn.org/state.html#w> Most simply: **Do No Harm**; if there might be harm, then **Protect First, Study Second; Act Third**. If there is already (or could be) harm, those who advocate for the harmful practice are the ones who should pay the costs associated with preventing, reversing and redressing the harm **while conforming to 1, 2, and 3**.

^{vi} See oral comments by Michael Keegan, Don't Waste Michigan, and also: http://legal.un.org/ilc/texts/instruments/english/draft%20articles/7_1_1950.pdf

^{vii} National Academy of Science. Biological Effects of Ionizing Radiation (BEIR 1--7)

^{viii} ECRR--2010 Recommendations of the European Radiation Risk Committee: <http://www.euradcom.org/2011/ecrr2010.pdf>

^{ix} Moeller and Mousseau, 2012. The effects of natural variation in background radioactivity on humans, animals and other organisms. *Biological Reviews* Volume 88, Issue 1, pages 226–254, February 2013

^x Letter to Secretary General of the United Nations, November 2013: <http://www.nirs.org/fukushima/expert-ltr-bankimoon-09-2013.pdf>

^{xi} The TORCH report was published by Dr Ian Fairlie and Dr David Sumner on the 20th anniversary of what was then the worst nuclear power reactor accident in history. A summary that makes the relevant points (and link to download the full report is posted here: <http://www.chernobylreport.org/?p=summary>

^{xii} See NRC, 1990 Expanded Policy Statement on Below Regulatory Concern(risk table)

^{xiii} See Olson, Mary "Atomic Radiation is more Harmful to Women, posted with other materials: <http://www.nirs.org/radiation/radhealth/radhealthhome.htm> and "Healthy from the Start" campaign at Institute for Energy and Environmental Research: <http://ieer.org/projects/healthy-from-the-start/>

^{xiv} *Status of NRC Research on High Burnup Fuel Issues* (Slide 7) Dr. Robert E. Einziger <http://1.usa.gov/15E8gX5>

^{xv} NRC Interim Staff Guidance 11, rev 3, *Cladding Considerations for the Transportation and Storage of Spent Fuel* <http://www.nrc.gov/reading-rm/doc-collections/isg/isg-11R3.pdf>

^{xvi} Appendix A to CoC No.1029, Technical Specifications for the Advanced Nuhoms® System (Table 2.12) <http://pbadupws.nrc.gov/docs/ML0515/ML051520131.pdf>

^{xvii} NRC *Draft Waste Confidence Generic Environmental Impact Statement NUREG-2157*, September 2013 <http://pbadupws.nrc.gov/docs/ML1322/ML13224A106.pdf>

^{xviii} NUREG 2157 page xxv "ES.6 What is Not Covered in the Draft GEIS?"

The NRC is evaluating the continued storage of commercial spent fuel in this draft GEIS. Thus, certain topics are not addressed because they are not within the scope of this review. These topics include:

- noncommercial spent fuel (e.g., defense waste)
- commercial high-level waste generated from reprocessing
- Greater-than-Class-C waste
- foreign spent fuel stored in the United States
- nonpower reactor spent fuel (e.g., test and research reactors, including foreign generated fuel stored in the United States)
- need for nuclear power
- reprocessing of commercial spent fuel