Environmental Defense Institute

News on Environmental Health and Safety Issues

June 2021 **Volume 32** **Number 6**

Don't Be Fooled - Nuclear Promoter's Aggressive Federal Lobbying Will Hinder Real Renewable Energy Solutions

Because citizens and businesses outside the nuclear bubble do not want investment in nuclear, the nuclear promoters have focused on greasing federal handouts.

The nuclear promoters are good at claiming their technology is safe and affordable when the exact opposite is true.

The nuclear promoters work to unravel real solutions for clean energy and exaggerate the problems of energy storage while glossing over the devastating risks and unstated and largely unfunded disposal costs their nuclear technology poses.

Investment in nuclear energy diverts money from needed energy solutions.

Why isn't the U.S. government requiring that the cost of spent nuclear fuel disposal be estimated? The fees collected from past nuclear power plants won't even cover the cost of repackaging the spent fuel, should the technology for repackaging welded closed canister ever be developed. The U.S. Nuclear Regulatory Commission required that the spent fuel be retrievable from the welded closed canisters but in fact no technology to retrieve the spent fuel from a welded closed canister has yet been demonstrated. Other countries did not allow the welded-closed canisters to be used because of the unsolved technical challenges associated with removing the spent fuel from a compromised canister.

The nuclear industry refused to use the containers deemed by the U.S. Department of Energy to be appropriate containers for disposal. The design of so-called disposable containers has never been completed. The existing containers are not only too large to handle in a repository, the higher enrichment of fuel used in the nuclear industry means the control of criticality in the spent fuel canisters has become increasingly difficult to the point that in many cases, criticality is not preventable if water enters the canisters.

The U.S. Department of Energy has no spent fuel disposal program and hasn't since 2010. The DOE's submittal to the NRC for Yucca Mountain was incomplete and based on deceptive and fraudulent information concerning the time it would take for containers to corrode and the rate of migration of radionuclides in groundwater. Any critical examination of the DOE's submittal on Yucca Mountain is proof of the proposed repository's inability to isolate the waste in the short term or in the long term.

While many in the U.S. government talk about fiscal responsibility, they do not seem concerned about the trillions of dollars the GAO has ignored that it will take to continue *attempting to find solutions* to isolate spent nuclear fuel from the environment.

The immorality of shifting the financial burden of dealing with the radioactive waste should be reason enough to stop making more waste. The U.S. already has enough waste now or from expected continued operation, to need two Yucca Mountains. We don't have and may never have one Yucca Mountain repository. And to make a dent in energy usage, we would need a new Yucca Mountain repository every year.

The U.S. NRC has been more concerned with saving the electric utilities money than with safety or disposal of spent nuclear fuel. And yet, the nuclear promoters continue to press for *reduced* NRC review and oversight. Inadequate nuclear regulatory oversight led to the Chernobyl catastrophe [1] as well as the Fukushima nuclear catastrophe. [2]

In the U.S., NRC nuclear safety reviews meet schedule demands of the nuclear industry, but are not complete or adequate, as the recent NuScale review shows. The NRC's NuScale design review is being touted as though a license to construct the facility will be granted. But the NRC has specifically stated that it may chose not to grant a license to construct and operate the facility. The NRC's NuScale review left unresolved multiple issues that are key to safety and cost of the proposed small modular reactor project including the unique, unproven heat exchanger design that is likely to cause safety problems as well as cost overruns. [3]

What is at stake? Your health, your family's health, and the health of future generations exposed to the inhalation and ingestion of radioactive contamination.

Nuclear promoters continue to pretend that the Chernobyl catastrophe was not devastating to the health of millions of people, and I witnessed the deceptive and untrue Idaho National Laboratory propaganda myself. [4] According to a 2021 *Greenpeace* article, around five million people in Ukraine, Belarus and Russia still live in the radioactive contamination from the 1986

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[1] Zhores A. Medvedev, *The Legacy of Chernobyl*, 1990, W. W. Norton and Company, ISBN 0-393-30814-6. The nuclear regulatory officials not only permitted lax protocols for the planned test that caused the reactor to explode, the plant was granted a license to operate although known to not met stated requirements. The test that was conducted was part of a plan that was hoped to help remedy the known deviation from design requirements regarding vulnerabilities during a loss of commercial power transient. Naturally, the blame was placed on the operators at the plant, rather than the regulatory authorities.

[2] *The official report of The Fukushima Nuclear Accident Independent Investigation Commission*, 2012 at http://www.nirs.org/fukushima/naiic_report.pdf, Japan's regulatory authorities ignored information that tsunami heights would be likely to exceed what the nuclear plant could withstand.

[3] See the November 2020 Environmental Defense Institute newsletter article "U.S. Nuclear Regulatory Commission cautions that its recent NuScale approval does not mean NRC will approve a NuScale construction permit or an operating license." The NRC's approval of the design excluded approval for the steam generator tubes and other essential aspects of the plant. See all Environmental Defense Institute newsletters at http://www.environmental-defense-institute.org/publications/

[4] See the November and December 2019 Environmental Defense Institute newsletters regarding the Idaho National Laboratory's Chernobyl Talks at http://www.environmental-defense-institute.org/publications/

Chernobyl nuclear disaster. [5] These people constantly receive new doses of radiation. [6] [7] Cancer and leukemia are not the only adverse health effects caused by radiation exposure, although the nuclear industry largely ignores the other adverse health impacts.

Chernobyl contamination includes cesium-137, strontium-90, plutonium-238, plutonium-239, plutonium-240 and americium-241. [8] These radionuclides remain in significant amounts even though the Chernobyl accident was over 30 years ago.

Nuclear promoters continue to coverup the extent of the harm from U.S. nuclear activities from mining, milling, uranium enrichment, spent fuel fabrication, nuclear fuel reprocessing, nuclear research, nuclear power plant operation, and so-called low level radioactive waste disposal.

The environmental monitoring of radiological contamination in the U.S. is largely controlled by the long reach of the Department of Energy. Why are decades of gamma spectrometry results of aquifer water samples at the Idaho National Laboratory not available to the public despite extensive disposal of liquid radioactive waste into the aquifer from nuclear spent fuel reprocessing? Why did (and still do) so many of the U.S. Geological Survey reports omit known radionuclide contaminants that were present? Why are short-lived radionuclides from current Idaho National Laboratory operations falsely attributed to former nuclear weapons testing? Why does the U.S. Environmental Protection Agency RadNet monitoring have so many weeks of "blackouts" from Bremerton to Hanford to Idaho, even in recent years? [9] Why is the environmental monitoring in Idaho so lax near the US Ecology Grandview Idaho hazardous waste dump that takes radioactive waste, including "special nuclear material"(plutonium and enriched uranium)?

Needed human health studies are hampered by incomplete and often fraudulent radiological contamination reports. The US Nuclear Regulatory Commission decided to refuse to fund

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[5] Andrey Allakhverdov, *Greenpeace*, "Do we need a new Chernobyl?" April 23, 2021. https://www.greenpeace.org/international/story/47384/nuclear-do-we-need-a-new-chernobyl/

[6] The estimates for the number of cancer fatalities caused by the Chernobyl accident range from the Idaho National Laboratory's claim during its public meetings to dispel fears about the Chernobyl accident where they said that Chernobyl only caused the increase of a few thousand thyroid cancers and that thyroid cancer usually does not cause death. UNSCEAR, the U.S. Nuclear Regulatory Commission, the U.S. Department of Energy, and others made estimates of the cancer fatalities of less than 30,000 deaths (see Table 7.9 of the report in the next footnote). In contrast, the estimate by Yablokov and others in *Chernobyl: Consequences of the Catastrophe for People and the Environment* was that world-wide Chernobyl probably will cause an additional one million cancer deaths by 2004 (see page 210 of report in the next footnote). In addition to cancer and leukemia deaths, are the birth defects and increased rates of death from increased illnesses for exposed populations.

[7] Alexey V. Yablokov, Vassily B. Nesterenko, and Alexey V. Nesterenko, Annal of the New York Academy of Sciences, "Chernobyl: Consequences of the Catastrophe for People and the Environment," Volume 1181, 2009. http://www.strahlentelex.de/Yablokov_Chernobyl_book.pdf

[8] Evangeliou, N. *et al.*, *Nature*, "Resuspension and atmospheric transport of radionuclides due to wildfires near the Chernobyl Nuclear Power Plant in 2015: An impact assessment." *Sci. Rep.* **6**, 26062; doi: 10.1038/srep26062 (2016). https://www.nature.com/articles/srep26062

[9] See the March 2020 newsletter. See all Environmental Defense Institute newsletters at http://www.environmental-defense-institute.org/publications/

epidemiology studies near US nuclear power plants. The framework for the study was reported in "Analysis of Cancer Risks in Populations Near Nuclear Facilities; Phase I (2012). [10] After 5 years in planning for the study, the NRC decided it would take too long and cost too much. The NRC knows that a credible study would be the end of licensing new nuclear plants.

If you care about people and the planet and you care about affordable solutions for energy, you simply cannot promote more nuclear energy. If you care about the economic health of the U.S., you cannot promote more nuclear energy. Nuclear promoters continue to pretend that dealing with spent nuclear fuel is not a problem and describe the impending burden on future generations as "not urgent." Nuclear promoters continue to avoid discussing how much nuclear waste issues are going to cost and actually how ineffective and actually fraudulent much of the basis for their previous Yucca Mountain plans have been.

TerraPower, X-energy and NuScale speakers promote their reactors at the Idaho LINE Commission meeting

The Idaho Leadership in Nuclear Energy (LINE) Commission held a meeting on May 12 which could be listened to by phone. [11]

Senator Mike Crapo expressed his concern for excessive government spending for infrastructure, but it seems that the sky is the limit regarding spending on nuclear research. Also, he wants to help ease financing costs by making law changes to allow corporations to be taxed like partnerships.

All the costs associated with managing the cleanup and spent nuclear fuel from the reactor research and the trillions of dollars it is going to take to attempt to manage the spent nuclear fuel and high-level waste [12] the U.S. already has, however, is apparently of no concern.

The LINE meeting included several representatives who each gave glowing and vague descriptions of only the positive attributes of their nuclear reactor concepts. It was noticeable how many MIT grads were involved at the May 12 meeting with the objective of promoting all things nuclear.

The Department of Energy is promoting all nuclear reactor concepts, unwilling or unable to discriminate among the wide variety of competing designs. This will ensure spending the most

[10] See cancer risk study at nap.edu.

[11] Idaho Leadership in Nuclear Energy (LINE) Commission meeting held May 12, 2021. See the LINE website at https://line.idaho.gov/agendas-and-meetings/

[12] The meaning of "high-level waste" typically includes both spent nuclear fuel and liquid or vitrified or solidified waste resulting from nuclear fuel reprocessing in U.S. Nuclear Regulatory Commission documents but the U.S. Department of Energy tends to discuss spent nuclear fuel issues as distinctly separate from the wastes resulting from nuclear fuel processing which meet the definition of "high-level waste" or HLW but which the Department of Energy is loath to actually call "high-level waste," preferring instead to call it pixy dust or simply "low level waste."

money on design, research and fuel storage and disposal but it won't assure a successful outcome in terms of the reactors being safe or affordable.

The briefings to the LINE Commission are perfect for highlighting potential strong points of various designs but give virtually no attention to their many shortcomings in terms of safety, affordability and subsequent management of the spent nuclear fuel.

The reason for this is apparently that if people actually understood the costs and risks, then they would not be in favor of the research. The chummy atmosphere of the LINE Commission is one that encourages aggressively pushing for tactics and law changes **to grease the way for implementing only nuclear solutions to our energy problems**.

As a whole, the Idaho LINE commission is a frighteningly uninformed and untethered-from-reality organization that aims to aggressively promote nuclear energy no matter the cost or risk. Nuclear presenters at the LINE meeting do not face much scrutiny for the optimistic and unsubstantiated claims they make. The omissions concerning the problems of nuclear energy go largely unchallenged.

I recall that it was largely MIT grads that had incorrectly asserted about two decades ago, that the nuclear industry had figured out how to control costs by using more efficient and cost saving manufacturing approaches. They were wrong then as people in the two states in the U.S. building Westinghouse AP1000 light-water reactors found out. The folks in South Carolina pulled the plug on two partially built reactors after continued cost overruns. The folks in Georgia are still racking up the cost overruns.

The MIT grads speaking at the LINE meeting are making the same promises now for any future nuclear projects and I believe their accuracy is likely to be the same as it was before. But these folks demonstrated no qualms about making very optimistic statements about their nuclear technology, no matter the history or experience counter to their claims.

The Department of Energy is throwing money at sodium-cooled fast neutron reactor concepts by TerraPower and GE Hitachi; high-temperature gas-cooled reactors with TRISO fuel by X-energy and by the mysterious Oklo microreactor which became no less mysterious during the meeting.

The TRISO fuel, X-energy claims, won't release fission products but didn't discuss actual fission product releases from routine operation or accident conditions. TRISO fuel particles are made from a mixture of uranium carbide and uranium oxide. TRISO fuel was used in the U.S. Fort St. Vrain and the Peach Bottom nuclear reactors. Even if the fuel were more robust than fuel in conventional light-water reactors, the storage of TRISO high enriched fuel and its disposal is proven to be costly. And of course, the Fort St. Vrain gas-cooled nuclear reactor was a complete economic disaster and rarely operated because it was always needing repairs.

The spent nuclear fuel resulting from new research from X-energy TRISO fuel and other higher enriched fuels proposed for various small and microreactors **will require additional**

research for spent fuel container, transportation and disposal, according to a May presentation to the U.S. Nuclear Waste Technical Review Board. [13]

Most people don't understand the many gaps still existing for fuel contain, transportation and disposal analyses for existing U.S. spent nuclear fuel let along the additional problems each new type of fuel and changes in burnup create. It means years of study and no one wanting to pay for it. The U.S. Nuclear Regulatory Commission passes the responsibility off on to the Department of Energy, whose main concern is how to make more nuclear waste, not how to safely store, transport or dispose of it — that's not the sexy part of nuclear research. That's why six decades after recognizing the need to safely handle the back end of the nuclear fuel cycle, there's a great deal of money spent and still no long term solutions. The existing dry storage containers will likely require replacement before people figure out that there is no way to actually dispose of spent nuclear fuel in a way that won't eventually contaminate the planet's water, air and soil.

X-energy discussed having selected Washington state as the place to build, particularly since the state has aggressive goals for phasing out coal and gas. [14]

TerraPower wants to build sodium-cooled fast reactors at the INL. There is ample experience with the high risks and high costs of sodium-cooled reactors and it is a recipe for maximum spending, minimum reliability, and increased nuclear weapons material proliferation.

For more about X-energy, TerraPower, and other proposed nuclear reactors, see the Environmental Defense Institute website for May and February 2021 newsletters. [15]

NuScale did not discuss how its third selected site at the Department of Energy's INL site was proceeding after the first two carefully selected sites were deemed unworkable. The NuScale facility is particularly seismically vulnerable as its reactor modules are not coolable unless they remain vertical. The reactor modules share the same pool of water and the same overhead crane which will be frequently lifting reactor modules for installation and for refueling.

The presenter for NuScale stressed that the NRC had approved the reactor but he failed to acknowledge that the NRC has stated that the design approval was for an incomplete design, much of the design of the facility not having been completed and that the NRC has stated that granting a license for construction was not a given. See Environmental Defense Institute newsletter article "U.S. Nuclear Regulatory Commission cautions that its recent NuScale

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[13] Sylvia Saltzstein et al. (Sandia National Laboratories, Oak Ridge National Labs, Pacific Northwest National Laboratory, Argonne National Labs and Department of Energy Office of Nuclear Energy), Presentation: Accident Tolerant Fuel and the Back End of the Nuclear Fuel Cycle, U.S. Nuclear Waste Technical Review Board, may 12-13, 2021, Virtual Meeting. https://www.nwtrb.gov/docs/default-source/meetings/2021/may/saltzstein.pdf?sfvrsn=8

[14] Hal Bernton and Jom Brunner, *The Seattle Times*, "Clean power is now the law, Inslee signs bill for zero-carbon electricity by 2045," May 8, 2019. https://www.seattletimes.com/seattle-news/politics/inslee-signs-package-of-long-sought-climate-bills-that-include-a-phase-out-of-coal-and-natural-gas-fired-power-plants/

[15] See the May 2021 Environmental Defense Institute website newsletter regarding TerraPower, X-energy and other proposed nuclear reactors and see Table 1 for a summary of nuclear reactors currently receiving U.S. federal research funding at http://www.environmental-defense-institute.org/publications/News.21.May.pdf

approval does not mean NRC will approve a NuScale construction permit or an operating license" in the November 2020 newsletter. [16] The NRC's approval of the design excluded approval for the steam generator tubes and other essential aspects of the plant.

The topic of how to lessen the regulatory burden from the U.S. Nuclear Regulatory Commission was raised at the LINE meeting. The costs and time involved in licensing a new reactor is deemed to need Congressional to pressure the NRC to reduce.

Former U.S. Nuclear Regulatory Commission Chairman Gregory Jaczko describes his tenure as NRC Chairman in his book. [17] From Yucca Mountain licensing issues to the March 11, 2011 nuclear catastrophe in Japan began at the Fukushima Daiichi nuclear plant that was of General Electric, Toshiba, and Hitachi design, his book describes **an agency that is in no way an impartial arbiter of safety, but composed of NRC commissioners who practice a truckling subservience to the industry.**

Modifications are to be made to the INL's Experimental Breeder Reactor II (EBR-II) reactor dome in order for the facility to be used for microreactor testing, which would perhaps be deemed to be less than 20 megawatts-thermal. The INL's Materials and Fuels Zero Power Research Reactor (ZPRR) is also to be used for low power physics tests.

In summary, fictions parading as fact at the LINE meeting include: *nuclear reactors are safe and affordable, there's no worries about spent nuclear fuel costs for management and disposal, there's no need to think of future cleanup costs for the research, the use of batteries or other energy storage is an unacceptable way to manage intermittent clean power from solar and wind and therefore nuclear energy is required for baseload power, and regulatory requirements for licensing nuclear reactors need to be reduced.*

After listening to the LINE meeting presentations and discussions, I was ready and eager to provide public comment during the meeting's public comment time. Ultimately, although my phone was unmuted, I was unable to provide public comment as it appears that I had been muted on the Webex interface, which is not unusual – but someone other than me had to unmute me but did not. The LINE Commission appears willing to accept my written comments, however, which I have submitted to them. The comments and some additional information are posted on the EDI website at http://www.environmental-defense-institute.org/publications/May12LINE.pdf

Department of Energy INL Cleanup Status presented to the Idaho LINE Commission meeting

[16] See all Environmental Defense Institute newsletters at http://www.environmental-defense-institute.org/publications/

[17] Gregory B. Jaczko, Former Chairman of the U.S. Nuclear Regulatory Commission, *Confessions of a Rogue Nuclear Regulator*, Simon & Schuster, Copyright 2019. ISBN 978-1-4767-5578-6.

The Idaho Leadership in Nuclear Energy (LINE) Commission held a meeting on May 12 which could be listened to by phone. [18]

The meeting included a status on the cleanup project run by the Department of Energy with contractor Fluor Idaho for cleanup work at the Idaho National Laboratory. It was discussed that the COVID pandemic had slowed progress on the Integrated Treatment Waste Treatment Unit (IWTU), further delaying by about one additional year, initial treatment of the liquid sodium bearing waste resulting from spent nuclear fuel reprocessing. The DOE hopes that the problem plagued IWTU will start up in early 2022. The IWTU was supposed to have completed treatment of this radioactive liquid waste by December 2012.

The time it is expected to take for the IWTU to treat the waste, once the facility starts up, has also extended considerably. Rather than take one year to treat the waste, it is now expected that it will take many years to complete treating the radioactive sodium bearing waste after the initial hot startup. Radioactive air emissions will be released during treatment and the estimates of the releases will be based on limited experimentation early on in the initial runs. There are reasons for concern that later runs could be more highly laden with alpha-emitting radionuclides and that air monitoring in general will not represent what is actually released during treatment once the short-term monitoring for release characterization is completed.

After the liquid waste is treated at IWTU, it will require packaging for disposal. And it will require a radioactive waste repository for disposal of this waste, along with calcine high-level waste and the Department of Energy's and the nation's commercial spent nuclear fuel. The small detail of having no repository for either spent nuclear fuel or high-level waste and having no program to obtain one is rarely discussed by nuclear promotors and means that the most important Idaho Settlement Agreement milestones are not going to be met.

Regarding the Department of Energy's plan to dispose of the treated sodium-bearing waste from treatment in the IWTU, see the article below which discusses the containers that the DOE has procured for the treated sodium-bearing waste that are compatible with the Waste Isolation Pilot Plant (WIPP) in New Mexico which forbids spent nuclear fuel tank waste.

The cleanup status for shipments of transuranic waste drums is that shipment are hoped to be completed in 2028. The treatment of sludges is supposed to finish by the end of the year.

When asked, the Department of Energy said that no information about the upcoming cleanup contract change could be discussed other than to say a new cleanup contract is to be announced later this year. Potential impacts to the IWTU project that Fluor has been working on since it became the cleanup contractor and the potential for the new contract to be protested are recognized as concerns for the Department of Energy.

[18] Idaho Leadership in Nuclear Energy (LINE) Commission meeting held May 12, 2021. See the LINE website at https://line.idaho.gov/agendas-and-meetings/

U.S. Nuclear Waste Technical Review Board (NWTRB) issues April report understates the U.S. spent nuclear waste disposal problems

The U.S. Nuclear Waste Technical Review Board (NWTRB) has issued a new report titled *Six Overarching Recommendations for How to Move the Nation's Nuclear Waste Management Program Forward.* [19]

The report has some sensible recommendations and provides some hints as to the scope of the problems, but overall, the NWTRB has taken some myths at face value, first, that nuclear energy is beneficial and second, that the delivery of a repository license application by the Department of Energy to the Nuclear Regulatory Commission in 2008 logically means that the challenge can be met. But the stack of paper that made up the DOE's submitted license application to the NRC for the proposed Yucca Mountain repository is an incomplete, fictional, largely fraudulent and unworkable repository license application that adds to the evidence that the Department of Energy does not know how to solve the nuclear waste problem.

Regarding the liquid nuclear reprocessing sodium bearing waste at the Idaho National Laboratory, the NWTRB report does point out that the Department of Energy has procured containers for the dried waste that will result from operating the Integrated Waste Treatment Unity (IWTU). The containers are tailored for the Waste Isolation Pilot Plant (WIPP) in New Mexico even though WIPP has specifically prohibited by law any former tank wastes resulting from nuclear fuel reprocessing. This unlawful act comes after years of conflict with New Mexico and the Department of Energy's unrelenting pressure for WIPP to accept the treated sodium-bearing waste.

The Department of Energy has also expressed its desire to dispose of the calcine waste and all of Hanford's vitrified high-level waste as well as all of the Navy's spent nuclear fuel at WIPP. It should be noted that two above ground "interim" parking lot spent fuel storage facilities are being pressed for NRC to license, each within 40 miles of WIPP.

The proposed but never granted a license-to-construct Yucca Mountain spent nuclear fuel and high-level waste repository, which is less than half the size needed, has not been funded since 2010. The Department of Energy also has stated it may dispose of surplus plutonium at the repository, which has not been funded since 2010.

The Department of Energy has had to cease collecting fees from nuclear utilities for waste disposal because it has no program for waste disposal — or for obtaining waste disposal spent nuclear fuel containers — or for spent fuel repackaging facility.

The Department of Energy has continued to research some disposal concepts but no decision as to rock type has been chosen. Moreover, recent studies have shown that criticalities after

[19] U.S. Nuclear Waste Technical Review Board (NWTRB), S*ix Overarching Recommendations for How to Move the Nation's Nuclear Waste Management Program Forward,* April 2021. https://www.nwtrb.gov/our-work/reports

waste emplacement are going to be unavoidable. So, the Department of Energy will just have to convince everyone that multiple criticalities in spent nuclear fuel repositories are not a problem.

The wide diversity of types of and condition of spent nuclear fuel greatly complicates analysis of waste package degradation and radionuclide migration. Higher enrichment fuels greatly increase the likelihood of criticality events before or after closure of a disposal facility. No where else in the world is there a wider variety of spent fuel and high-level waste forms that need disposal. And with all the work to be done to address existing spent nuclear fuel and high-level waste, the Department of Energy wants to accelerate how much spent nuclear fuel is being made while actively ignoring how much money it is going to cost to manage, store and hopefully, someday, dispose of it.

The Nuclear Regulatory Commission has always put the electric utilities economic interests ahead of safety and the NRC approved dry storage designs for spent nuclear fuel that, despite NRC regulations requiring the spent fuel to be removable from the canisters, in reality no one knows how to remove the spent fuel from these welded-closed canisters.

Understanding the chemistry of a repository and the corrosion of the spent nuclear fuel and waste container is not something the Department of Energy can do well, for periods of decades and a repository is supposed to keep the waste isolated for, roughly speaking, about one million years.

While the NWTRB report does say "the enormity of the challenge cannot be overstated." the report's overall tone is just that the Department of Energy just needs to be better integrated and transparent. The NWTRB just isn't going to accuse the Department of Energy of fraud, no matter the evidence of that in DOE's repository license application to the NRC. The State of Nevada was paying attention to the fraudulent corrosion studies and fraudulent water migration studies.

The NWTRB report points to the funding problems but omits discussing just how wildly expensive continuing to seek a repository is, even if the attempts continue to fail. The amount of money collected from electricity rate payers won't even pay for repackaging the spent fuel into disposal containers, let alone transport the spent fuel and build two or more repositories.

The NRC's former chairman, Allison Macfarlane, as I interpret what she is actually saying in the book *Uncertainty Underground* [20] is that the prediction of repository performance over these long time-frames is so speculative and uncertain that all the nuclear industry can actually do is

[20] Edited by Allison M. Macfarlane and Rodney C. Ewing, *Uncertainty Underground – Yucca Mountain and the Nation's High-Level Nuclear Waste*, The MIT Press, 2006. ISBN 0-262-13462-4. Chapter 14 by Lynn W. Gelhar, *Containment Transport in the Saturated Zone at Yucca Mountain*. He concludes that the DOE calculations "could easily be three orders of magnitude larger than the DOE predicts (see figure 14.3). Figure 14.3 shows radiation dose versus time with the dose peaking after 10,000 years from closure. The DOE prediction was from 2001, DOE/RW-0539. Gelhar also points out the looseness of the EPA's standard "that probabilistic results be interpreted by applying the numerical standards to a "reasonable expectation" prescribed to be the mean is troubling." Figure 14.3 shows DOE's model yielded 95th percentile doses above 1000 mrem/yr after 100,000 years.

compare potential sites and based on whatever criteria they want, just pick one. It can be argued that this will be better than just leaving the spent fuel above ground all around the country. Just say there are "multiple barriers" and imply that everything will be fine for a long time or at least until the project managers have retired.

The U.S. NWTRB, through its understatement, is providing a smoke screen for the Department of Energy and the nuclear industry, as much as it is pointing out technical deficiencies. This mess is a mutation-causing, cancer-causing, planet-poisoning genocide in the making — and the report will be used to warn citizens that they are being anti-science if they have any concerns about nuclear energy.

Read more about the nuclear industry's spent nuclear fuel waste storage disposal problems in the December 2020, January 2021, February 2021 and March 2021 Environmental Defense Institute's newsletters. [21]

NRC Requests Additional Information from Holtec Regarding Proposed Interim Spent Fuel Storage in New Mexico

The U.S. Nuclear Regulatory Commission staff issued its second request for additional information from Holtec, concerning Holtec's proposed HI-STORE Consolidated Interim storage Facility in Lea County, New Mexico. [22]

The NRC is requesting additional information concerning the calculations for the spent nuclear fuel dry storage facility. The issues range from calculations to support seismic analyses, support for flooding assumptions, support for weld quality requirements, to why oil drilling or potash would not be conducted on the Holtec site.

The spent nuclear fuel canisters require air circulation and the vents to the individual concrete pits where each canister is stored used a very non-conservative average temperature (62 F) when for three months of the year the average would be 93 F and maximum would be 108 F.

[21] Environmental Defense Institute's newsletter articles: December 2020: "Yucca Mountain, it's not the uncertainty – it's the pervasive lack of scientific integrity," "Devil in the details of the Standard Contract with the Department of Energy under the NWPA," and "The last 10 years of repository research shows that the criticality issues are a problem, especially for direct disposal of spent nuclear fuel canisters." January 2021: "The NRC Required Canistered Spent Nuclear Fuel To Be Retrievable – But It Isn't and Prevalent Canister Storage Poses Huge Safety Risks as Well as Higher Disposal Costs," and "Spent Nuclear Fuel Canister Breaches – The Potential Radiological Releases are Too Scary for the NRC to Admit." February 2021: "IN provides marketing propaganda for TerraPower (and X-energy) and no mention of safety and waste disposal problems," and "Existing spent nuclear fuel, including commercial SNF at the Idaho National Laboratory on track to miss Idaho Settlement Agreement milestones." March 2021: "Department of Energy sticking to the misleading characterization that the nation's spent fuel could fit on a football field," "Department of Energy Already Needs Two Spent Fuel Repositories and Would Need a New One Every Year, If Nuclear Energy Were to Make a Difference for Climate," and "Another Elephant in the Room: The Costs and Risks of Continuing Spent Fuel Storage."

[22] The NRC staff's letter may be viewed under ADAMS Accession Number ML21124A308, or the following link: https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML21124A308

But no matter how technical these issues are, nor how convenient Holtec's assumptions have been, I still expect the NRC to accept any hogwash Holtec provides as a response.

The NRC has written regulations to excuse Holtec from realistically addressing the likelihood and consequence of canister breaches.

Canister breaches from chloride-induce stress corrosion cracking which are known to occur within 20 years of chloride exposure, and to which many of the coastal canisters are known to be exposed to is not required by NRC regulations to be realistically addressed. So don't expect the NRC to request information regarding the most serious inadequacies of the Holtec's *safety* analysis.

The radionuclides blowing in the wind will not be adequately monitored and it will ruin more than the health of citizens, it will also ruin their economies because of the radiological contamination.

There will be hundreds if not thousands of spent fuel canisters exposed to the environment for who knows how many decades. The nuclear industry does not have a spent nuclear fuel repository to send the spent fuel to. And the U.S. NRC although requiring spent nuclear fuel in the canisters to be retrievable has admitted that no one knows how to repackage the spent fuel if it is in a compromised canister or if it needs to be placed in a disposable canister.

The radiological release from just one canister is going to forever change the region around the proposed interim storage facility. The spent fuel canisters will corrode and it is not a matter of if — it is a matter of when. Read more about canister breach consequences on the Environmental Defense Institute website. [23]

Articles by Tami Thatcher for June 2021.

[23] Environmental Defense Institute's newsletter articles: January 2021: "The NRC Required Canistered Spent Nuclear Fuel To Be Retrievable – But It Isn't and Prevalent Canister Storage Poses Huge Safety Risks as Well as Higher Disposal Costs," and "Spent Nuclear Fuel Canister Breaches – The Potential Radiological Releases are Too Scary for the NRC to Admit.""