

Environmental Defense Institute

News on Environmental Health and Safety Issues

January 2023

Volume 34

Number 1

Recap of the egregious safety shortcuts at the Los Alamos National Laboratory for heat source Pu-238 and weapons pit production

The Defense Nuclear Facilities Safety Board held a meeting on November 16 on legacy cleanup, on existing heat source plutonium (Pu-238) for space missions, and on increased nuclear weapons pit production at the Los Alamos National Laboratory (LANL) in New Mexico.
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The Defense Nuclear Facilities Safety Board asked direct and important questions regarding nuclear safety issues at LANL of the National Nuclear Security Administration (NNSA), the Field Office and its contractors at LANL who were panelists at the November 16, 2022 hearing.

Ongoing delays in 10 CFR 830 compliant documented safety analysis, performing needed safety upgrades and the recent retraction of previous commitments for safety upgrades at the LANL plutonium facility known as PF-4 were among the topics of the hearing.

The “documented safety analysis” (DSAs) are the analysis for Department of Energy nuclear facilities and are relied upon to protect workers, the public and the environment.

Regarding the status of documented safety analyses and safety upgrades at LANL, the panelist’s responses can be summed up as, “we are being very thoughtful and working very hard,” “it’s costly to make safety upgrades,” “it’s a difficult time now, in the U.S. for construction projects,” “surprises, are by definition, surprises,” and “there’s nothing we would rather do than meet all the requirements...” Unstated is that NNSA will not be attempting to meet the requirements deemed needed for protection of the offsite public.

Some improvements to the plutonium facility at LANL, known as the PF-4 facility, have apparently been made such as improvements to the building structure to prevent its collapse in a seismic event.

Specific gloveboxes that handle molten materials were seismically upgraded so that these gloveboxes would not topple over in a modest seismic event. **But other gloveboxes were not**

¹ Defense Nuclear Facilities Safety Review Board website at dnfsb.gov, November 16, 2022 meeting on the Los Alamos National Laboratory, see meeting agenda, videos, exhibits for cleanup and increased pit production and other information on the dnfsb.gov webpage <https://www.dnfsb.gov/public-hearings-meetings/november-16-2022-public-hearing>. As of November 30, 2022, no meeting transcripts had been provided yet. Announced during the meeting but not on the website, public comment is allowed until December 16, 2022 to hearing@dnfsb.gov

made seismically capable of withstanding even modest Performance Category 2 seismic events.

Safety upgrades identified as needed at PF-4 since 2009 continue to be delayed or eliminated completely from project planning.²

I think there is reason to believe the delays in providing needed nuclear safety upgrades at PF-4 may continue beyond the now-stated 2026 timeframe (See Exhibits for the NNSA session, particularly Exhibit 30.) And I see the elevated risks to the public and to workers from LANL's PF-4 as unacceptable. The permanent loss of lives and homes due to a large radiological release from PF-4 could be the result if NNSA's shortcutting safety prevents an accidental release of radionuclides from the facility. Large radiological releases to the offsite public are unacceptable. Large as well as lesser accident conditions will likely result in unacceptable worker intakes of radionuclides as well.

The panelists tended to deflect DNFSB questions and to defend the slow progress on safety upgrades and the retraction of previously planned upgrades to the confinement ventilation system.

There may be "lots of other things LANL is doing" for safety, but the panelists did not coherently explain what these things were or what the present status of these upgrades was at the time of the hearing. The Department of Energy nuclear safety regulations do not require a coherent assessment of facility accident risk.

Over two decades ago, in January of 2001, the Department of Energy's Code of Federal Regulations 10 CFR 830, "Nuclear Safety Management" for Department of Energy nuclear facilities. DOE nuclear facilities were to have submitted a compliant nuclear safety basis to DOE by October 10, 2001. And these submittals were to include all types of facilities accidents, including seismically induced accidents and other natural phenomena hazards specific to the location of the facility.

And although many submittals were later than October 2001, LANL is setting records in tardiness in completing upgraded "documented safety analysis" for LANL's plutonium facility, PF-4 (as well as LANL's cleanup operations).

The Department of Energy documented safety analysis process can become focused on searching for ways to excuse themselves from making safety improvements and ways to avoid the inconvenience and cost of making safety improvements to mitigate accidents and prevent significant offsite radiological releases.

At LANL, even now, in 2022, the analysis to obtain a desirable building leak path factor for PF-4 remains an ongoing effort at LANL. The objective is to achieve the lowest offsite public

² Los Alamos National Laboratory, *SSUP* [Safety System Upgrade Project] *Project Implementation Plan*, Revision 0, Los Alamos National Laboratory, Los Alamos, NM, March 2009

dose by “pencil whipping” the problem to claim that the offsite dose to the public is below 25 rem.

When it is discovered that an accident at a DOE nuclear facility is more likely to occur or would have worse consequences than previously stated in the approved documented safety analysis, this is called a “Potential Inadequacy in the Safety Analysis” or PISA.

There have been two dozen PISAs associated with LANL’s cleanup operations. The LANL cleanup operations documented safety analysis has still not been upgraded to meet the 10 CFR 830 regulations issued two decades ago. Excuses that the older safety analysis are adequate yet just not “modern” display ignorance of the importance of adequate documented safety analyses to protect workers, the public and the environment.

The philosophy that rigorous “Integrated Safety Management” of work processes would compensate for the inadequate nuclear safety basis or documents referred to as “documented safety analysis” or DSAs **was proven ineffective** at the Idaho National Laboratory’s Materials and Fuels Complex in 2011.

The accident at the Idaho National Laboratory on November 8, 2011 at the Materials and Fuels Complex (MFC), at the Zero Power Physics Reactor (ZPPR) where defective plates were handled in a malfunctioning fume hood, involved the DOE-approved yet inadequate documented safety basis for the facility.³ DOE had declared that rigorous “Integrated Safety Management” would compensate for the inadequate safety documentation but in fact the inadequate safety basis documentation was used as a rationale for not putting needed worker protections in place.

At INL’s MFC, the documented safety analysis that was known to not meet the intent of 10 CFR 830 but this documentation was used and in fact relied upon to train workers and nuclear facility management. And the technically indefensible safety basis was effective in providing false reassurance to workers and work planners and radiological control personnel.

When these DOE nuclear facilities take years or decades to attempt to upgrade their documented safety analyses, why would DOE expect that adequate nuclear safety expertise would somehow become abundantly available for ad hoc work planning?

But this assumption was repeated at the DNFSB November 16 meeting, the assumption that rigorous Integrated Safety Management (or work planning that requires identifying and mitigating the hazards) would save the day and compensate for the inadequate nuclear facility documented safety analysis.

At the INL’s MFC, some accidents were documented incorrectly as being “extremely unlikely” that actually were “anticipated” events and were actually even more likely “expected”

³ U.S. Department of Energy Office of Health, Safety and Security Accident Investigation Report, *Plutonium Contamination in the Zero Power Physics Reactor Facility at the Idaho National Laboratory, November 8, 2011*, January 2012. See page 14, page E-6, and E-8.

events.⁴ Yet, events deemed “extremely unlikely” were a rationale for work planners to ignore the worker safety mitigations for the accident, although likely other factors were involved.

At INL, technically indefensible calculations that underestimated the potential accident radiation doses also can and did mislead facility managers as well as work planners at INL’s MFC for handling plutonium materials.

So, it is deeply troubling to hear LANL’s cleanup contractor defend the lack of updated documented safety bases or DSAs because they assume that rigorous Integrated Safety Management processes will compensate for the, now two decades of failure, to provide safety analysis for cleanup operations that meet the intent of 10 CFR 830. Certainly, Integrated Safety Management is essential, but it may not compensate for errors and deficiencies in the older safety analyses.

At LANL, the plutonium handling facility, PF-4, is expected to increase operations and staffing for weapons pit production, continue heat source plutonium (Pu-238) operations for defense and space missions, and other plutonium research, **despite significant difficulty hiring and retaining workers.**

At PF-4, safety deficiencies were certainly recognized by 2001, although a detailed plan was not published until 2009.⁵ The safety upgrades are needed to protect the offsite public from a large airborne radiological release that would exceed 25 rem. Worker safety was not mentioned at the November 16 public hearing, but would also be affected by the inadequate documented safety analyses for cleanup of transuranic waste operations as well as PF-4 operations.

The heat source Pu-238 is used for National Aeronautics and Space Administration (NASA) missions and defense missions.⁶ The plutonium glovebox work for the heat source (Pu-238) creates the risk of very high radiological releases to the offsite public and was stated in the hearing on November 16, 2022 as posing the offsite public radiation dose **roughly 200 times higher than for weapons pit production.**

An August 2022 letter from the DNFSB to DOE states that the National Nuclear Security Administration (NNSA) has accepted **the extraordinarily high mitigated offsite dose consequences range from 490 to 3175 rem, via the “exigent circumstances processes.”** Typically, radiation doses above about 400 rem are considered lethal. Vast areas would become

⁴ Typically, in nuclear facility safety analysis, an “anticipated event” is deemed less likely than 1-in-100 years.

However, an “expected event” would be deemed less likely than 1-in-10 years recurrence interval. The important distinction between an anticipated event and an expected event, however, is not required by the Department of Energy.

⁵ Defense Nuclear Facilities Safety Board letter to the Department of Energy, Secretary James Richard Perry, dated November 15, 2019, which transmits the DNFSB Staff Report “Safety Basis for the Plutonium Facility at Los Alamos National Laboratory,” August 16, 2019, at DNFSB.gov

⁶ Defense Nuclear Facilities Safety Board letter to the Department of Energy, Secretary Jennifer Granholm, dated August 11, 2022, which transmits the DNFSB Staff Report “Receipt and Repackaging of Large Amounts of Heat Source Plutonium at the Los Alamos National Laboratory Plutonium Facility,” May 27, 2022, at DNFSB.gov

permanently uninhabitable and citizens will die because of the extraordinary and irresponsible lack of adequate safety mitigations.

Again, let me emphasize, that the mitigated offsite dose consequences far exceed 25 rem and range from 490 to 3175 rem for certain heat source Pu-238 operations at PF-4.

The true horror of the extraordinarily high radiological risks from radiological releases to the offsite public that may far exceed 25 rem from PF-4 operations that the NNSA is accepting at LANL was not made clear during the meeting.

New Mexico's citizens are being offered excuses by NNSA that appropriate safety class and seismically capable nuclear safety systems are too expensive and too difficult to construct, especially now.

The slipping of the schedule to complete needed safety upgrades was mentioned at the November 16 hearing, but the extent that this has been going on for over a decade and actually for at least two decades was not emphasized enough.

Why hasn't the Department of Energy or the National Nuclear Security Administration (NNSA) complied with the intent of DOE regulations? Because it is costly and inconvenient to provide appropriate protection of workers and the offsite public.

And importantly, because they can choose to not comply. These agencies are not being made to comply with their own regulations. Yet, they continue to parade these regulations in documentation such as is included in Environmental Impact Statements for NEPA and it is implied that these agencies actually comply with these regulations rather than exempt themselves from complying.

Rather than comply with 10 CFR 830 for Department of Energy nuclear facilities and meet the intent of these regulations to protect the offsite public, DOE and/or NNSA have invoked the "exigent circumstances processes." At PF-4, rather than ensure the offsite public dose remains well below 25 rem, they are accepting the offsite public dose **consequences range from 490 to 3175 rem. Despite the mitigated radiation doses to the offsite public being far above 25 rem, they are refusing to upgrade the confinement ventilation system. They are also refusing to implement meaningful and enforced combustible loading limits and by reducing the amount of material at risk, the grams of material in vulnerability storage or processes, to reduce the risk.**

At LANL, year after year, and actually for at least two decades, needed safety upgrades to protect the public have been talked about but very few changes made. There have been improvements to the seismic capability of the PF-4 building and to certain gloveboxes, but only to the glove boxes that handle molten material.

At LANL, completion of the improvements to the fire suppression system has been delayed to 2026 (see Exhibit 30 for the hearing). Completion of efforts to address aging components for the ventilation system have also been delayed to 2026 (also see Exhibit 30).

Despite some seismic bracing for some gloveboxes at PF-4, many, probably most gloveboxes at PF-4 remain vulnerable to seismic events because they are not seismically braced. And some of these gloveboxes handle powders or solutions of material.

The amount of material at risk, or MAR, is the amount of radiological material that is handled and can be involved in an accident leading to airborne release. And the NNSA has approved very large amounts of material at risk that will be allowed to be handled and in vulnerable conditions, despite the gloveboxes not being seismically braced and the fire suppression system not being seismically capable and the confinement ventilation system not being safety class or seismically capable.

And the DNFSB points out that even the relatively easy measures to help reduce the offsite public dose consequences were not taken. These measures include specific, meaningful and enforced combustible loading limits that were not put in place for high hazard heat source plutonium (Pu-238) work. These measures also include limiting the amount, (grams or curies) of material-at-risk allowed in unsafe configurations and this would have reduced the offsite public dose consequences but also were not put in place at PF-4.

The years of delays in making needed safety upgrades to protect workers, the offsite public and the environment display an erroneous LANL and NNSA group think that seismic events and other accidents won't happen. Or is it related to a perverse discounting of the true harm to people's health and lives from these events?

While building structural improvements are said to have been made to LANL plutonium facility, known as "PF-4," the Department of Energy allows meeting seismic performance category 3 (PC-3) for non-reactor facilities. The actual amount of plutonium that could be released and high likelihood of an accident at PF-4 would actually require, by technically appropriate rationale, meeting the more stringent seismic performance category 4 (PC-4) required of nuclear reactors.

And in reality, much of the equipment in LANL's PF-4, both safety related and non-safety related, it appears, will likely not survive a small PC-2 seismic event. And non-safety equipment that falls may be able to degrade the performance of safety equipment.

During the November public hearing, the status of safety upgrades and prudent safety controls was not always clear. Certain upgrades may be in progress but yet not be slated to be completed until 2026.

At PF-4, remaining safety upgrades include needed fire barriers, fire sprinkler lines, and the removal of firewater lines to buildings that are not non-seismically capable of PC-3 events. The upgrade of fire suppression system power supplies from diesel generators and their often-deficient fuel supply lines, is also apparently needed.

At PF-4, it has long been known that many gloveboxes still need safety upgrades for seismic restraint (rated to PC-3), including gloveboxes containing liquid solutions of plutonium and powders and other forms. But it is deemed too inconvenient to upgrade the gloveboxes.

And at PF-4, remaining safety upgrades for the confinement ventilation system are needed, but may never be performed. If there was ever a DOE facility that needed a safety class confinement ventilation system, LANL's PF-4 is such a facility because (1) of the far greater than 25 rem offsite dose without it and (2) there are about 1000 workers in PF-4 now and that number is expected to grow.

What is at stake if PF-4 has a large release of airborne radionuclides? The meaning of even a 25-rem dose to the offsite public may sound benign to some people. The 25-rem guideline was the level at which, when exceeded, safety class mitigations would be expected to be implemented. With a plutonium-239 or plutonium-238 inhalation dose of 25 rem to the offsite public, the amount of release is enormous. And the contamination, practically speaking, will never be remediated.

The radioactive half-life of Pu-238 is far less than Pu-239. However, both of these radionuclides decay through many additional decay progeny before eventually becoming non-radioactive lead. In the case of Pu-238, once it decays to uranium-234, the tendency is for DOE to ignore it and assume it is from naturally occurring uranium-238 decay. Environmental monitoring programs may monitor Pu-238 but DOE or state programs typically do not monitor airborne radium or radon or thallium or lead levels. Yet, these radioactive particles are still harmful.

If the new employee training is half as effective as described by Dr. Thom Mason, Laboratory Director, Triad National Security, LLC, for the PF-4 facility during the DNFSB public hearing on November 16, at helping workers not be pressured to perform work unsafely, perhaps NNSA Administrator Jill Hruby and NNSA Associate Principal Deputy Administrator James McConnell should be required to attend those classes.

It is clear to me that Hruby is succumbing to Department of Defense pressures to continue the two decades long tradition of egregiously inadequate protection of workers and the public from LANL radiological releases, particularly at the plutonium facility, PF-4. McConnell is among those who approved the "exigent circumstances" provisions to allow immorally and obscenely high radiological offsite public doses, far exceeding 25 rem, from accident radiological releases from PF-4.

Sacred lives and sacred land are poised to be lost, by the mistakes of managers who by now should know better. See the complete public comment submittal by Tami Thatcher on the LANL meeting on the Environmental Defense Institute website ⁷ and the December 2022 Environmental Defense Institute newsletter.

⁷ Public Comment Submittal from Tami Thatcher to the Defense Nuclear Facilities Safety Board (DNFSB) Regarding the Public Hearing on Los Alamos National Laboratory held in Santa Fe, New Mexico on November 16, 2022, at <http://www.environmental-defense-institute.org/publications/CommentDNFSB2022.pdf>

Zero funding for the Versatile Test Reactor, the proposed test reactor that only uses electricity and does not generate electricity

Once again, Congress provided no funding for the Department of Energy's Versatile Test Reactor, a proposed sodium-cooled test reactor at the Idaho National Laboratory, that would test materials but would not generate any electricity.

While the Department of Energy announced in May 2022 that they had selected the Versatile Test Reactor (VTR) as the design to be built at the INL, Congress did not provide funding for the project in 2022 or 2023. The VTR, if built, will be too late to aid any new reactor designs.

The VTR would be a 300 mega-watt-thermal reactor that requires electricity to prevent the liquid sodium from solidifying. The VTR would be a pool-type, sodium-cooled reactor prone to sodium fires. The reactor would use a uranium-plutonium-zirconium metal fuel. The design is called "evolutionary" as it mainly relies on previous designs (some never built) but also requires many changes. The VTR is said to be based on the General Electric Hitachi's PRISM small modular reactor, which has never been built.

The VTR has been deemed necessary to modernize US nuclear research and accelerated advanced nuclear fuels, material, instrumentation, and sensors. Yet, it would never be designed and constructed in time to aid to construction of reactors in time to help with climate change.

The VTR, however, would allow testing similar to the materials testing conducted for naval submarines and carriers, although at fast reactor spectrums rather than the slow or thermal neutron spectrum available at the Advanced Test Reactor. The test specimen maximum length would be from 0.6 to 1 meter in length, similar to the ATR test specimens.

The VTR was said to cost about \$ 6 billion to construct. Given the nuclear industries and particularly the Department of Energy's track record, those costs can be expected to balloon. In addition, the cost estimates typically cited do not include decommissioning costs or the costs of forever storage and/or disposal of the spent nuclear fuel produced.

The Department of Energy has no spent nuclear fuel disposal program. It continues to seek welcoming communities for the indeterminate interim storage above ground in inadequate storage containers that will fail or require repackaging many times, long before the radioactive waste has decayed away. The decay heat generated from spent nuclear fuel can largely decay away within a few hundred years; however, the radioactive decay of uranium, plutonium and other radionuclides, even though having less overall decay heat produced, still produce radioactive decays for more than hundreds of thousands of years. This material is harmful to human health and all life when inhaled, ingested or absorbed. Despite the best guess that a deep underground repository seems the best way to at least delay its release to the environment, there is no known technology that will reliably isolate this radioactive spent (or partially used) nuclear fuel from the biosphere.

To build electricity generating sodium-cooled reactors, such as the TerraPower's Natrium sodium-cooled reactor, is to invite nuclear disaster.

The high plutonium content of the fuel makes safety, transportation and disposal especially problematic.

The DOE wants us to believe its many assumptions and assertions about the accident risks posed by the project. Buried in the EIS document it does admit that if the VTR has a bad day, “the consequences can be in the hundreds or thousands of rem to the public...”⁸ But trust us, they say, that is “beyond extremely unlikely.”

The VTR will produce spent nuclear fuel beyond the 2035 deadline for removal of spent fuel from Idaho. The EIS says that the Department of Energy would explore possible approaches with Idaho regarding that issue. The fact is that the Department of energy has no program for the disposal of spent nuclear fuel.

There is no place for the spent nuclear fuel already stored at the Idaho National Laboratory to be sent in 2035, the 1995 Idaho Settlement Agreement date for removing spent fuel from the INL. There is not even a repackaging facility for repackaging the existing spent fuel at the INL to meet the 2035 deadline, if a storage or disposal area were available.

The Idaho Falls Post Register reported that Assistant Department of Energy Secretary Kathryn Huff claims that the VTR will help fight against climate change.⁹ But this is completely untrue. The VTR will not be designed and constructed before it is too late to address climate concerns.

The U.S. Nuclear Regulatory Commission is paving the way toward licensing above ground temporary solutions for storing waste, all without having any disposal solution. And all without addressing the large airborne radiological releases that will occur when the spent nuclear fuel canisters degrade over time. Chloride-induced stress corrosion cracking of canisters can occur within a few decades, as short as 20 years after loading fuel into the canister, and there is currently no way to confine a degraded canister or replace or repair a degraded canister containing spent fuel.^{10 11}

⁸ Excerpt from VTR EIS, Appendix D, page D-74, Section D.4.9 Versatile Test Reactor Beyond-Design-Basis Reactor Accidents, “By design, the VTR is able to withstand a wide range of accidents. Most events that could affect safe operation of the VTR are mitigated by the VTR design. This section addresses potential beyond-design-basis accidents that have the potential for high consequences even though the probability is very low (1×10^{-6} to 1×10^{-8} per year). These accidents represent events in which the consequences can be in the hundreds or thousands of rem to the public while probabilities are less than one in a million per year. Consideration of these very low-probability but potentially high-consequence accidents provide valuable insight for the public and decision-makers in understanding the overall risks of operation, siting decisions, and the need for emergency preparedness.”

⁹ Keith Ridler, Associated Press, *The Idaho Falls Post Register*, “US releases environmental study about new test reactor,” May 25, 2022.

¹⁰ U.S. Nuclear Regulatory Commission, Email May 27, 2022: SUBJECT: NRC Letter to Holtec International – Revised Review Schedule for Holtec HI-STORE CISF License Application. On May 26, 2022, NRC staff issued a letter notifying Holtec International that it has revised the schedule for the completion of its detailed safety, security, and environmental reviews of Holtec’s application for a license to construct and operate the proposed HI-STORE Consolidated Interim Storage Facility (CISF), in Lea County, New Mexico. The NRC staff’s letter

See Environmental Defense Institute comments on the proposed unsafe, hugely expensive Versatile Test Reactor at our website ¹² and our newsletters, especially the March 2021 newsletter articles:

- “Buried Deep in the Department of Energy’s Environmental Impact Statement, DOE Admits Proposed Versatile Test Reactor Accidents Can Be Catastrophic to Southeast Idaho,”
- “Department of Energy sticking to the misleading characterization that the nation’s spent fuel could fit on a football field,” and
- “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.”

TRISO nuclear fuel production for microreactors, over its life cycle is an enormous threat

TRISO nuclear fuel production for microreactors that can poison any place on earth has begun. ¹³ This fuel is said to be the most robust on fuel on earth but its deployment will mean that no one can live and be safe from the deployment of microreactors.

There is no place to safely dispose of the TRISO spent fuel and so it will remain a hazard to humans and all life for more than hundreds of thousands of years. The transportation of this spent fuel may be particularly unsafe or these microreactors may remain stranded, with no safe storage or disposal planned.

The TRISO fuel particles are small, each the size of a poppy seed. The fuel is said to be four times more enriched in uranium-235 than typically used in conventional nuclear reactors and this means that higher burnup can be achieved. It also means that far more fission products and hazardous nuclear radioactive waste will be produced in this fuel.

NASA’s Space Technology Mission Directorate continues to put lives at risk and produce nuclear waste as though human life on earth simply doesn’t matter.

may be viewed under ADAMS Accession Number ML22126A132, or the following link:

<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22126A132>

¹¹ U.S. Nuclear Regulatory Commission, Email June 1, 2022: Email SUBJECT: “Fwd:ISP’s WCS CIS [Interim Storage Partners Waste Control Specialists Consolidated Interim Storage] Licensing Amendment Request.” The NRC staff’s letter may be viewed under ADAMS Accession Number ML22138A361. The Agency Document Access and Management System (ADAMS) is at <http://www.nrc.gov/reading-rm/adams.html>

¹² See Versatile Test Reactor (VTR) draft Environmental Impact Statement comments on our home page at <http://www.environmental-defense-institute.org> (see <http://www.environmental-defense-institute.org/publications/EDI.Com.VTR.6.pdf> and <http://www.environmental-defense-institute.org/publications/CommentVTRdEIS.pdf> and <http://www.environmental-defense-institute.org/publications/CommentVTRdEIS2.pdf>)

¹³ Rachael Smith, Lunchburg News, printed by *The Idaho Falls Post Register*, “INL, BWXT celebrate start of TRISO nuclear fuel production,” December 9, 2022.

The Department of Defense's Strategic Capabilities Office intends to manufacture and deliver a prototype microreactor, to be operated at the Idaho National Laboratory starting in 2024 as part of Project Pele. This unsafe reactor is not anything safe to be around even when it has not had an accident and it will be a target for further harm to any location it is deployed.

The military's proposed Project Pele Mobile Microreactor project which uses TRISO fuel is ill-conceived, puts troops, the public and the environment at risk, wastes precious resources, and bases its contrived safety case on biased assumptions that they don't wish to disclose. The radiological releases from a 10 megawatt-thermal reactor could be far higher than the draft EIS discusses. The risks and costs associated with the management of its spent fuel are also very important and dismissed with vague and misleading statements that it would be addressed by existing processes. The draft EIS is misleading, lacks transparency, and fails to protect people or the environment.

See our 2021 public comment submittals on Project Pele on the home page of Environmental-Defense-Institute.org.^{14 15}

Integrated Waste Treatment Unit preparing for radiological operations in January 2023

The Department of Energy's website stated on December 20, 2022 that the Integrated Waste Treatment Unit (IWTU) DOE plans to initiate radiological operations in 2023.¹⁶

Liquid sodium-bearing waste (SBW) that contains an unspecified amount of Newly Generated Waste will be pumped from New Waste Calcining Facility (NWCF) "tanks to the IWTU waste feed tank where it will be blended with simulant to achieve the desired blend ratio." The initial blend is to be 90 percent simulant and 10 percent radioactive liquid waste.

The IWTU process will produce a dry granular product using a "steam-reforming process." The dry product will be placed in canisters. Airborne effluents will not be continuously monitored.

¹⁴ Public Comment Submittal on the U.S. Department of Defense Draft Construction and Demonstration of a prototype Mobile Microreactor (Project Pele) Environmental Impact Statement (Issued September 2021), November 7 2021, by Chuck Broscius, Environmental Defense Institute at <http://www.environmental-defense-institute.org/publications/EDIComPele2021.pdf>

¹⁵ Public Comment Submittal on the U.S. Department of Defense Draft Construction and Demonstration of a prototype Mobile Microreactor (Project Pele) Environmental Impact Statement (Issued September 2021), November 6 2021, by Tami Thatcher, at <http://www.environmental-defense-institute.org/publications/Pele2021commentdraftEIS.pdf>

¹⁶ Department of Energy, webpage, "Idaho Site Prepared Waste Treatment Facility for Radiological Operations," December 20, 2022, <https://www.energy.gov/em/articles/idaho-site-prepares-waste-treatment-facility-radiological-operations>

The treatment of radioactive high-level radioactive sodium-bearing waste is expected to take three to seven years to complete. Waste treatment had been planned to have been completed in 2012, over a decade ago. The ten-percent blend is expected to commence on January 12, 2023.¹⁷

Since “substantial completion of construction,” the IWTU has been subject to numerous modifications, corrective measures, and improvements. The IWTU has been in the redesign, modify and test mode since 2012 when it was scheduled to have completed treatment of the high-level liquid radioactive sodium bearing waste.

Results obtained from ten years of system performance tests using a non-radioactive simulant material indicate that **the treated waste will need almost double the storage vaults originally expected.** It is currently estimated that the treated sodium bearing waste will need 78 vaults to store the processed waste if the IWTU is actually able to operate. The existing storage facility has room for only 37 vaults.

Construction of the IWTU was stated to have been completed in 2011. The most recent set of design modifications include:

- Replace the existing Inconel 625 process gas filter bundle tiedown hardware with 316 stainless-steel, increase tiedown hardware torquing requirements, and install anti-rotation devices.
- Revise control logic to replace temperature indication from the Denitration Mineralization Reformer (DMR) fluidizing gas to temperature indication from the DMR fluidizing gas distributor to determine the temperature differential between the DMR neck and DMR fluidizing as distributor.
- Install on-site nitrogen purification units.
- Add ten-second time delays for five automatic waste feed cutoff parameters.
- All instruments AC-C-760-1 (Carbon Reduction Reformer O2 Concentration) and L-C-131-2 and D-C-131-1 (Waste Feed Tank level indication probes) to be taken out of service during operational maintenance activities, such as purging/cleaning and calibrations, without shutting down the process or ceasing waste feed.¹⁸

Articles by Tami Thatcher for January 2023.

¹⁷ State of Idaho, Letter to citizens, [no subject], Regarding Hazardous Waste Management Act/Resource Conservation and Recovery Act (HWMA/RCRA) activities, for System Performance Test (SPT) of the emissions and the expected time period for the commencement of the SPT, dated December 21, 2022.

¹⁸ Idaho Environmental Coalition (IEC), Letter to citizens, [Subject] Notification of Class 1 Permit Modification Request Requiring Prior Approval for the Volume 14 Hazardous Waste Management Act/Resource Conservation and Recovery Act Storage and Treatment Permit for the Liquid Waste Management System at the Idaho Nuclear Technology and Engineering Center on the Idaho National Laboratory, EPA ID No. ID4890008952, dated December 20, 2022.