nuclear watch new mexico

January 20, 2023

Defense Nuclear Facilities Safety Board
625 Indiana Avenue NW, Suite 700
Washington, DC 20004

Via email at <hearing@dnfsb.gov>

Re: Comments concerning the November 16, 2022 public hearing regarding legacy cleanup activities, nuclear safety, and increased production activities at the Los Alamos National Laboratory

Dear Safety Board:

Nuclear Watch New Mexico (NukeWatch) appreciates the opportunity to provide follow up written comments for the November 16, 2022 public hearing in Santa Fe, NM. We want to thank the Board for its continuing concern over Los Alamos National Laboratory (LANL) safety issues and for having a public hearing to begin with. Further, we are grateful for the DNFSB's perseverance in the face of the Department of Energy's arguably illegal attempts to restrict its access. We look forward to many more years of the Safety Board's insights and recommendations on nuclear facilities at DOE and NNSA sites, for which the DNFSB is uniquely positioned. Your service is invaluable and irreplaceable. Thank you!

Our mission statement: *Nuclear Watch New Mexico seeks to promote safety and environmental protection at nuclear facilities; mission diversification away from nuclear weapons programs; greater accountability and cleanup in the nation-wide nuclear weapons complex; and consistent U.S. leadership toward a world free of nuclear weapons.*

Comments on Nuclear Safety at Area G

One of the two stated objectives of DNFSB's hearing in Santa Fe was to understand actions completed or planned to strengthen Area G's safety basis and planned removal of legacy transuranic wastes while reducing the amount already stored above ground. The Board focused on activities performed by Department of Energy Environmental Management (EM) at LANL's Area G transuranic waste management facility.

LANL has long struggled with safety bases in general, as well at Area G specifically. We believe the Lab should stop work at Area G if there is not an approved, up-to-date safety

basis in place. In addition, we agree that the Environmental Management Los Alamos (EMLA) field office has not ensured that potentially inadequate safety bases are in accordance with federal regulations and applicable directives. While we realize that having a separate contractor for cleanup is relatively new to LANL, there has been more than enough time for EMLA to figure out who has ownership of the field office safety basis documents and to have adequately defined roles and responsibilities for safety basis reviews and approvals. But nevertheless nuclear safety at Area G is not where it should be.

Given existing issues with safety bases, we fear that other documents may not be as thorough as they must be, particularly documents that condone leaving wastes in the ground forever.

The Los Alamos Lab is located in an active seismic zone between a rift valley and a dormant super volcano, so it's no place for long-term waste disposal such as plutonium-239 with a half-life of 24,000 years. The buried wastes at LANL are also situated above the region's sole-source aquifer, which provides precious drinking water to 250,000 people.

The New Mexico Environment Department (NMED) has regulatory authority over hazardous wastes at LANL through a 2016 Consent Order (CO). DOE and LANL are required to suggest cleanup milestones for each upcoming year. These milestones are usually agreed upon by NMED in December each year after which a public meeting is held to present them. But in February 2021, NMED filed a lawsuit against DOE to terminate the 2016 Consent Order governing cleanup at LANL. NMED now seeks a robust schedule for cleanup of legacy contamination, termination of the 2016 Consent Order, and court-supervised negotiations to set the terms of a new consent order. A new CO would be a new chance for comprehensive cleanup at LANL instead of leaving the radioactive and toxic wastes in place as planned. DOE is not self-regulating here, and spends much time bumping heads with the regulators.

Compounding these problems is that no one truly knows how much or what exactly is buried at LANL dump sites such as the 65-acre Area G. LANL's own estimates are 200,000 cubic yards of total wastes, including 54,000 cubic yards of transuranic (TRU) wastes in Area G. Given these facts, buried wastes at all disposal sites must be characterized to fully understand the potential for any migration to groundwater. The pits and shafts at Area G are only 65 feet deep at maximum. By DOE's own rules, transuranic waste (mostly plutonium and americium) requires disposal in a geologic repository that will remain safe for 10,000 years. Given the amount of transuranic waste that is likely to be in Area G, leaving it buried at 65 feet deep in an unlined landfill rated for 1,000 years is not acceptable. (A table giving the LANL estimated amounts of wastes at Area G is appended below.)

As one knowledgeable source out it, "If DOE's remediation goals are to protect public health and the environment from long-term risks and demonstrate consistency in national TRU waste management practices, then this article recommends that DOE exhume these

materials at Los Alamos and dispose of them at the Waste Isolation Pilot Plant (WIPP) in southern New Mexico. Otherwise, DOE should publish a 10,000-year performance assessment of the alternatives."[1]

Will the Board please consider reviewing LANL documents, such as corrective measures evaluations and performance assessments, to determine how long the Board thinks that the public will be protected from buried wastes at LANL?

National Security Missions and Nuclear Safety Posture Comments

The Board sought information on (1) the production activities to be conducted in the Plutonium Facility, (2) the nuclear safety risks NNSA has accepted, and (3) the state of planned safety improvements to safety system infrastructure and safety programs.

On February 14, 2014, "an exothermic reaction involving the mixture of the organic materials and nitrate salts occurred inside" a container of mixed transuranic waste emplaced at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. The "exothermic reaction resulted in pressurization of the drum, failure of the drum locking ring, and displacement of the drum lid."[2] In other words, the container ruptured, releasing plutonium, americium, and other radionuclides into the open air.

The rupture resulted from the mixture of nitrate salts and sWheat Scoop, a commercial kitty litter, in the same container. These substances are incompatible and capable of producing a violent chemical reaction. A formal investigation concluded that the accident was preventable, if the Laboratory had adequately developed and implemented repackaging and treatment procedures that incorporated suitable hazard controls.[3] As a result, WIPP was shut down for three years, costing the American taxpayer ~$2 billion to reopen.

If this rupture had occurred inside a building, such as LANL's plutonium facility, things could have been much worse. As the Board is aware, LANL has had a long history of resisting active confinement. The Board has closely followed LANL's efforts to update the leak path factor analysis for the Plutonium Facility (PF-4). The leak path factor is an important input to the PF-4 safety basis as it quantifies the amount of radioactive material that might escape from the passive confinement structure during an accident.

However, in a March 15, 2022, letter to the Safety Board, the National Nuclear Security Administration (NNSA) stated that it would no longer pursue a safety class active confinement ventilation system at PF-4. Given the importance of the leak path factor

---

[1] Neill, Helen R. & Robert H. Neill, *2009 Shallow-Buried Transuranic Waste: A Comparison of Remediation Alternatives at Los Alamos National Laboratory*, 151, Natural Resources Journal, Volume 49, Index 2009 http://digitalscholarship.unlv.edu/sea_fac_articles/128/)

[2] U.S. Dep't of Energy, *Accident Investigation Report: Phase 2, Radiological Release Event at the Waste Isolation Pilot Plant, February 14, 2014* at ES-15, 15-17 (Apr. 2015).

[3] *Id.* at 211.

analysis in ensuring that the passive confinement system can adequately mitigate accident consequences, the Board advised NNSA to address the concerns.

The Board detailed concerns with the existing PF-4 leak path factor (LPF) analysis. For instance, the LPF analysis assumed that the exterior confinement doors are only open for five minutes following an earthquake, which could lead to significantly underestimating the radiological material released during the accident if the doors are open longer. Additionally, the Board had problems with the statistical methodology used to derive LPF values, discrepancies in averaged weather data, and software quality assurance.

We believe that the Lab should have a safety class active confinement system in place at PF-4 before any plutonium pit production takes place. We note DNFSB's verbal statement at the hearing that LANL has the only plutonium facilities in the NNSA complex that rely upon only passive confinement. LANL Director Thom Mason stated his preference for passive confinement because of "fundamental physics." But passive and active confinement are not mutually exclusive – you can have both. NNSA Administrator Jill Hruby mentioned "budgetary balance" some half dozen times. LANL is receiving $1.6 billion for pit production in FY 2023. Spending perhaps $50 million (?) on an active confinement system would be balanced. NukeWatch simply does not understand NNSA and Lab intransigence on not installing a safety class active confinement system for expanded plutonium pit production.

We hope that the DNFSB will continue to strongly recommend a safety class active confinement system for PF-4. It could well end up being the only pit production facility in the country if the troubled program at the Savannah River Site completely fails, thereby creating yet more pressure on PF-4 to produce more than 30 pits per year. In the event that NNSA continues to refuse to install an active confinement system, the Safety Board should demand that the agency provide full justification for cutting corners in nuclear safety.

In addition, LANL is behind on updating its Probabilistic Seismic Hazard Analysis (PSHA). We believe that the Lab should complete an updated PSHA before it finalizes the site-wide environmental impact statement which is currently underway. Otherwise the inevitable claims by the Lab in the SWEIS that all is seismically safe will ring hallow.

Moreover, there are at least three safety system upgrades that will not be completed when pit production is scheduled to start:

1. Fire suppression seismic upgrades;
2. Ventilation equipment replacements; and
3. Removing seismically unqualified buildings from the firewater loop.

All of these should be completed before any plutonium pit production takes place.

Studies have shown that the Los Alamos area has a probability of a major earthquake once every 10,000 years. In the worst case, a devastating quake would be followed by a fire that would spread contamination. LANL should not be allowed to roll the dice with

public safety through its own indifference to updated safety bases, an updated Probabilistic Seismic Hazard Analysis, and safety system upgrades.

During the hearing Robert Webster, LANL Deputy Director of its nuclear weapons programs, admitted that it was entirely possible that PF-4 could be "oversubscribed" in programmatic work. In addition to plutonium pit production, this will likely include the preprocessing of excess plutonium pits into plutonium oxide for eventual "dilute and dispose" and processing of gamma-emitting Pu-238 for radioisotope thermoelectric generators. We submit that the DNFSB should analyze the safe integration of these major, hazardous operations all within the confined working floor space of a facility built for plutonium research (not production) in the middle 1970's. How is it all to be safely done? What are the anticipated inventories (which may substantially fluctuate) of Materials at Risk?

A 2020 "Supplement Analysis" for the 2008 LANL Site-Wide Environmental Impact Statement (SWEIS) states:

> "In 2019, DNFSB submitted a report expressing concerns on delays for completing seismic upgrades and improvements to the Plutonium Facility. NNSA acknowledges concerns regarding delays and will continue to implement seismic upgrades and improvements to PF-4 prior to implementing pit production analyzed in this SA [Supplement Analysis]." [4]

These words are hollow as NNSA plans to begin plutonium pit production in the next fiscal year 2024 and still has not fully completed seismic upgrades and improvements to PF-4. We assert that the Defense Nuclear Facilities Safety Board should aggressively hold NNSA's feet to the fire on this.

We would also ask that the Safety Board consider commenting on specific portions of the pending draft LANL Site-Wide Environmental Impact Statement. What most prompts this request is the low potential radioactive doses that NNSA always calculates in its National Environmental Policy Act documents. For example, a NNSA 2020 "Supplement Analysis" for the 2008 LANL SWEIS calculated the following:

> "Public Health
> The 2008 LANL SWEIS analyzed the expansion of pit production operations at the Plutonium Facility Complex. It projected the maximum offsite dose to a MEI would be approximately 0.012 millirem per year (DOE 2008a, ch. 5 p. 90). The proposed pit production estimated offsite dose to the MEI is 6.7 x 10 –6 millirem per year for 80 pits per year and 2.5 x 10 –6 millirem per year for 30 pits per year (Table 3-2). This projection is less than the 0.012 millirem per year as projected in the 2008 LANL SWEIS. As pit production expands at the Plutonium Facility Complex, the projected population dose is calculated to be 2.8 x 10 –5 person-rem

[4] *Final Supplemental Analysis of the 2008 SWEIS for LANL for Plutonium Operations*, DOE/EIS-0380-SA-06, August 2020, p. 41, https://www.energy.gov/sites/default/files/2020/09/f78/final-supplement-analysis-eis-0380-sa-06-lanl-pit-production-2020-08.pdf

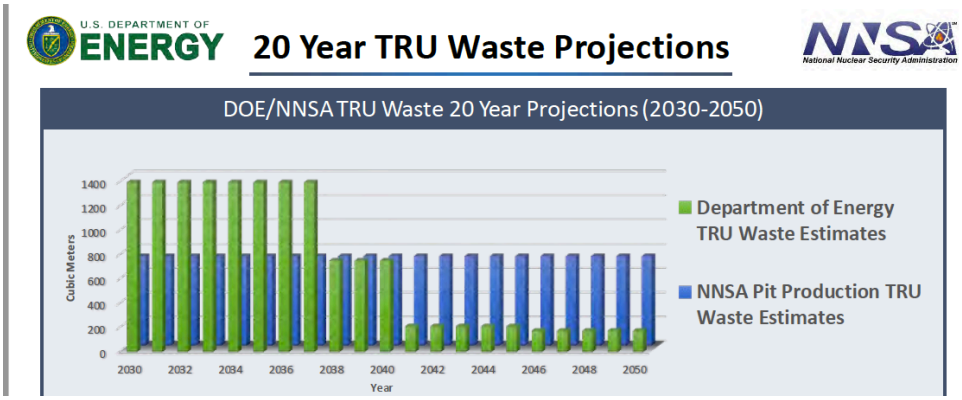
per year for 80 pits per year and 1.05 x 10 –5 person-rem per year for the 30 pits per year (LANL 2020) (Table 3-2). This projection is less than the 0.2 person-rem per year as presented in the 2008 LANL SWEIS (DOE 2008a, ch. 5 p. 98).

Worker Health
In the 2008 LANL SWEIS, the projected collective worker dose by expanding pit production was 220 person-rem per year (DOE 2008a, ch. 5 p. 104, Table 5-27). However, the projected collective worker dose associated with the proposed action is estimated to be 206 person-rem per year for 80 pits per year and 155 person-rem per year for 30 pits per year (LANL 2020)(Table 3-2)" [5]

What is missing in the 2020 Supplement Analysis and its predecessors is any mention of the potentially lethal doses that the Safety Board calculated in DNFSB/TECH-46, *Potential Energetic Chemical Reaction Events Involving Transuranic Waste at Los Alamos National Laboratory.* That report calculated occupational doses of up to 760 rem total effective dose and public doses of 24 rem total effective dose from incompatibly mixed radioactive wastes. That this potential threat can suddenly become all too real is substantiated by LANL's improperly prepared waste barrel that ruptured in 2014 and closed the Waste Isolation Pilot Plant for three years.

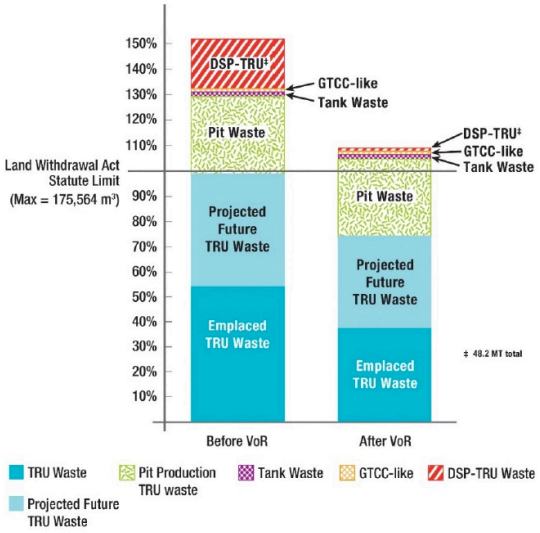
We are suggesting that the Safety Board should adopt a "keep them honest" approach, reviewing the draft SWEIS and offering limited comments as merited. This is important as site-wide environmental impact statements are legal public record in which the agency is required to respond to comments. Further, in the past draft SWEISs have resulted in great institutional and public benefit when, for example, public comment for a 1999 draft LANL SWEIS compelled DOE to undertake wildfire mitigation measures. This arguably prevented the 2000 Cerro Grande Fire from reaching ~40,000 barrels of above ground TRU waste barrels at Area G, which otherwise could have been catastrophic.

As a longer term safety matter, we respectfully suggest that the Safety Board should analyze the uncertainty of disposing of TRU wastes from future plutonium pit production. As this graph illustrates, NNSA is counting on the Waste Isolation Pilot Plant (WIPP) for the next 30 years:



[5] *Ibid,* p. 45

In this graph, the National Academy of Sciences makes clear that WIPP is already oversubscribed: [6]



Further, the New Mexico Environment Department (NMED) is now processing a renewed Resource Conservation and Recovery Act permit for WIPP. NMED is insisting upon renewal every 10 years instead of the indefinite extension that DOE wants. Moreover, NMED is insisting upon prioritization of LANL TRU wastes (in contrast to out-of-state wastes) and automatic revocation of the permit should Congress expand WIPP's mission. The underlying point is that WIPP may not be available for disposing of more than 50,000 cubic meters of future TRU wastes from pit production over 50 years. We believe that this is an issue that the Safety Board should analyze and address.

Thank you for your consideration of our comments.

Sincerely,

Jay Coghlan
Executive Director

Scott Kovac
Research Director

[6] Review of the Department of Energy's Plans for Disposal of Surplus Plutonium in the Waste Isolation Pilot Plant (2020), National Academy of Sciences, https://nap.nationalacademies.org/catalog/25593/review-of-the-department-of-energys-plans-for-disposal-of-surplus-plutonium-in-the-waste-isolation-pilot-plant

Estimated Pit Inventories at Area G at LANL

Table G-3.4-1
Excavation of Pits

Pit No.	Dimensions (length × width × depth)	Rectangular Volume of Pit (yd^3)	Field-Measured Pit Volume (yd^3)	Estimated Disposed Waste Volume in Pit (yd^3)	Estimated TRU Waste Volume (yd^3)[a]	Estimated MLLW Volume (yd^3)[b]	Estimated Total Waste Volume (yd^3)[c]	Estimated Materials Suitable for Backfill (yd^3)[d]
1	616 ft × 113 ft × 20 ft	51,561	37,080	5529	5529	31,551	37,080	14,481
2	618 ft × 104 ft × 26 ft	61,892	42,911	6407	6407	36,504	42,911	18,981
3	655 ft × 115 ft × 33 ft	92,064	56,759	9473	9473	47,286	56,759	35,305
4	600 ft × 110 ft × 34 ft	83,111	44,950	8212	8212	36,738	44,950	38,161
5	600 ft × 100 ft × 29 ft	64,444	41,258	6624	6624	34,634	41,258	23,186
6	600 ft × 113 ft × 26 ft	65,289	43,933	6696		43,933	43,933	21,356
7	600 ft × 50 ft × 30 ft	33,333	17,101	4343	4343	12,758	17,101	16,232
8	400 ft × 25 ft × 25 ft	9259	6528	2311	2311	4217	6528	2731
10	380 ft × 57 ft × 27 ft	21,660	15,549	4016		15,549	15,549	6111
12	400 ft × 25 ft × 25 ft	9259	7303	2363	2363	4940	7303	1956
13	400 ft × 42 ft × 28 ft	17,422	12,107	1931		12,107	12,107	5315
16	400 ft × 25 ft × 25 ft	9259	8081	2235		8081	8081	1178
17	600 ft × 46 ft × 24 ft	24,533	17,399	4962	4962	12,437	17,399	7134
18	600 ft × 75 ft × 40 ft	66,667	46,685	12,358		46,685	46,685	19,982
19	153 ft × 30 ft × 18 ft	3060	1371	0		1371	1371	1689
20	600 ft × 71 ft × 36 ft	56,800	37,454	14,899		37,454	37,454	19,346
21	402 ft × 56 ft × 26 ft	21,678	13,328	3607		13,328	13,328	8350
22	413 ft × 56 ft × 33 ft	28,268	17,690	3744		17,690	17,690	10,578
24	600 ft × 58 ft × 30 ft	38,667	23,388	7327		23,388	23,388	15,279
25	395 ft × 103 ft × 39 ft	58,767	47,000	6530		47,000	47,000	11,767
26	310 ft × 100 ft × 36 ft	41,333	22,209	4312	4312	17,897	22,209	19,124
27	400 ft × 80 ft × 46 ft	54,519	26,946	7441		26,946	26,946	27,573
28	330 ft × 83 ft × 40 ft	40,578	21,381	4422		21,381	21,381	19,197
29	658 ft × 80 ft × 50 ft	97,481	45,795	9784		45,795	45,795	51,686

Table G-3.4-1 (continued)

Pit No.	Dimensions (length × width × depth)	Rectangular Volume of Pit (yd^3)	Field-Measured Pit Volume (yd^3)	Estimated Disposed Waste Volume in Pit (yd^3)	Estimated TRU Waste Volume (yd^3)[a]	Estimated MLLW Volume (yd^3)[b]	Estimated Total Waste Volume (yd^3)[c]	Estimated Materials Suitable for Backfill (yd^3)
30	568 ft × 39 ft × 35 ft	42,843	28,716	13,464		28,716	28,716	14,127
31	280 ft × 52 ft × 25 ft	13,481	13,481	2702		13,481	13,481	0
32	518 ft × 74 ft × 51 ft	72,405	36,364	5367		36,364	36,364	36,041
33	425 ft × 115 ft × 40 ft	72,407	59,930	7776		59,930	59,930	12,477
35	363 ft × 83 ft × 40 ft	44,636	20,957	3361		20,957	20,957	23,679
36	435 ft × 83 ft × 43 ft	57,501	28,057	4491		28,057	28,057	29,444
37	731 ft × 83 ft × 61 ft	137,076	57,213	24,299		57,213	57,213	79,863
Totals		**1,491,253**	**898,924**	**200,986**	**54,536**	**844,388**	**898,924**	**592,329**

Note: Blank cell indicates this waste type/material is not known to be found in the pit.
[a] Newly generated TRU equals volume of waste in pit containing TRU in Table 2.1-1.
[b] Difference between the field-measured pit volume and estimated TRU waste volume.
[c] Sum of estimated TRU waste volume and estimated MLLW volume.
[d] Difference between the rectangular volume of pit and field-measured pit volume.