

Presentation to the Los Alamos community and others at SALA Event Center, October 24, 2024

Overview of Pit Production at Los Alamos National Laboratory

Greg Mello, Executive Director, Los Alamos Study Group

“We have had the bomb on our minds since 1945. It was first our weaponry and then our diplomacy, and now it’s our economy. How can we suppose that something so monstrously powerful would not, after years, compose our identity?”

E.L. Doctorow

Only he who knows the empire of might and knows how not to respect it is capable of love and justice...Thus it is that those to whom destiny lends might, perish for having relied too much upon it.

Simone Weil

A new generation will have to be taught a new way of harmony, mutual respect, common interest, and love for each other and the planet.

Herman Agoyo, Ohkay Owingeh



10/24/2024

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Blog: [Forget the Rest](#)

Los Alamos Study Group * www.lasg.org



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Our schedule this evening

6:00 Welcome and introduction; who am I and what is the Los Alamos Study Group?

6:05 Part I: Why are questions about pit production important?

History of pit production at LANL

6:20 Q&A

6:40 Part II: The current pit production program of record

How did we get here?

7:00 Q&A

7:20 Part III: Forces majeure

Observations about scale, duration, alternative paths forward, impacts

7:40 Q&A

8:00 End of program.

Why are questions about pit production important?

- **Scale: ~\$22 B at LANL and SRS (each) by FY32; ~\$63 B in costs through FY39, largest program at AEC/ERDA/DOE/NNSA since early 1950s.**
- **Currently 1/3 of LANL's total \$5.2 B effort. Changes what LANL is.**
- **Affects nature and direction of US nuclear weapons establishment, arms control regime, and US foreign policy**
- **Does not affect deployments immediately but could begin to do so a decade from now; LANL pit production enables MIRVing Sentinel**
- **Affects governance, society, economy, mobility, and identity in NM, in Los Alamos County most of all**
- **Has widespread and growing impacts**
- **Is and will remain metastable and temporary, even if there is an attempt to grow pit production further**

History of pit production at LANL

- **~150 simple pits, 1945-July 1949 (2, 7, 4, 37, ~100 in these years, respectively).**
- **From July 1949 to 2007, LANL was a pit R&D, not production, site.**
- **LANL made 30 War Reserve (WR) W88 pits over the 2007-2012 period (21 went to the stockpile), with a maximum of 11 in one year. This was a capability demonstration exercise, not an enduring production mission.**
- **LANL Plutonium Facility (PF-4) was subsequently shut down for 3+ years in 2013 due to egregious safety violations.**
- **From 2013 to now (11 years), LANL has had no actual WR pit production capability. Despite years of investment, PF-4, and some supporting LANL facilities, still do not meet DOE safety standards (discussed further below)**

Early plutonium pit and bomb production at LANL and elsewhere

Year	Stockpile	Notes
1945	2	DP facilities first operation Oct. or Nov. 1945; design began in Jan or Feb 1945; first bombing plan against Soviet cities delivered to Groves by end of August 1945
1946	9	7 of these usable; 2 lacked initiators. "Pincher" war plan against Soviets June 1946, LANL managers petition MED to get rid of all production work
1947	13	"One operable bomb in Jan. 1947," said David Lilienthal, AEC; Truman stunned
1948	50	Sandstone X-Ray test of levitated pit 4/14/48; Mk III (Fat Man) production immediately halted, switched to Mk IV; Sandia bomb assembly facility (Bldg 904) opened 9/1/1948, continued as primary assembly site through 1952
1949	250	Hanford took over all pit production July 1949; apparently no significant hitches
1950	450	
1951	650	
1952	1,000	Rocky Flats opened, Hanford continues pit production also
1953	1,350	

David Rosenberg, *Bull. Atom. Sci.* May 1982 pp. 25-30; Chuck Hansen, *US Nuclear Weapons, the Secret History*, 1987, <https://www.sandia.gov/about/history/1940s/>, Gregg Herken, *The Winning Weapon*; DOE *Linking Legacies*; "The Postwar Laboratory," Norris Bradbury et. al, 1946 LA-UR-16-28879.

Table 1. LANL Pit Manufacturing through FY11.

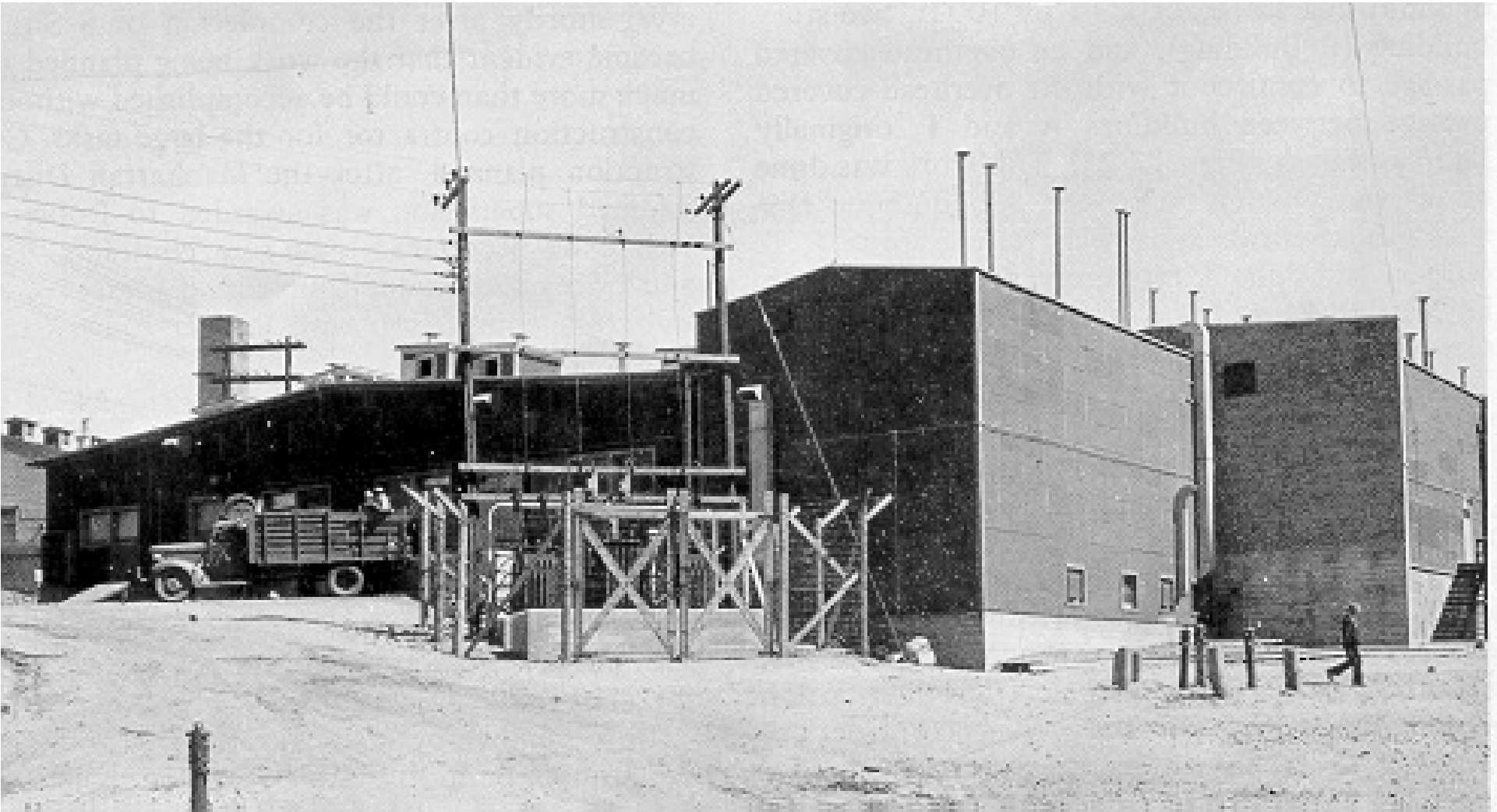
Fiscal Year	Total Pits Built against a 29 unit requirement	Pits delivered to the WR Stockpile	Pits delivered to Destructive Testing	Pits delivered to Shelf Life Surveillance
2007	11 [*]	3	1	6
2008	6	5	0	1
2009	4 [*]	4 [*]	0	0
2010	6 [*]	5	0	0
2011	2	3 [*]	1 [*]	0
2012	1	1	0	0
Total	30 [*]	21 [*]	2 [*]	7

* One pit built in FY07 was accepted in FY09, One pit built in FY09 was accepted in FY10, and two pits built in FY10 were accepted in FY11

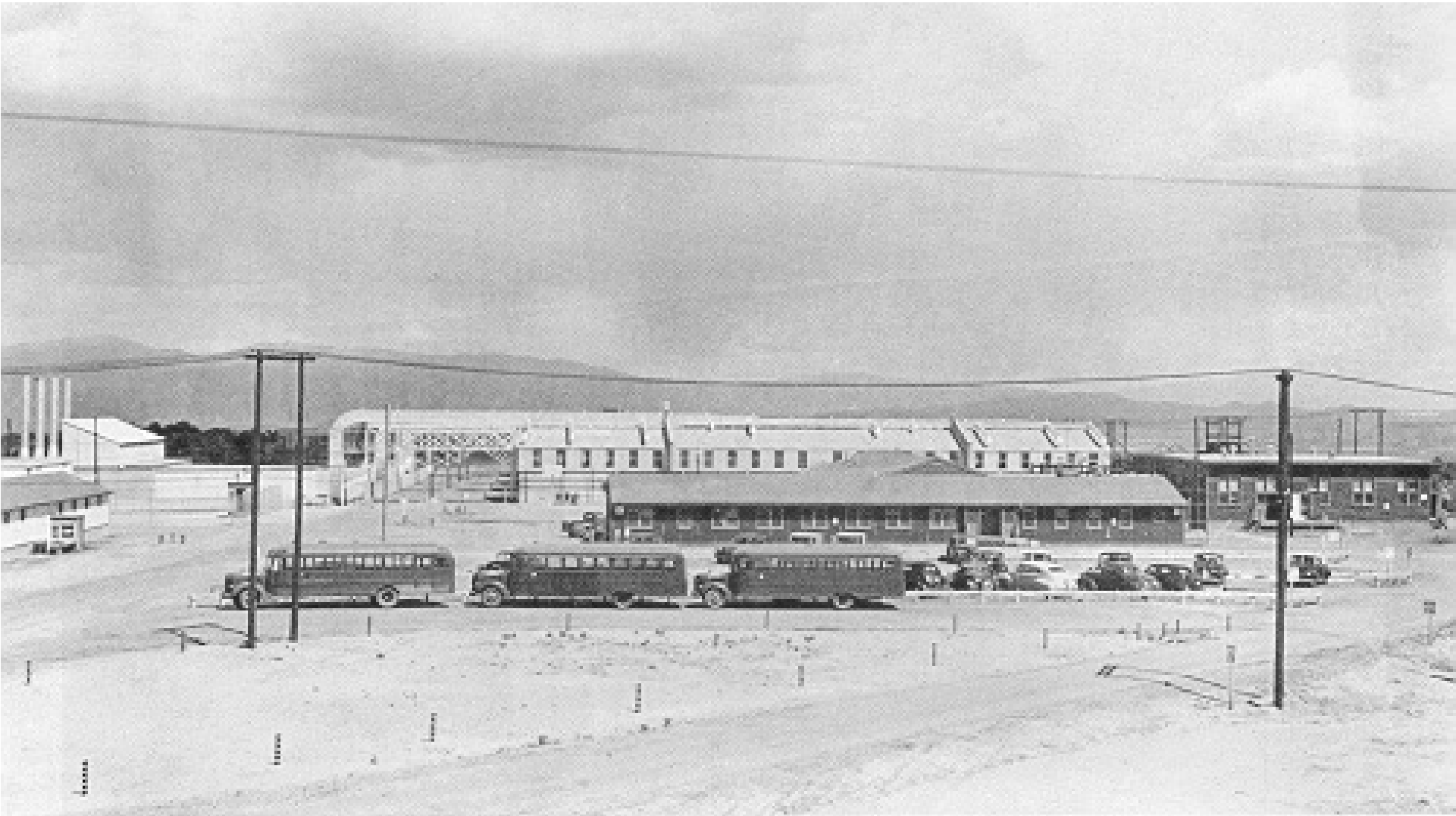
(From LA-UR-12-25400, "Pit Manufacturing Fiscal Year 2012 Program Report to the University of California, Bradford G. Story)



**Sandia
Bldg 904,
Weapons
Assembly
(sans pits)**



Building D, Los Alamos, circa 1944



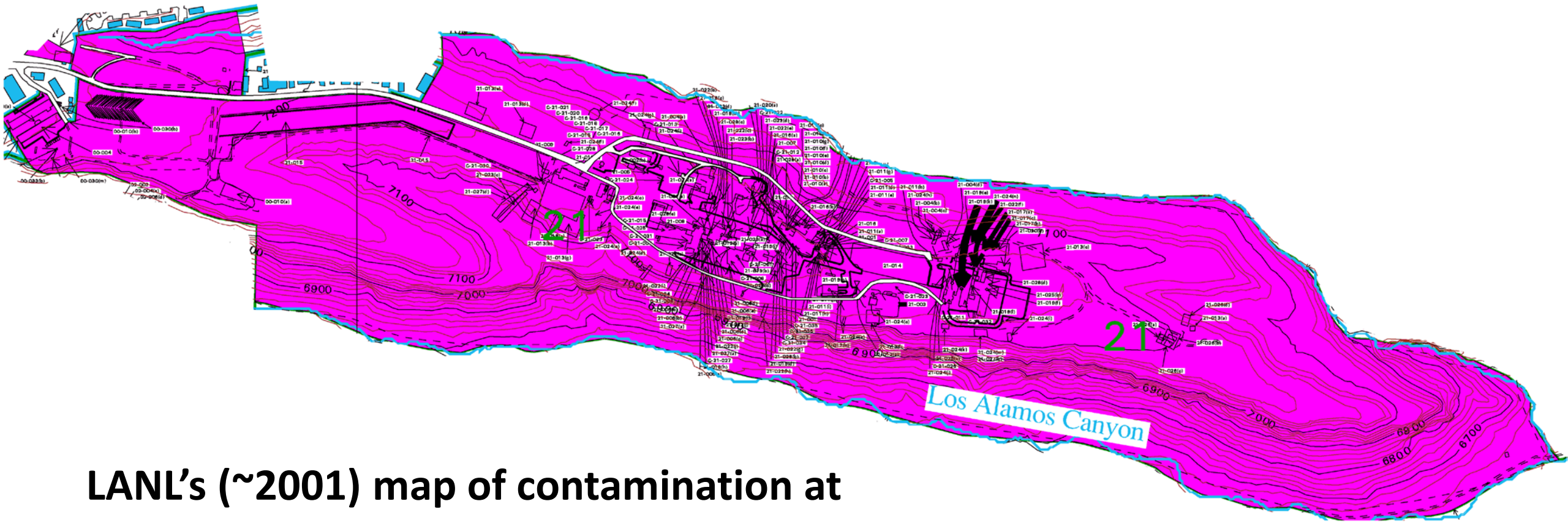
DP Site ("D Prime"), TA-21, which replaced D Building in late 1945.



DP Site (TA-21); plutonium manufacturing in foreground

LANL TA-21, DP Site after partial D&D; Uranium & Plutonium Processing & Manufacturing, (1999 photo, LASG)





LANL's (~2001) map of contamination at TA-21, DP Site, LANL's former pit production and plutonium (etc.) processing site.

Some things don't change: "needs," greed, and the misguided efforts of NGOs to concentrate nuclear weapons & waste in NM

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Los Alamos Can Supply All N-Bombs

Lab's Annual Plutonium Capacity
May Be Enough for 300 Weapons

7/22/2023

Los Alamos Could Supply Plut

CONTINUED FROM PAGE A1

ments provide the most detailed publicly available information to help answer the question of how many bombs Los Alamos could produce.

The answer is this: It appears Los Alamos could build all of the bombs the United States would need to support a 21st century, post-Cold War arsenal, said Christopher Paine, an analyst at the Natural Resources Defense Council, a Washington, D.C., environmental group.

"The significance of it is in the ability of the lab to serve as either an interim or long-term replacement for Rocky Flats," said Brian Costner, head of the Energy Research Foundation, a South Carolina environmental group, and co-author of a study on U.S. nuclear

weapons plutonium work.

To manufacture a plutonium "pit," the explosive core of a nuclear weapon, the metal is heated to more than 1,500 degrees Fahrenheit and melted down, then poured into a graphite mold.

Pits must then be shaped to precise specifications. The work is done inside "glove boxes," which permit workers to handle the radioactive metal remotely, often using lead-lined gloves inserted through sealed portholes.

According to the documents, the metal fabrication area in TA-55 was designed to be able to process and shape 220 pounds of plutonium metal per month.

The amount of plutonium required for a nuclear weapon is a secret, but independent researchers put it at roughly 4 kilograms — 8.8 pounds.

Using that estimate, Paine said

the newly released documents suggest Los Alamos could make about 300 bombs a year. That closely matches an estimate he previously made based on other data about Los Alamos plutonium processing capabilities.

A more conservative estimate, based on the documents' statement that "up to" 12 kilograms — 26.5 pounds — may be used to manufacture a single bomb, yields a production rate of 100 bombs a year.

No one without a security clearance knows whether 100 or 200 or 300 new plutonium pits a year is enough to meet 21st century stockpile needs.

No new bombs are now being built. Questions about whether bombs in the existing stockpile will need to be replaced remain unanswered.

The Department of Energy is trying to plan its future weapons man-

By John Fleck, 12/8/93. Archived at http://lasg.org/Pit_Prod.htm

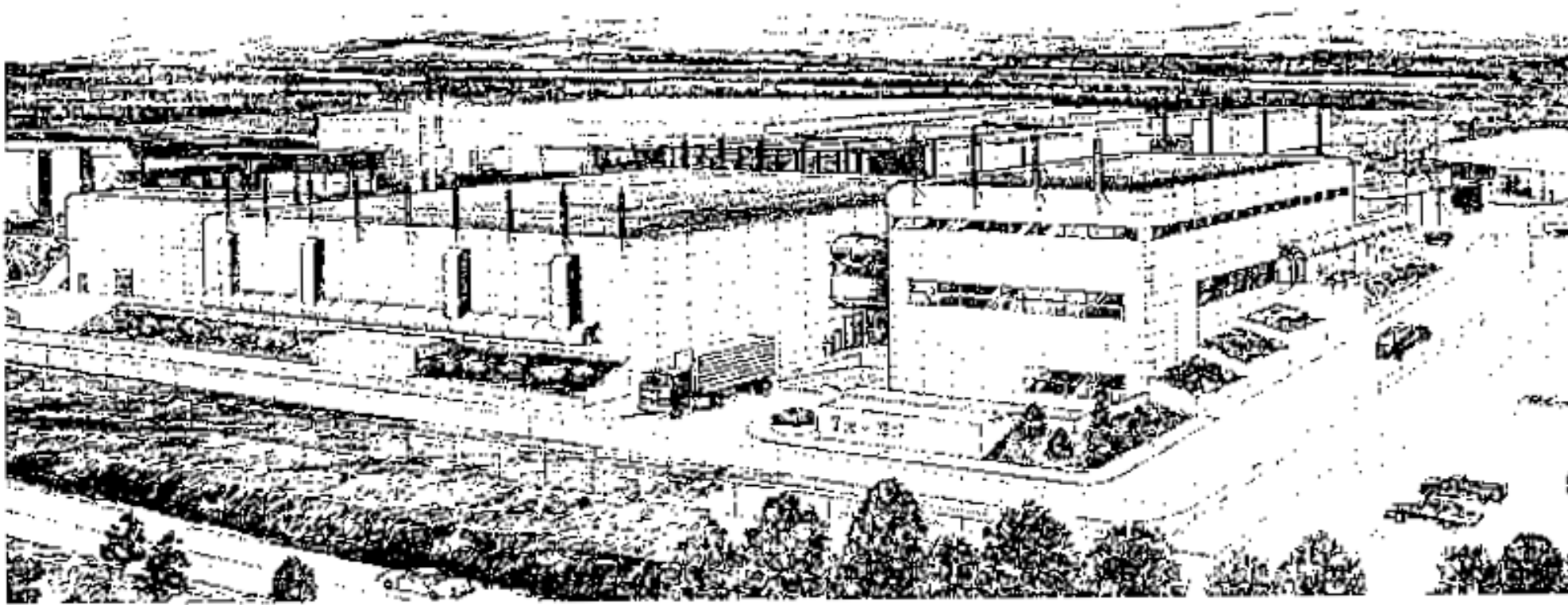
Failures of successive LANL pit production plans, to date

1. PF-4 + SNML, 1988-1991

In 1988 LANL, then directed by plutonium scientist Siegfried Hecker, began to plan for a large (193,000 sq. ft.) new plutonium facility at Technical Area (TA-)55 to greatly augment PF-4 capabilities, the Special Nuclear Materials Laboratory (SNML). As RFP shut down, LANL began acquiring key pit manufacturing personnel and equipment. Prominent experts and influential congresspersons began promoting LANL for pit production. Both New Mexico senators resisted this, as did the University of California and even LANL itself. SNML was put on hold in 1990 and canceled in 1991 in favor of the Chemistry and Metallurgy Research Upgrades (CMRU) project in TA- 3.



Special Nuclear Materials Research and Development Laboratory Replacement Project at Los Alamos National Laboratory



**A glance
back at
LANL's
first
proposal
for a post-
Rocky
Flats pit
facility, to
be located
SW of PF-
4 in TA-55**

Architectural rendering of the Special Nuclear Materials Research and Development Laboratory Replacement Project.

2. PF-4 + CMRU, 1991-2001

By 1993, DOE's efforts to build a consolidated warhead production complex ("Complex 21") had collapsed. LANL now actively sought the pit production mission, to be centered in PF-4 in TA-55 and enabled by CMRU.

A 1996 DOE study found LANL could solidify what it said was a pre-existing single-shift, 50 ppy capacity for \$110 million (M) plus \$30 M/year in added operating costs and \$200 M in deferred PF-4 maintenance. If more pits were required LANL could provide a single-shift 100 ppy capacity for \$44 M more.

As a result, DOE chose LANL over SRS for the "interim" pit production mission, set at ≤ 20 ppy because of the "small current demand" for pits.

LANL had no such capability. Key infrastructure elements weren't remotely suitable. CMRU proceeded haltingly for a decade before being found infeasible and was replaced by the Chemistry and Metallurgy Research Replacement (CMRR) project in 2001.



3. PF-4 + CMRR-NF + CMRR-RLUOB

After the Bush administration failed to convince Congress that a greenfield “Modern Pit Facility” (MPF) was justified, the incoming Obama administration again turned to LANL’s PF-4 for pit production, this time to be augmented by two new buildings in TA-55: the Radiological Laboratory, Utility, and Office building (CMRR-RLUOB, now PF-400) and the large Nuclear Facility (CMRR-NF, originally >95% of the project’s cost).

In 2010, DOE told DoD that LANL would be producing "a minimum of 50-80 pits/year in 2022" using PF-4 and the two CMRR facilities.

In 2012, CMRR-NF was indefinitely deferred. In 2014, it was cancelled. It too was infeasible. A subsequent NNSA study found that without CMRR-NF LANL was no longer be capable of 20-30 ppy absent a decade-long, \$800 M effort and shifting some work to Lawrence Livermore National Laboratory.



RLUOB = Radiological Laboratory/Utility/Office Building
 CMRR NF = Chemistry and Metallurgy Research Replacement Nuclear Facility
 LLUOB = Light Laboratory/Utility/Office Building

Figure S.3.4.1-7—TA-55 Site Plan Showing the Proposed
 CMRR and Manufacturing Annex Facilities

**Somewhat fanciful proposal
 for a pit factory at LANL,
 2008.**

**Half of this was a real
 project (CMRR), most of
 which (CMRR-NF) was
 canceled due to LASG
 litigation and prior geologic
 acts of God.**

**Compare “Mfg. Annex
 LLUOB” to “Cold Hardened
 Shop,” next slide**

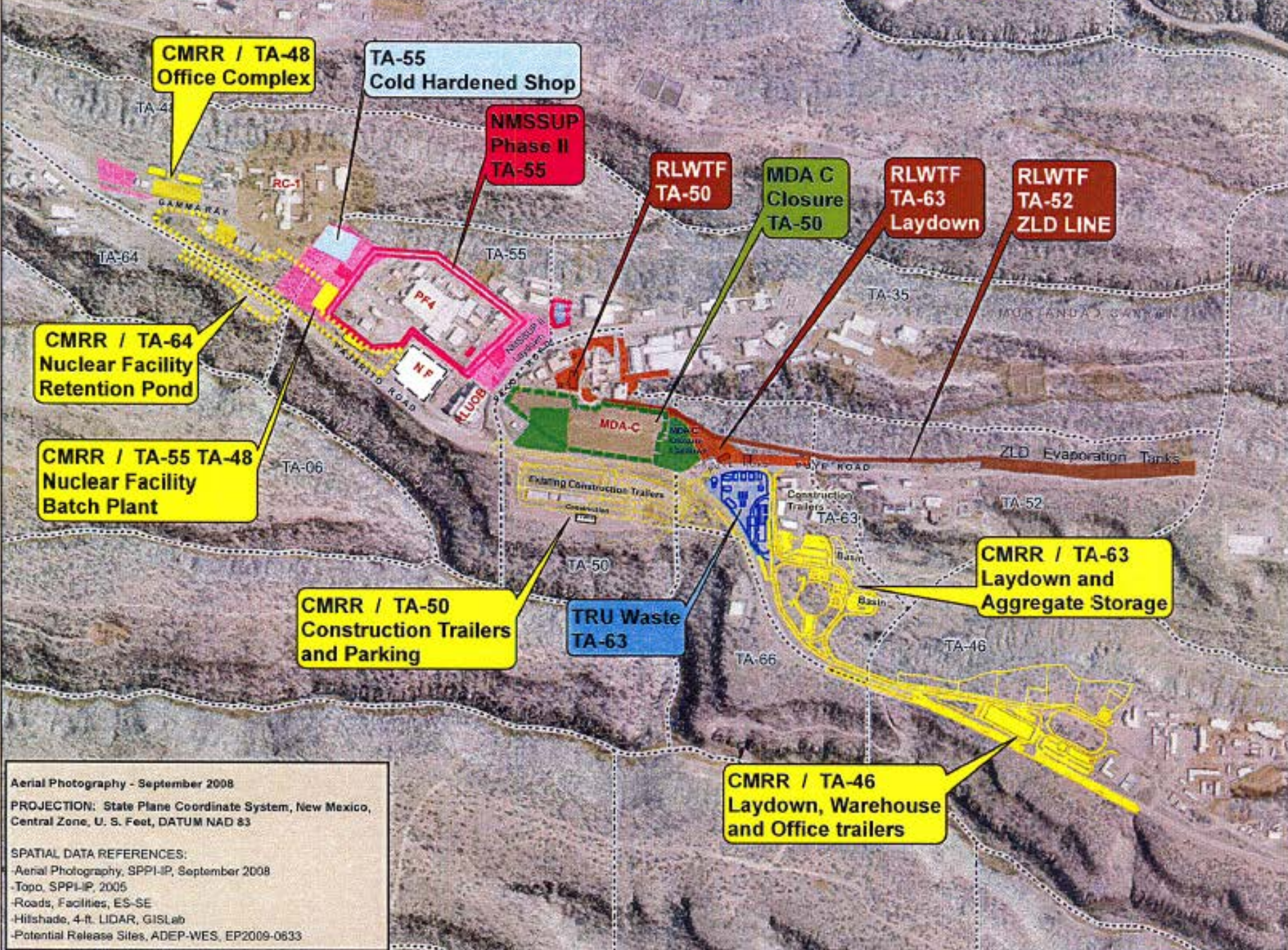
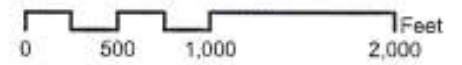
**Pajarito Corridor
Project Planning
2010 - 2020
DRAFT
December 2, 2010**

Legend

- Potential Release Site
- Technical Area Boundary



1 inch = 1,000 feet



Aerial Photography - September 2008
PROJECTION: State Plane Coordinate System, New Mexico, Central Zone, U. S. Feet, DATUM NAD 83
SPATIAL DATA REFERENCES:
-Aerial Photography, SPPI-IP, September 2008
-Topo, SPPI-IP, 2005
-Roads, Facilities, ES-SE
-Hillshade, 4-ft. LIDAR, GISLab
-Potential Release Sites, ADEP-WES, EP2009-0633

4. PF-4 + “modules,” the "Plutonium Modular Approach" (PMA)

From 2012 to 2017 NNSA's pit production hopes – still all at LANL – shifted to a new plan, involving underground production "modules" adjacent to PF-4. In 2013 and in 2014 Congress mandated PMA construction. Mission need was established via CD-0 in 2015. This is now CD-0 for the Los Alamos Plutonium Pit Production Project (LAP4).

In August 2016 GAO issued a scathing review of PMA. In its 2017 *Analysis of Alternatives* NNSA found that TA-55 was too small to accommodate enough “modules” and the risk to existing Pu programs would be high. The 2018 *Engineering Analysis* found that LANL’s PMA plan (Option 2c) would take longer and have higher program risks than all other options examined.

PMA has vanished without a trace. The extra capacity embodied in the PMA concept is for now to be provided by two production shifts in PF-4.



Rendering of 3 module plan, 2018

Enduring, “reliable” WR pit production is a new mission for LANL

Industrial plutonium pit production is a brand-new mission for LANL, [recommended](#) for the very first time on 5/10/18, placed in [statute](#) on 8/13/18, and chosen in twin NEPA decisions ([here](#) and [here](#)) on 9/2/20.

Until then, the LANL pit program had always been an “interim” “plutonium sustainment” program of strictly limited scale (≤ 20 pits/year), operating on a single work shift, with relatively modest cost (~\$200 million/year, rising to \$513 M at LANL by FY19 and \$516 M by FY20).

The FY97 National Defense Authorization Act (NDAA) (signed 9/23/96) required a report on plans to produce plutonium pits at scale ([p. 418](#)). Pending those plans and a future decision based on them, DOE chose LANL for “development and demonstration work” ([p. 11](#)). The decision to limit pit production at LANL to a technology “sustainment” level was repeated [multiple times](#), and any decision regarding capacity larger than 20 ppy postponed [multiple times](#), until Sep. 2, 2020.

Subsequently, a capital project called the “Los Alamos Plutonium Pit Production Project” (LAP4) received the [formal go-ahead](#) (“CD-1”) on April 28, 2021. Although it is the centerpiece of the pit effort, its limited scope and current high-end cost estimate of [\\$5.45 B](#) (p. 234) show it is but a fraction of the total pit production effort, which reliable sources told us in 2021 that LANL was estimating would cost \$18 B over the current decade. NNSA now [estimates](#) just that.

Until this year, LANL had no actual War Reserve (WR) pit production capacity at all, beyond making developmental pits. This year (2024), NNSA (meaning LANL) is [required](#) to make at least 10 WR pits, in 2025 ≥ 20 pits, in 2026 ≥ 30 pits, the minimum rate LANL is required by law to maintain after that date.

Part II: The post-2020 pit production program of record & how we got here



An aerial photograph of a large industrial or research facility, likely Los Alamos National Laboratory. The facility consists of numerous large, rectangular buildings with flat roofs, some in shades of tan and others in white. There are several parking lots with cars and trucks scattered throughout. The facility is situated in a valley, with a road running along the bottom edge. In the background, there are steep, rocky hillsides covered with sparse vegetation and trees. A white text box is overlaid on the upper portion of the image, containing text about building placement. The overall scene is captured from a high angle, looking north.

Looking north. Large, heavy buildings cannot be placed on the S side of TA-55 due to unconsolidated sediments plus high seismicity.

PF-4 was built circa 1975 (opening in 1978) for R&D, not production. It is crowded, inside and out, requiring 24/7 work reach even 20 ppy ([SA, 2020](#)).



Seismic “demand” has increased x3 horizontally and x6 vertically since it was built (Keilers, NNSA, 2014).

No one knows when or how PF-4 will fail. Hopefully not too many people will be hurt.

Los Alamos Study group photograph, April 2021, looking S (from 12,000 ft).

Savannah River Site

Los Alamos National Laboratory

	SRPPF	CMRR				LAP4	TLW	TRP III	Program	M and R Projects	EMC2 Projects
		PEI1	PEI2	REI2	RC3						
1 Process infrastructure											
2 Process equipment											
3 Transuranic waste storage and loading											
4 Material characterization and analytical chemistry											
5 Utilities and site Infrastructure (buried utilities, roads, lighting, waste stream lines, etc.)											
6 Administrative building											
7 Maintenance and construction support building											
8 Safeguards or security measures*											
9 Vehicle and pedestrian entry											
10 Measures to safeguard special nuclear material*											
11 Training and operations center											

From [GAO-23-104551](#),

“NUCLEAR WEAPONS: NNSA Does Not Have a Comprehensive Schedule or Cost Estimate for Pit Production Capability,” p. 70

* - Represents a pre-existing capability at Los Alamos National Laboratory

SRPPF: Savannah River Plutonium Processing Facility

CMRR: Chemistry and Metallurgy Research Replacement Project

PEI1: PF-4 Equipment Installation, Phase 1

PEI2: PF-4 Equipment Installation, Phase 2

REI2: RLUOB Equipment Installation, Phase 2

RC3: RLUOB Hazard Category 3

LAP4: Los Alamos Plutonium Pit Production Project

TLW: Transuranic Liquid Waste Treatment Facility Upgrade Project

TRP III: Technical Area-55 Reinvestment Project, Phase 3

Program: Plutonium Modernization Program

M and R Projects: Maintenance and Recapitalization Projects

EMC2 Projects: Enhanced Mission Capabilities, Commercial Projects



Repurposing a seismically-qualified structure

- 400,000 square feet of Hazard Category-2 space
- Interior walls of reinforced concrete for personnel shielding and durability for 50-year facility design life

FY24 work focused on:

- Achieving 60% design complete milestone
Removing unnecessary walls and equipment from existing 226-F structure
- Site prep and early construction work packages
- **SRPPF Process design now 90% complete**
- **Balance of Plant design at 55%**
- **Near term construction strategy prioritizes early work packages (CD-3X) with a focus on CD-4 date in 2032.**

Workforce Recruitment and Training

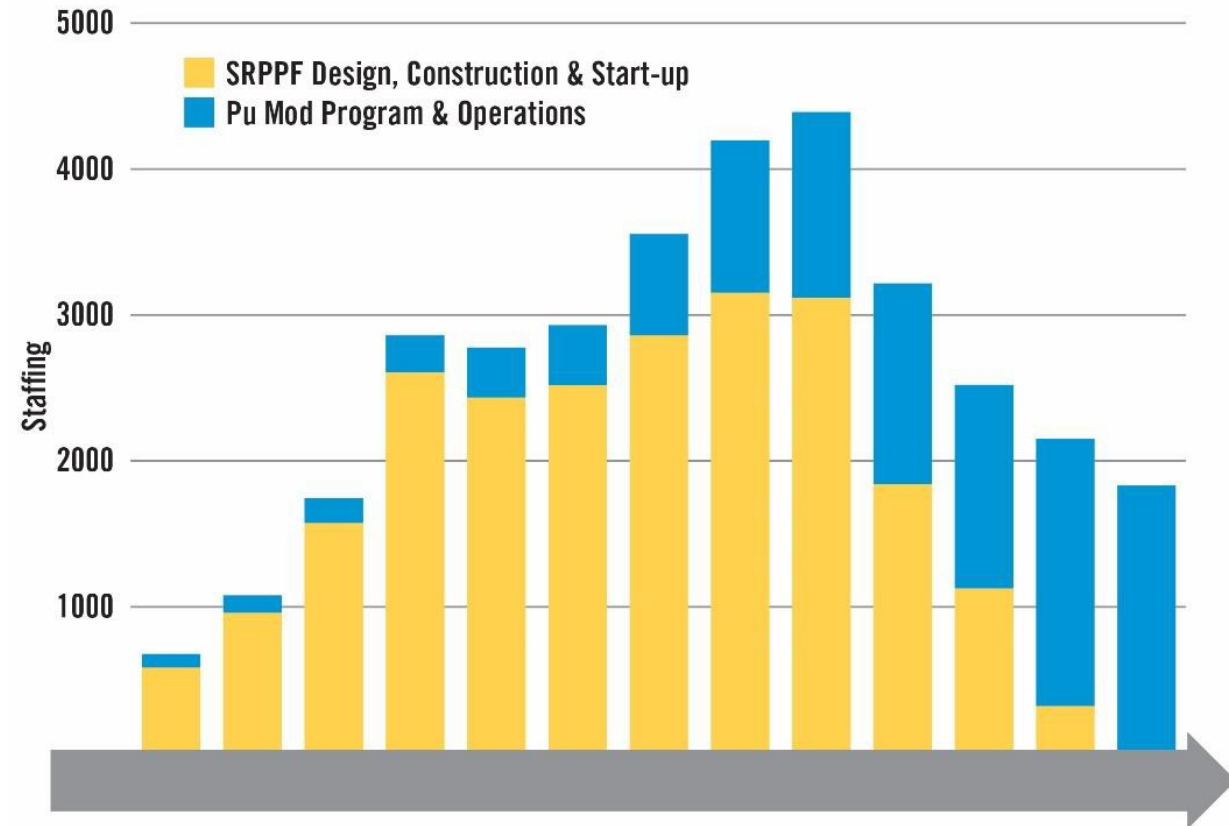
Objective: Recruit, hire, train and qualify ~1,800 future O&M and security staff over next 10 years

Status:

- Currently at 45 program staff (plus >600 project staff)
- Software model being utilized to balance staffing supply vs demand
- Working with colleges/tech schools to prime pipeline with candidates
- Active knowledge transfer program from LANL to SRS
- Benchmarking other NSE sites

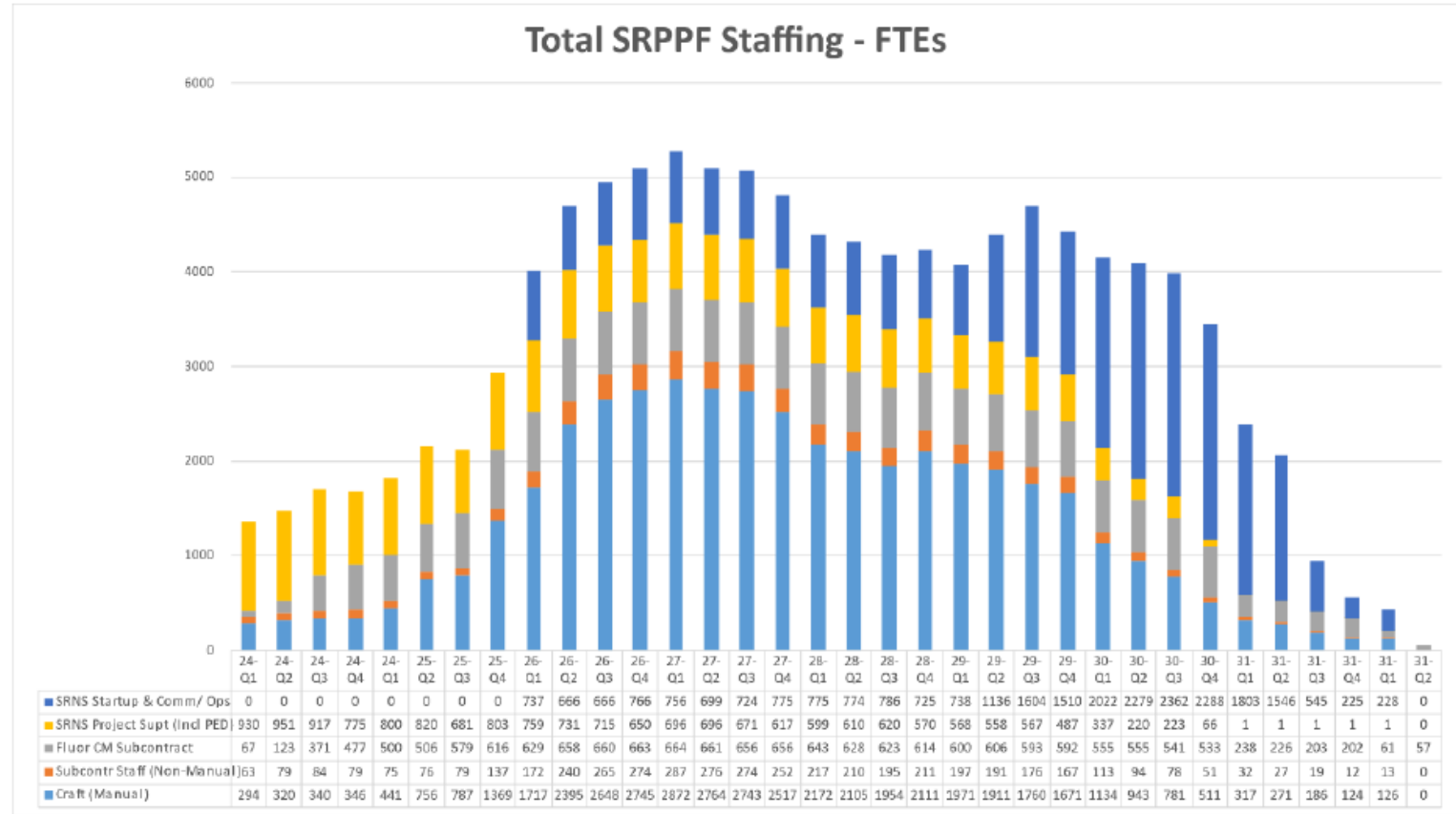
Near-Term Program Needs:

- Staffing – (see later slides)
- Other – Virtual Reality/Augmented Reality training platform for operators



[NNSA, SRFO, slide 9, April 2022](#)

- Sharp increase in craft labor to support SRPPF Construction over the next 24 months.
- Requires significant increase in temporary housing availability in areas surrounding SRS.
- SRNS coordinating with city and county governments, trade associations, and others to facilitate needed capacity.



5. PF-4 (as upgraded by LAP4) + TRPIII + PF-400 + TRUWF + TLWF + DAF + Sigma + remote LANL campus(es) plus:

- **Pu Modernization Operations & Waste Management Bldg, Pu Mission Safety & Quality Bld, Pu Program Accounting Bldg, maybe Pu Production Bldg (\$50 M each), maybe RACR (\$37 M)**
- **Protective Forces Support Facil., Pu Engineering Support Bldg, (\$99 M ea.)**
- **Pu-supporting small capital construction projects and equipment not included above**
- **Pu-supporting site-wide infrastructure improvements**
- **Site-wide and regional transportation investments**
- **Sigma Replacement (FY23 SSMP, pp. 117-118, FY24 SSMP pp. 129, 131; >"\$750 M, FY24-34.") LASG est. >\$1 billion**
- **PF-4 replacement/augmentation (FY21 Campus Master Plan p. 54), >>\$10 billion if feasible (probably not) and if pursued (unlikely to be pit facility)**

NNSA estimates of near-term LANL pit production

- 9 full “development” pits in FY2023; first production unit (FPU) of W87-1 in 4QFY24/1QFY25? ([Hruby 4/18/24](#)). THIS HAPPENED.
- Prep for production ≤ 10 ppy are funded by Pu Modernization.
- New “30 Diamond Strategy,” aimed at optimizing activities to achieve 30 ppy at LANL ASAP ([p. 231](#)).
- Initial 30 pit per year (ppy) capacity (\neq production) “in or near” FY2028 ([Hruby 4/18/24](#)). Apparently this is Key Performance Parameter (KPP) 30B KPP1: “Complete turnover to operations and equipment hot testing (as applicable) of the minimum equipment necessary for 30 WR ppy” ([p. 237](#), emphasis added). 30 Base (30B) is the 2nd of 5 subprojects within the Los Alamos Plutonium Pit Production Project (LAP4, project 21-D-512).

NNSA estimates of near-term LANL pit production (continued)

- **30B KPP2: “Complete turnover to operations and equipment hot testing (as applicable) of the remaining equipment to support 30 WR ppy with moderate confidence.” (p. 237, emphasis added). “Moderate” = 50% confidence (p. 236). Mean production will be ~30 ppy (see NNSA 2017, [Pit Production Analysis of Alternatives](#), p. 41). This is 30B CD-4, estimated in 4QFY30. Equipment installation is not yet 30 WR ppy, however.**
- **30R: “Complete equipment hot testing and turnover of all 30 ppy reliable equipment and structures, systems, and components in PF-4 and Sigma for *initiation of Process Prove-in activities*.” (p. 237, emphasis added). 30 Reliable (30R) is the 3rd LAP4 subproject and aims at 90% confidence in ≥ 30 ppy with single-shift production, i.e. average production of ~41 ppy ([AoA, p. 13](#)) or ~36 ppy ([NNSA CEPE, 2021, p. 7](#)). Est. CD-4 for 30R is now 4QFY32.**

The interim pit production mission: early cost & capacity estimates

A [1996 DOE study](#) found LANL could solidify what it said was a single-shift, 50 ppy capacity for \$110 million (M), plus \$30 M/year in added operating costs and \$200 M in separately-justified PF-4 deferred maintenance. Total capital cost for 50 ppy: \$310 M in 1996 \$, or \$622 M in 2024 \$.

If more pits were required LANL could provide a single-shift 100 ppy capacity for \$44 M more, for a total of \$616 M and \$52 M/year in today's [2021] dollars. Total capital cost for 100 ppy: \$354 M in 1996 \$, \$710 M in 2024 \$.

It was on the basis of these estimates that LANL was chosen for the interim pit production mission (at ≤ 20 ppy).

Production at these levels could begin, it was said, in 5 years, i.e. 1Q 2002.

Current LANL pit production acquisition and operating costs compared to 1996 and 2017

LAP4 has yet to be baselined (CD2/3 expected 4QFY26), but we assume no further cost escalation in LAP4 or in other necessary construction, or in program costs, beyond those presented in March 2024. We assume full production reliability. We omit important infrastructure costs not yet budgeted. Taken together, these are very optimistic assumptions.

Under these assumptions, we estimate total costs for start-up to reliable ≥ 30 ppy at \$22.1 B by 4QFY32. We estimate forward costs from FY24 for this capability at \$13.6 B.

Since 1996, estimated LANL startup costs have increased from \$622 M to \$22.1 B (a factor of 36x in constant dollars), for 60-80% of the then-claimed production capacity, using these optimistic estimates.

If we start from the "modern" 2017 estimate, cost growth from a "nominal" 30 ppy to a "reliable" 30 ppy (\$3B to \$22B, in current dollars) is a factor of 7x.

NNSA Analysis of Alternatives (AoA), October 2017:

- **Cost: \$3 B (for 30 ppy nominal, not ≥ 30 ppy; also temporary). "[A]fter a new 80 WR ppy capability is established, PF-4 can return to the research and development mission for which it was built," p. 2)**
- **Schedule: 2026 for full nominal ("Pu Sustainment") production at 30 ppy.**
- **Rejects two-site production of ≥ 80 ppy and enduring production reliance on PF-4.**
- **Did not credence achievement of "reliable" production at ≥ 30 ppy in PF-4.**
- **Contra DOE O. 413.3B, no AoA supports the present LANL strategy.**
- **By contrast an "at least 80 ppy" version of the SRPPF, i.e. single-site production at SRS, was one of the two preferred pit production strategies in the 2017 AoA; indeed it was thought to be the cheapest and quickest option to achieve an "at least 80" ppy capacity with high confidence.**
- **Rejected TA-55 modules.**
- **The only feasible ≥ 80 ppy LANL alternative was a new dedicated pit facility.**

Parsons/NNSA Engineering Assessment (EA), April 2018:

- The nominal, temporary 30 ppy at LANL was now assumed to be ≥ 30 ppy and "enduring."
- *Nota bene*, the EA halved the assumed floor area needed per piece of equipment vs. the AoA, without explanation. This favored LANL options.
- The EA examined single-site production at what is now the SRPPF, rating it the least-risky alternative examined and the one with the greatest "opportunities."
- There was no analysis of an enduring ≥ 30 ppy mission at LANL, nor of two-site production, in the EA. The EA did analyze three options for producing pits at LANL, all of which had been rejected in the AoA and none of which are being implemented today.
- Between the EA in April of 2018 and its presentation the next month, a brand-new strategy of a) maximizing the b) now-assumed "enduring" production in PF-4 and c) potentially increasing it beyond 30 ppy using multiple shifts, plus d) creating what is now SRPPF, was recommended in the briefing slides, misrepresenting the actual EA.

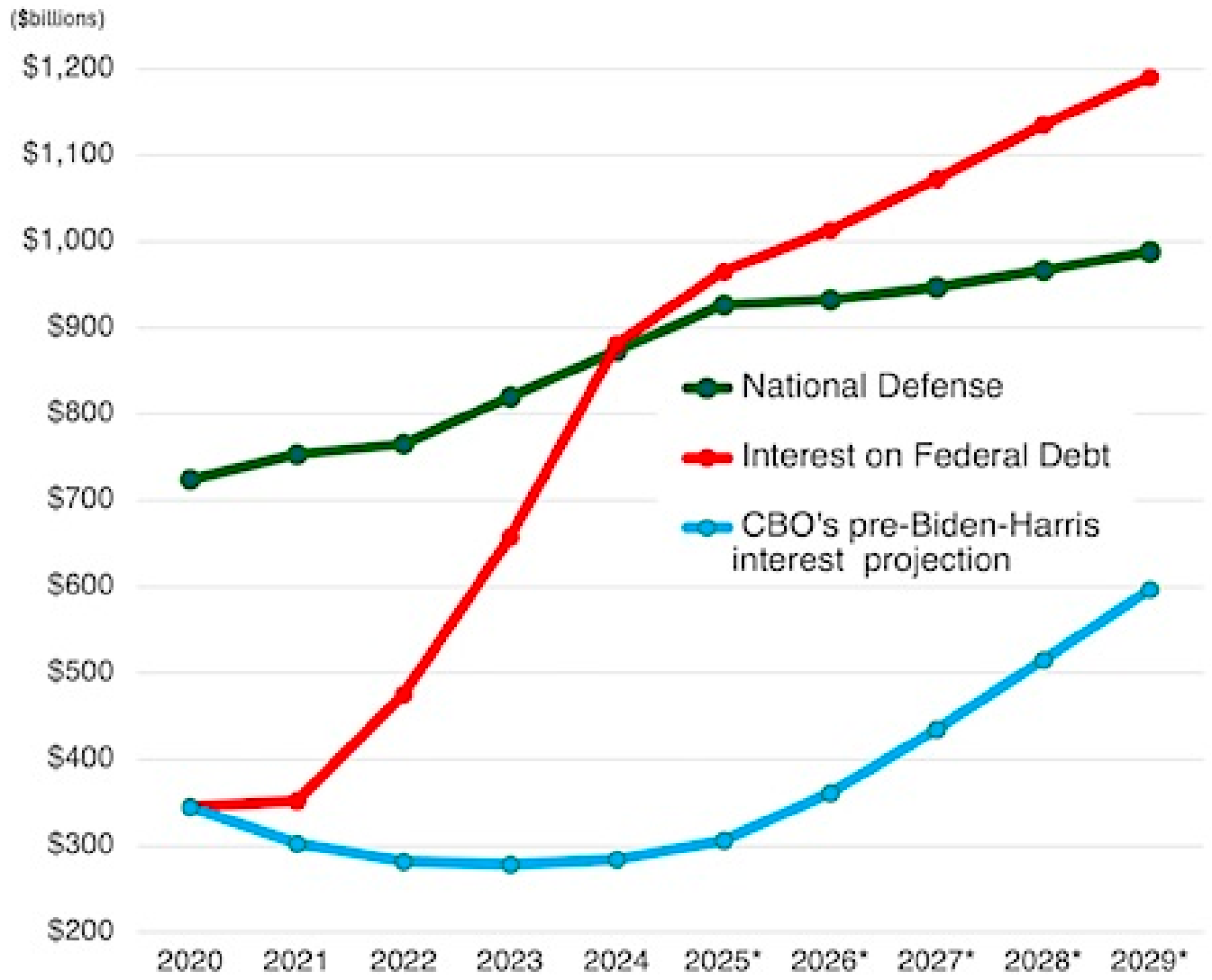
Estimated LANL pit costs through these fiscal years (LASG, based on NNSA budget requests):	FY32	FY35	FY39
Total cost, no further escalation or failures, \$B*	22.1	27.2	35.1
Lower bound, \$M per pit (176, 296, & 456 pits)	126	92	77
Upper bound, \$M per pit (142, 250, & 394 pits)	156	109	89
Forward cost after FY24, no escalation, \$B	13.6	18.6	26.6
Lower bound, \$M per pit (176, 296, & 456 pits)	77	63	58
Upper bound, \$M per pit (142, 250, & 394 pits)	96	74	68
Average annual cost, FY32-FY39, including operations plus \$150 M/yr recapitalization: \$1.9 B. Implied cost/pit over this period: ~\$50 M.			

Estimated SRS pit costs using two official estimates of SRPPF cost (LASG, from NNSA, Parsons data):	2024 SRNS bottom-up estimate of \$18.5 B		2024 NNSA high-end (of “\$18-25 B”)	
	Capacity: ≥50 ppy	≥80 ppy	≥50 ppy	≥80 ppy
SRPPF capital cost, \$B	18.5	18.5	25	25
50-yr operating cost, \$B	33.1	36.8	33.1	36.8
Total 50-yr life-cycle cost	51.6	55.3	58.1	61.8
Average cost/pit, \$M	12.3	10.7	13.8	12.0
Marginal cost/pit (total \$ for ≥80 ppy minus \$ for ≥50 ppy/950 pits), \$M	3.9		3.9	

Part III: Forces majeure; observations about scale, duration, alternative paths forward, impact

Forces majeure include

- **Pit production will cost at least \$63 B through FY2039 under current plans, if pursued. Warhead costs will skyrocket. DoD will want a lot of that money. And what about the actual needs of citizens? LANL pits cost much more than SRS pits.**
- **National debt is now approaching 36 trillion dollars. To keep the system going, one trillion dollars (one thousand billion, or one million million dollars) in additional US debt is now being manufactured every 90 days. (Next slide)**
- **Rise of the BRICs, decline of the dollar**
- **PF-4 aging and related instabilities**
- **LANL's uniquely unsuitable geography and logistics (see below)**
- **Climate change (see below)**
- **Labor and supply chain issues, in competition with pressing civilian needs. China could pull the rug out at any time.**
- **Sentinel is in worse shape than is being reported, softening impact of pit delays**
- **Social and political instabilities, war, and many more big-picture problems**



* forecast
 SOURCES: Treasury Dept., Office of Management and Budget, Congressional Budget Office
 I&I Chart

Jim Rickards: “You can’t borrow your way out of a debt crisis. You can’t fund defense with deficits when interest payments cost more than defense. It’s a doom loop.”

2022 Climate Change Vulnerability Assessment and Resilience Plan Summary

Example VARP results from Los Alamos National Laboratory (LANL)

Wildfire risk in particular remains high at LANL. A crown fire in forested canyons under high wind conditions might be impossible to stop. Habitat concerns prevent drastic forest thinning.

Table 1. VARP Risk Score and Color Key.

VARP Risk Score and Color Key	
High	>7
Medium	3.5 - 7
Low	<3.5
No	Zero Calculated Risk

Table 2. LANL Summary Risk Matrix of Average VARP Risk Scores for High Impact Hazards across Asset Type.

Asset Type	Hazards				
	Increased Extreme Heat Events	Increased Extreme Precipitation Events	Increased Thunderstorms	Increased Flooding Events	Increased Wildfire Frequency
Specialized or mission-critical equipment	8.5	8.8	8.4	7.7	8.4
Energy Generation and Distribution Systems	7.5	7.5	7.5	7.5	7.8
Onsite Waste Processing	8.6	8.0	7.8	7.6	8.1
Site Buildings	7.2	8.2	7.8	7.4	7.7
Water and Wastewater Systems	6.4	7.9	7.9	6.8	7.6
IT and Telecommunication Systems	7.2	7.2	4.7	6.7	7.7

LANL facility challenges: capacity, resilience, safety, longevity, costs

- Costs are discussed above.
- Longevity also; see [“Risks for Sustainment of PF-4 at LANL, Report to Congress,”](#) Nov 2020 (2045 implicit end of life); [“LANL 2021 "Campus Master Plan," LA-UR-22-21424”](#) (new or augmented PF-4 needed by 2040s).
- Capacity: NNSA speeches (e.g. Jill Hruby, [54:28 to 56:19](#)) and budget requests (e.g. [p. 236](#), March 2024), limit LANL production to (\geq) “30 ppy,” which as noted above NNSA has estimated at 36-41 ppy (average). The [2017 AoA](#) discusses the space limitations in PF-4 in depth. Additional Pu missions at PF-4 include (per [GAO-23-104661](#), pp. 65-66): Pu-23 thermoelectric generator production; stockpile surveillance; produce components for subcritical experiments; fundamental science concerning the properties and aging of plutonium; oxidation of surplus Pu for disposition; produce americium oxide; surveil and monitor 3013 containers. Facility maintenance and basic operation, plus waste management, require significant area within PF-4.

NNSA estimates a total cost for the W87-1 program at \$15.9 B (in then-year dollars), which we may take as a minimum cost. (GAO's 2020 [estimate](#) was \$9-15 B.) *Both estimates are exclusive of pit production.*

To provide an average of two MIRV warheads to 450 Sentinel missiles to supplement the available 500 W87-0 warheads (leaving 30 W87-0 surveillance units), plus 30 surveillance units plus just 20 spares would require a production run of 900 W87-1 warheads. Many people assume (why?) that NNSA's requirement is for 800 W87-1s. This would give a unit cost of \$20M, exclusive of pits.

NNSA has [said](#) the lifetime of PF-4 could be extended to as late as 2045. Assuming all goes perfectly (it won't) LANL could make as many as 700 W87-1 pits by then; 600 is a more realistic best case.

LANL pit production is temporary, even in the most optimistic case.

W87-1 pits are to be the exclusive province of LANL for at least the 2030s. (["Los Alamos to make plutonium cores \("pits"\) for new ICBM, Savannah River to make pits for new submarine missile warhead"](#)). The total per-pit cost of these LANL pits would be about \$83M, assuming total program success (forward-looking per-pit costs: \$63M).

Were pit costs included, W87-1 unit costs would rise to \$103M (using total pit cost), 5x the current estimated cost, or \$83M (using forward pit cost), 4x the current estimate.

Massive Growth in LANL workforce

- The lab employed 9,500 in 2013, 15,707 in 2022, ramped up to 17,438 by September 30, 2023 and now employees 19,000.
- In 2022 LANL's Transportation Director, Jay Faught noted "LANL's workforce is 75% larger than just a decade ago, with 17,000 current employees (badge holders) compared to 9,500 in 2013. Backups and delays getting into and out of the Lab negatively impact both that workforce and the Lab's business operations"

As of March 2024, 67% of the 18,500 LANL employees live outside of Los Alamos

- (Wyka, T. “67% of our 18,500 [workers] live off the mesa” 53mins https://losalamos.granicus.com/player/clip/3685?view_id=2&meta_id=262983&redirect=true)

LANL's Parking Spaces in Pajarito Corridor and TA-3

- LANL reports 19,000 employees today
- 500 work off-site
- Up to 18,500 or more will be on-site every day, unclear how many
- Some employees have hybrid schedules and will work from home some of the time

LANL's Transportation Crisis: 19,000 employees & between 7,644 - 13,574 parking spaces

- Today, we don't know exactly how many parking spaces are at LANL.
- 67% of the 19,000 LANL employees commute from outside of Los Alamos County

FY23 Q2 Parking Spaces: 7,644

Pajarito Corridor parking as of FY23 Q2

(Fiscal Year 2024
Transportation Plan p. 5)

Total Car Parking Spaces in the Pajarito Corridor as of FY23 Q2 : 2,399
 Total Car Parking Spaces in Pajarito Corridor + TA-3: 7,644
 Total Motorcycle Parking Spaces in the Pajarito Corridor as of FY23 Q2 : 67
 Total Motorcycle Parking Spaces in the Pajarito Corridor + TA-3 as of FY23 Q2 : 242
 Total number of current ANL employees = ~19,000

TA-3
 Workers: 3,185
 Total parking spaces: 630
 Transit Center

TA-50
 Workers: ?
 Parking Spaces: 1307

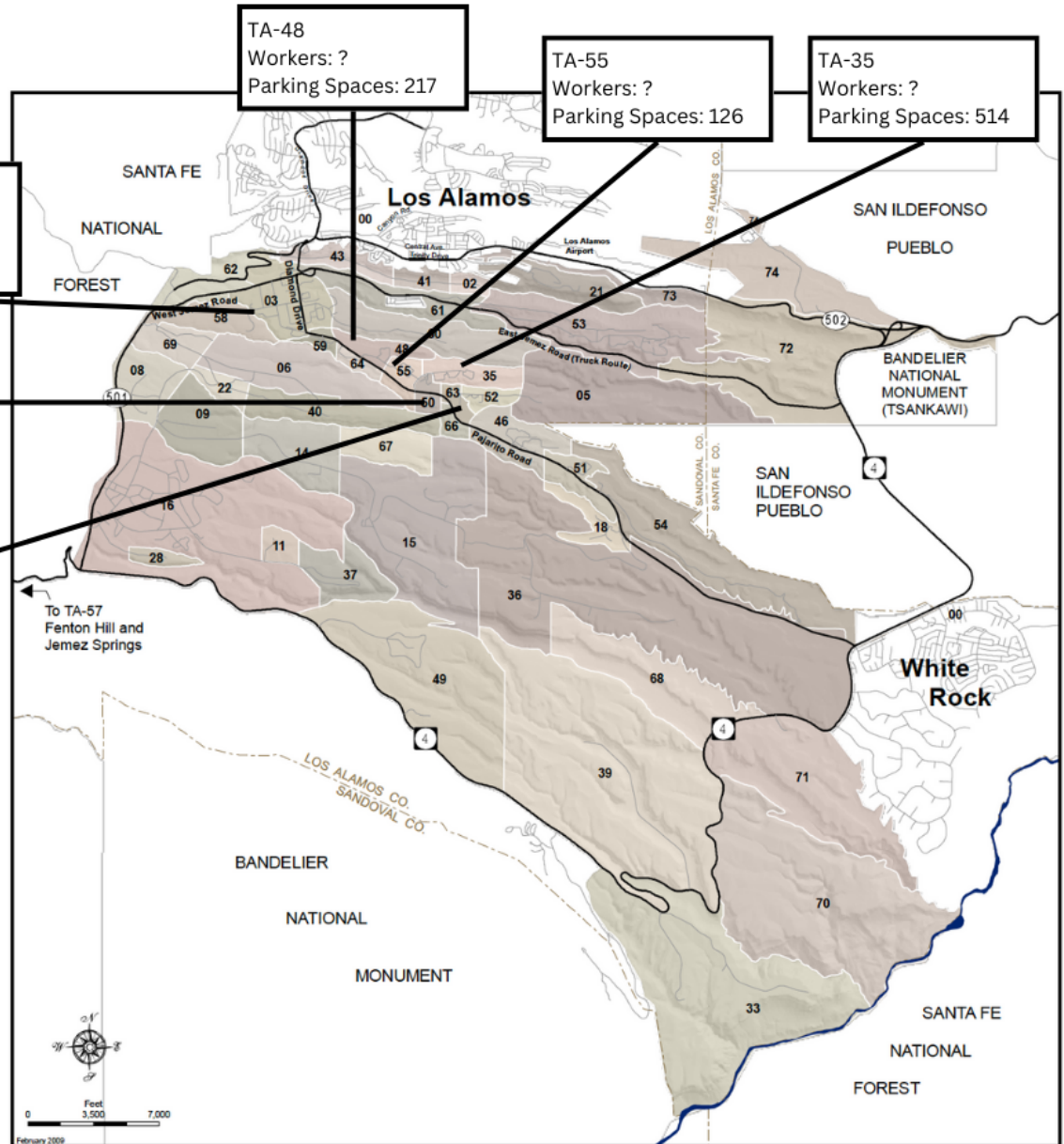
TA-63
 Workers: ?
 Parking Spaces: 235

*Construction
 Laydown will
 temporarily or
 permanently occupy
 149 spaces

TA-48
 Workers: ?
 Parking Spaces: 217

TA-55
 Workers: ?
 Parking Spaces: 126

TA-35
 Workers: ?
 Parking Spaces: 514



Future Plan: 13,574 total spaces

LANL'S PARKING PLAN (p. 34-38)

(Fiscal Year 2024 Transportation Plan p. 5)

TA-3 (outside Pajarito Corridor)
Workers: 3,185
Total parking spaces: 630
*Transit Center may be expanded

TA-50
Workers: ?
Parking Spaces: 1307

TA-63/TA-52
Workers: 832
Parking Spaces: 557
*NEW Transit Center to accommodate 4 45ft buses (50-60 passengers)

According to this plan, 4,145 LANL employees who work in the Pajarito Corridor cannot park there.

At a maximum, the buses can transport 660 workers at a time.

Total Car Parking Spaces in the Pajarito Corridor Plan: **8,329**
Total Car Parking Spaces planned for Pajarito Corridor + TA-3: **13,574**
Total Motorcycle Parking Spaces in the Pajarito Corridor: 67

TA-48
Workers: 3,185
Total parking spaces: 630

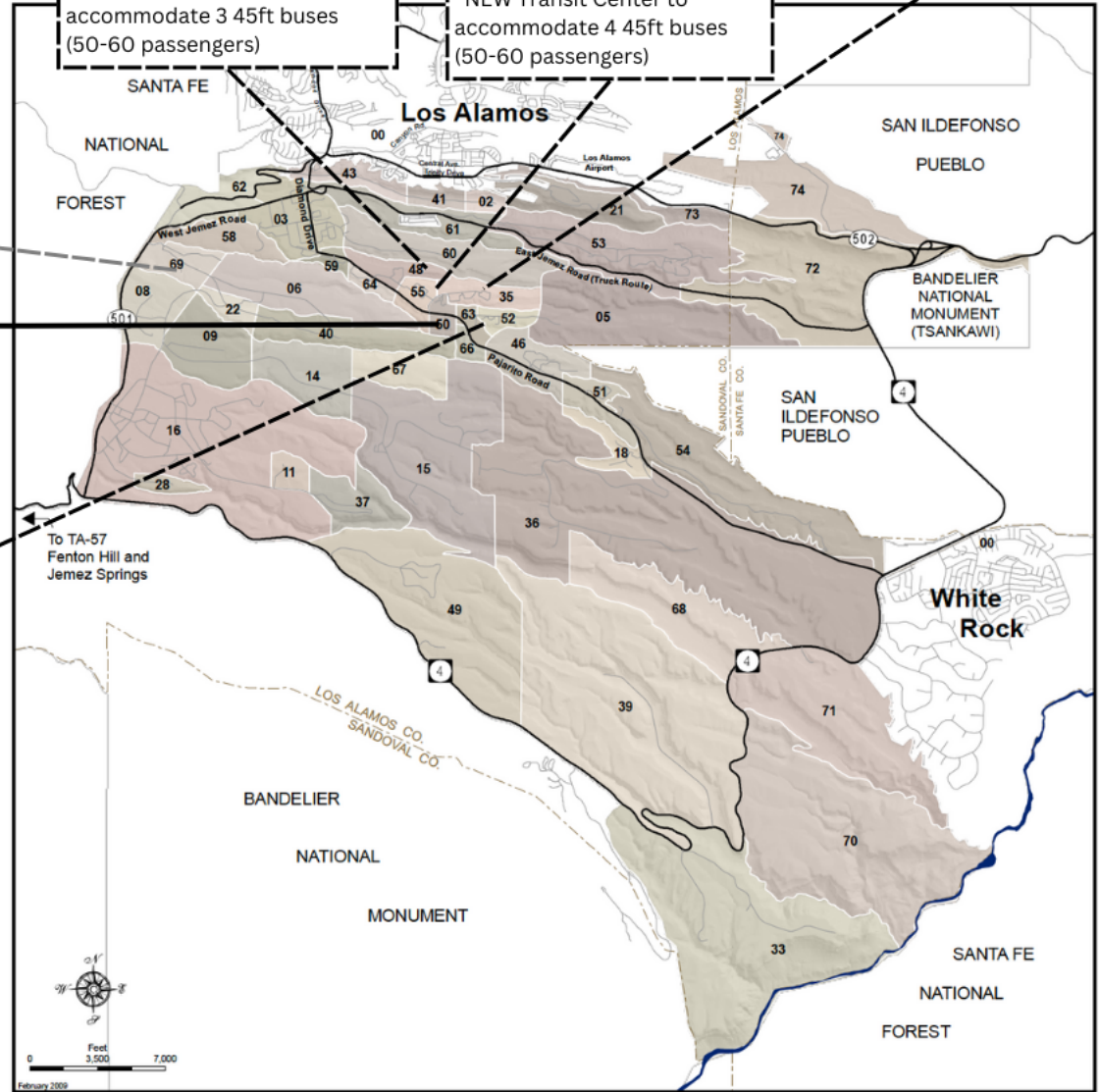
*NEW Mini Transit Center to accommodate 3 45ft buses (50-60 passengers)

TA-35/TA-55
Workers: 3,280
Parking Spaces: 1,467

*NEW Transit Center to accommodate 4 45ft buses (50-60 passengers)

TA-35

*possible site of 2 bus spaces



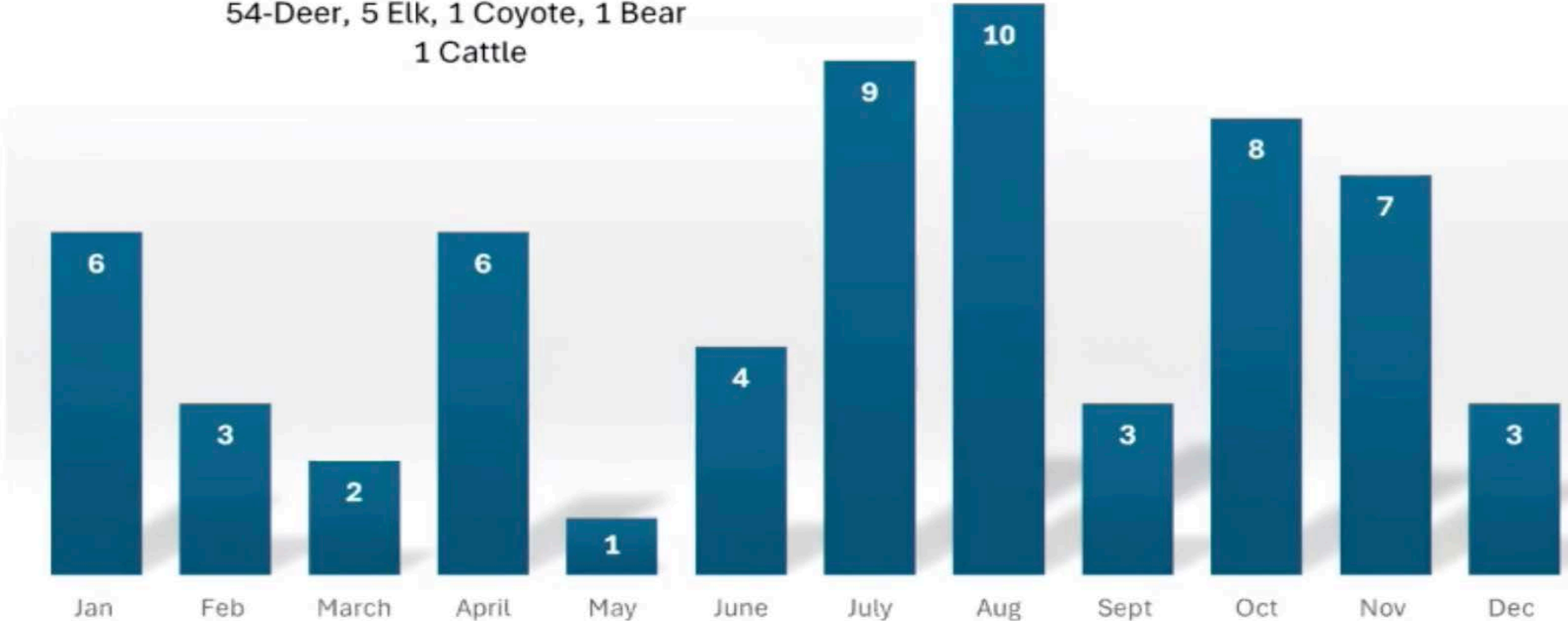
Where will 5,426+ employees park?

- According to LANL's 2023 Transportation Plan, 1,900, or 10% of the current 19,000 employees are projected to work off site. This means around 17,100 could still be driving their personal vehicle to work on any given day. 3,800, or 20% of the 19,000 employees are projected to work off-site at least some of the time. (FY23 plan p. 6-8).
- If all employees that worked off site some of the time had to report to work on the same day, at least 17,100 employees would need parking spaces at LANL if they drove their vehicle to work alone.
- **If all 19,000 employees needed to report to LANL main campus on the same day, with 13,574 parking spaces (whenever they are completed) LANL would be 5,426 parking spaces short.**

“This is a terror part of their day--commuting to and from work” - Ted Wyka to Los Alamos County Council in March 2024

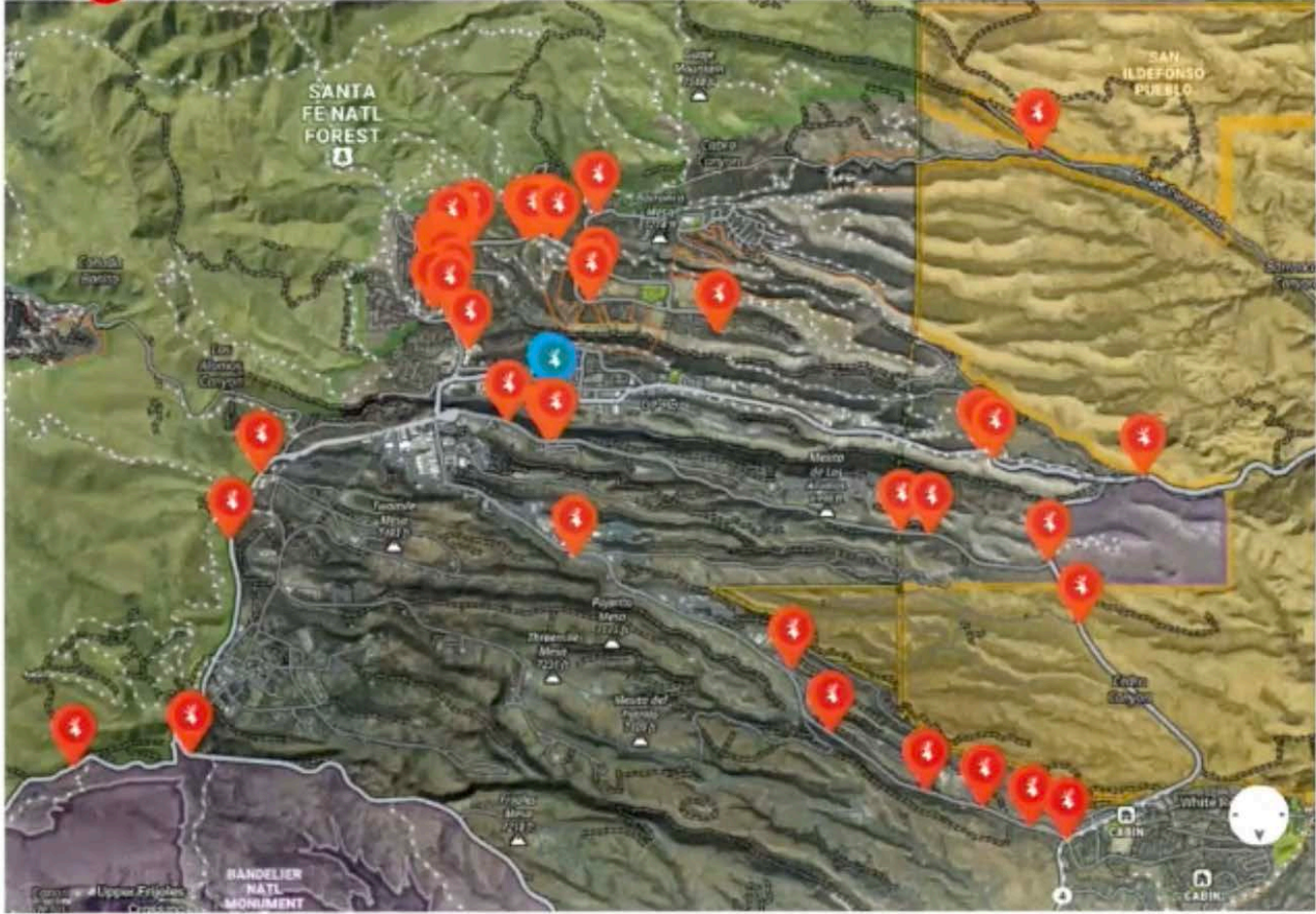
Large Game Animals Hit by Car 2023

593 - Total accidents
62- Involving wildlife:
54-Deer, 5 Elk, 1 Coyote, 1 Bear
1 Cattle



**“This is a terror part of their day--commuting to and from work” -
Ted Wyka to Los Alamos County Council in March 2024**

Large Animal/Vehicle Crash Map



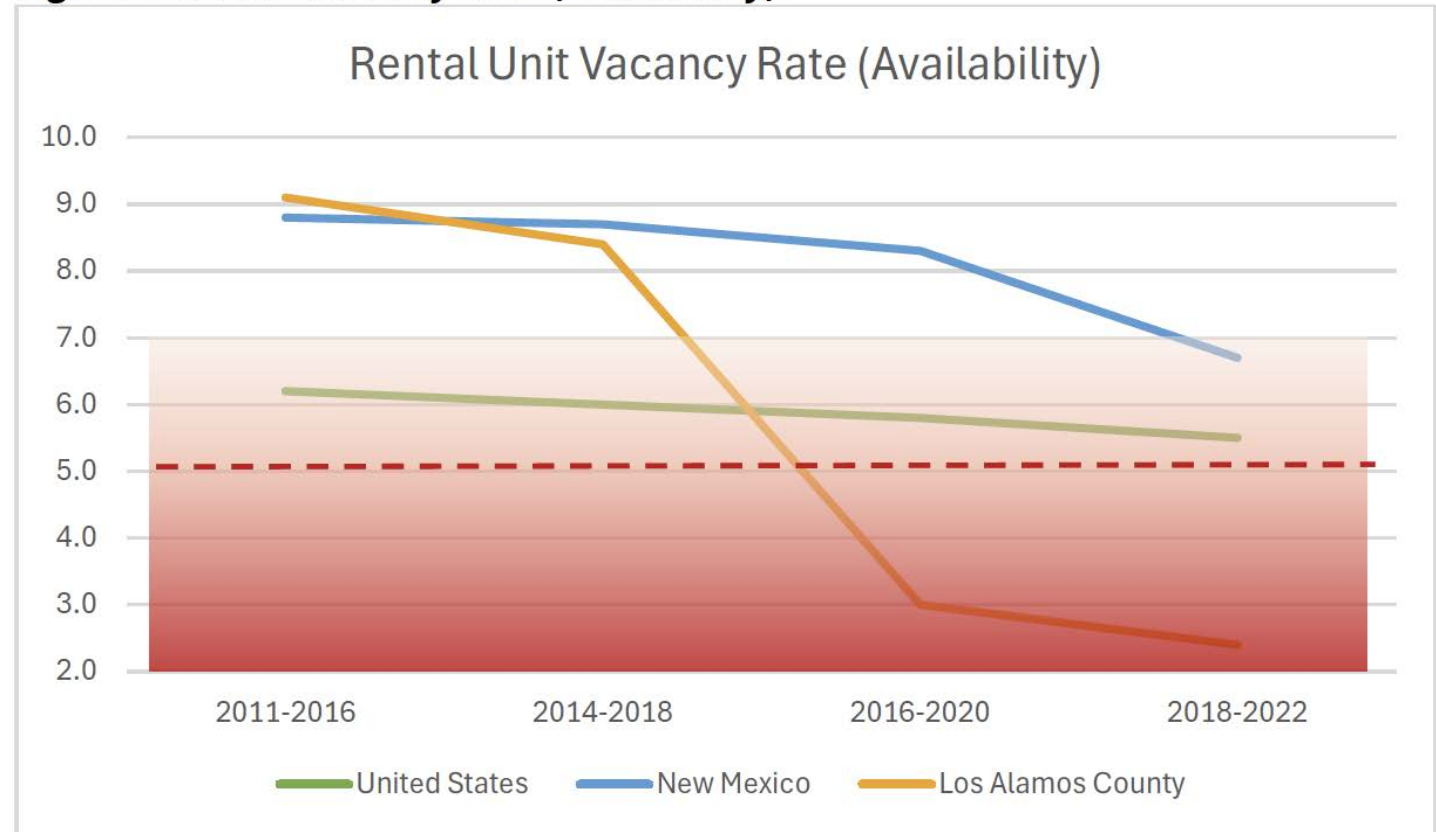
Avoid the Commute and live in Los Alamos?

Change in Income vs. Housing Costs, 2018-2023 (Figure 10, Pg. 27)



Figure 1. Change in income vs housing costs in Los Alamos. (Source: Los Alamos County's 2024 Affordable Housing Plan - final review draft)

Figure 6. Rental Vacancy Rate (Availability)



U.S. Census ACS: CP04, 2016, 2018, 2020, 2022

Fighting an uphill battle up the hill

- LANL has several convoluted solutions
 - Park and Rides
 - Carpooling to LANL or Park and Rides
 - Vanpooling to LANL or Park and Rides
 - Hybrid work, tele-work
- Is it actually enough? Where are LANL employees parking? Do the roads leading to LANL have capacity to sustain the rapid growth?

LANL pit production: inherent geologic and geographical challenges

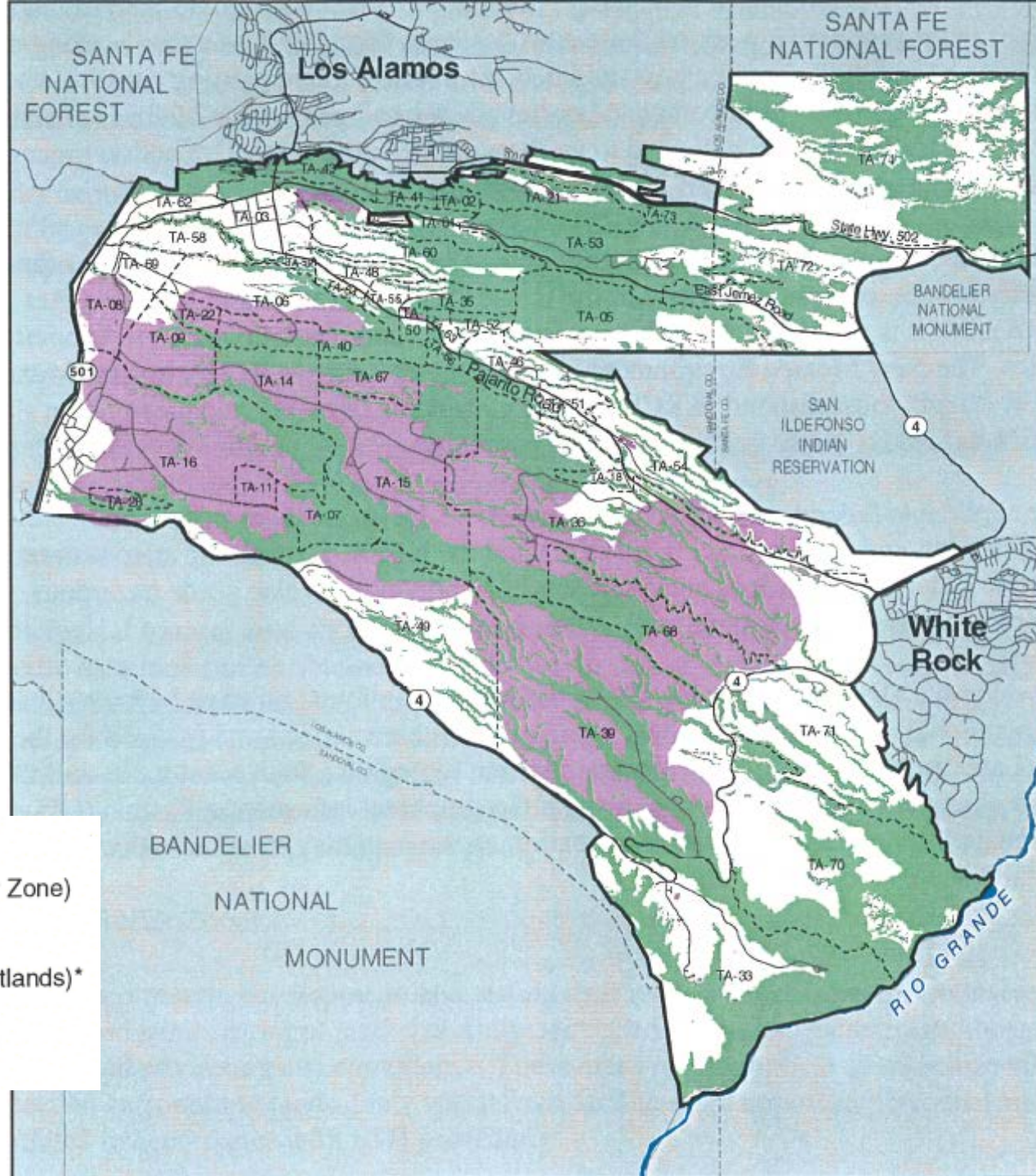
- Geographic isolation. Limited road access, long traffic standstills already, limited local housing, limited regional education and industry. Essentially no high-tech industry within 1.5 hour drive. Limited craft labor supply. Isolation underlies many other issues.
- Highly dissected topography, including near TA-55.
- LANL is effectively a rather small site, with few possible sites for nuclear facilities. Residences, highways, national monuments, tribal lands, are near nuclear facilities needed for pit production and waste staging.
- Unconsolidated sediments at modest depth beneath most or all LANL sites, amplifying seismic accelerations and providing poor lateral buttressing near mesa edges. At the surface, there is extensive fracturing of the more welded tuff, potentially destabilizing cliffs in major earthquakes, as LANL has observed (see [LASG letter of 7/1/20](#) at 5.)
- High seismicity (Richter ≥ 7.0), near-surface (1-mile deep) epicenters, fault zone bordering site and splays traversing it.
- Pit production at LANL depends on a number of aging and/or questionable (PF-4, Sigma, Main Shops), new but with problems (TRUWF, RLUOB). Specialized functions (e.g. radiography) are challenged and may require workarounds (Pantex or DAF).

Extra slides, unfinished


Policy summary

If preparations for pit production must occur, it would be better to do this at one adequate site and facility, namely SRPPF, for reasons of cost, safety, risk to other NNSA programs, and environmental impact. The only real “downside” to such a policy is that it would limit warhead deployment on the Sentinel ICBM to the present single-warhead level for an unknown period of time. Despite decades of work, the LANL plutonium facility (PF-4) does not yet meet DOE safety standards and may never do so. PF-4, which is old and was built for R&D, not production, also houses several other NNSA programs, essential to the arsenal. The full scope of required investment at LANL remains unbounded and will grow. Inherent problems of the site and its facilities make success of current highly-ambitious plans doubtful. Even in the most successful case, LANL’s pit production will be time-limited, as NNSA understands, and unable to support the U.S. arsenal. SRPPF, by contrast, could fully support the current U.S. nuclear arsenal or any smaller one. The best and only quasi-sustainable pit role for LANL is one of technology demonstration and training.

LANL operational and physical constraints, LANL, from 2000 Site Plan

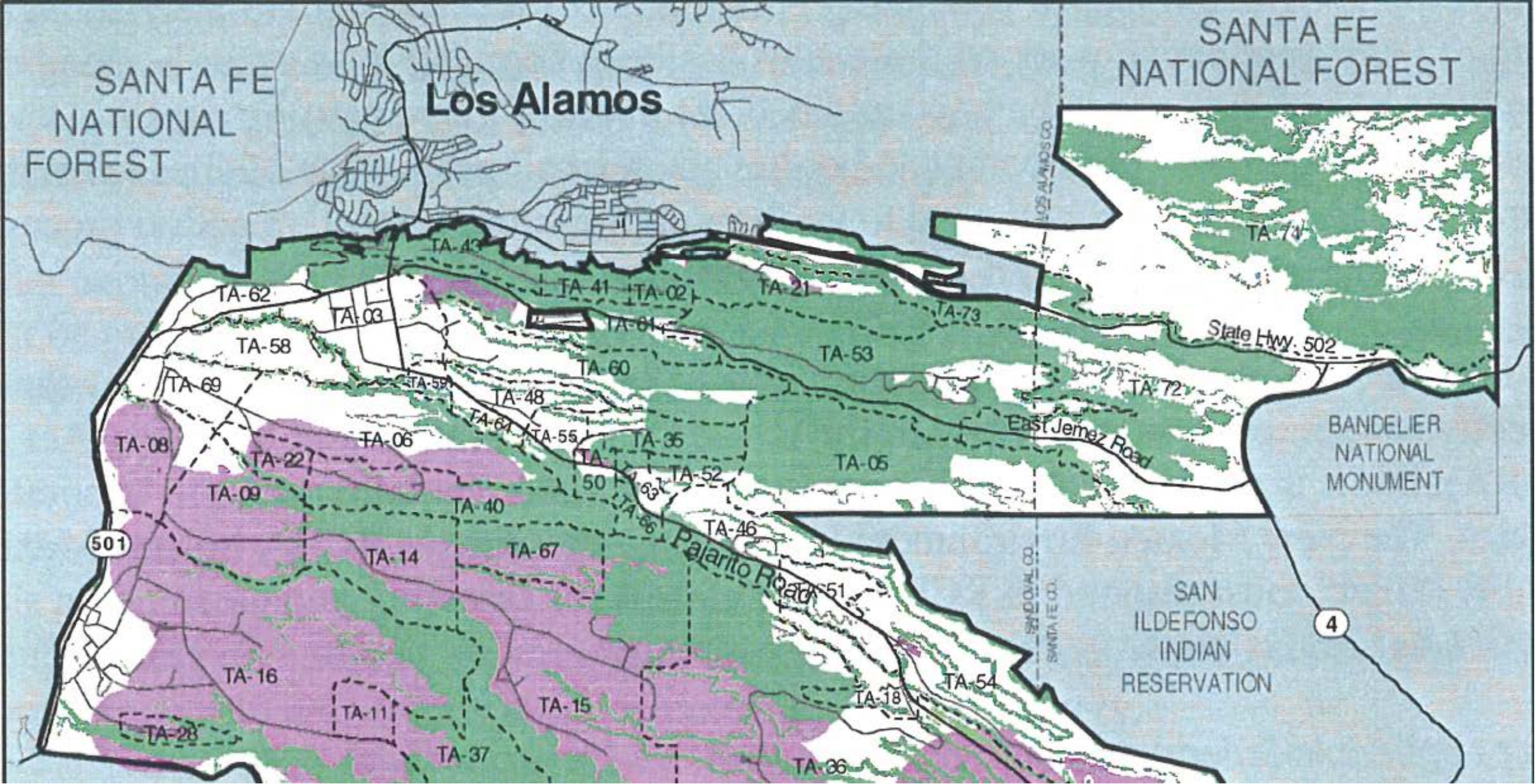


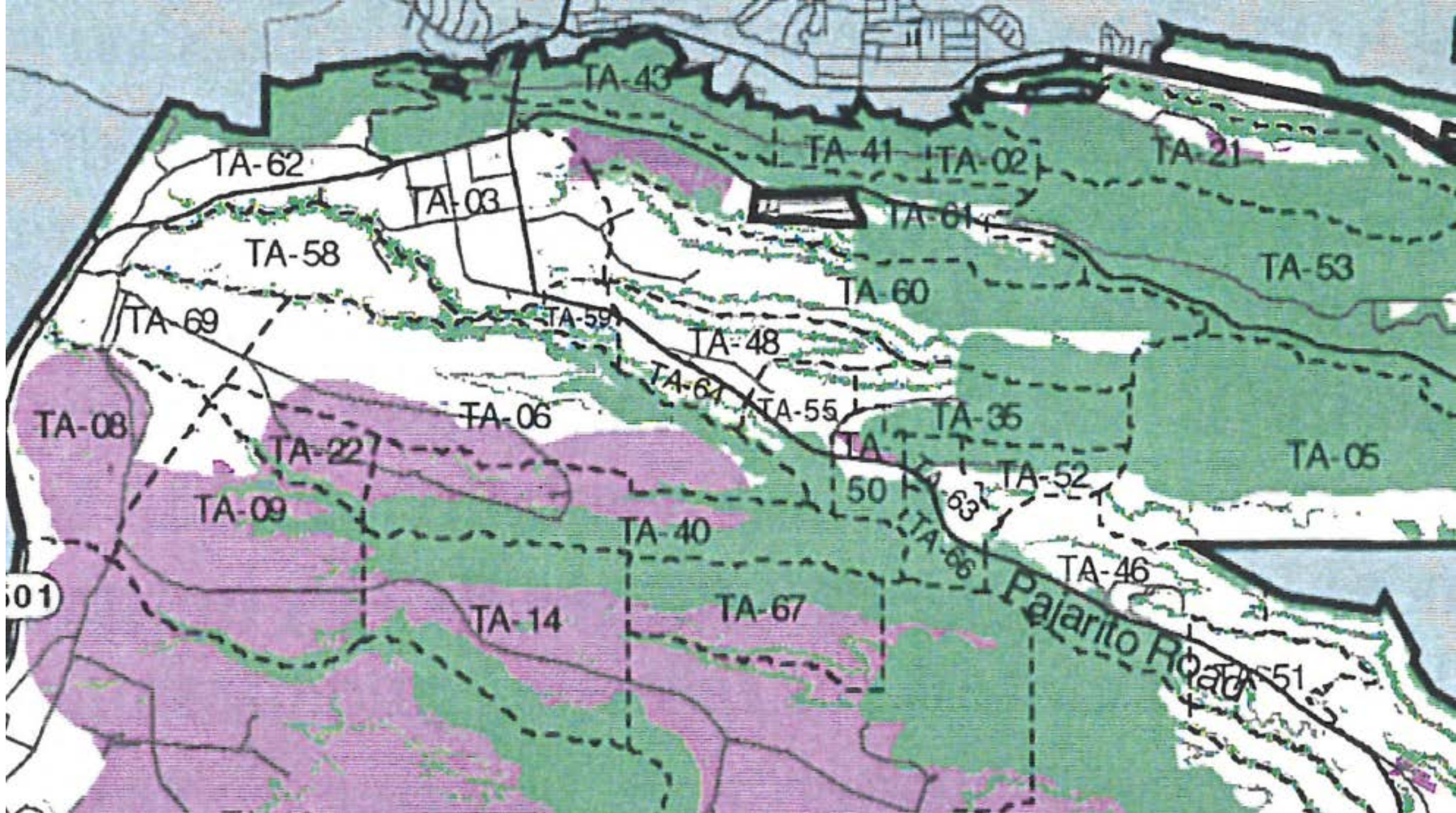
 Operational Constraint
(Hazardous Waste, Blast Buffer Zone)

 Physical Constraint
(Slope >20%, T&E Habitat, Wetlands)*

*Archeological Sites Not Shown

Also not shown:
known active
earthquake faults,
buffer zones from
site boundaries
needed for a)
security, b)
limiting accidental
exposures, and c)
retaining open
campus in TA-03.





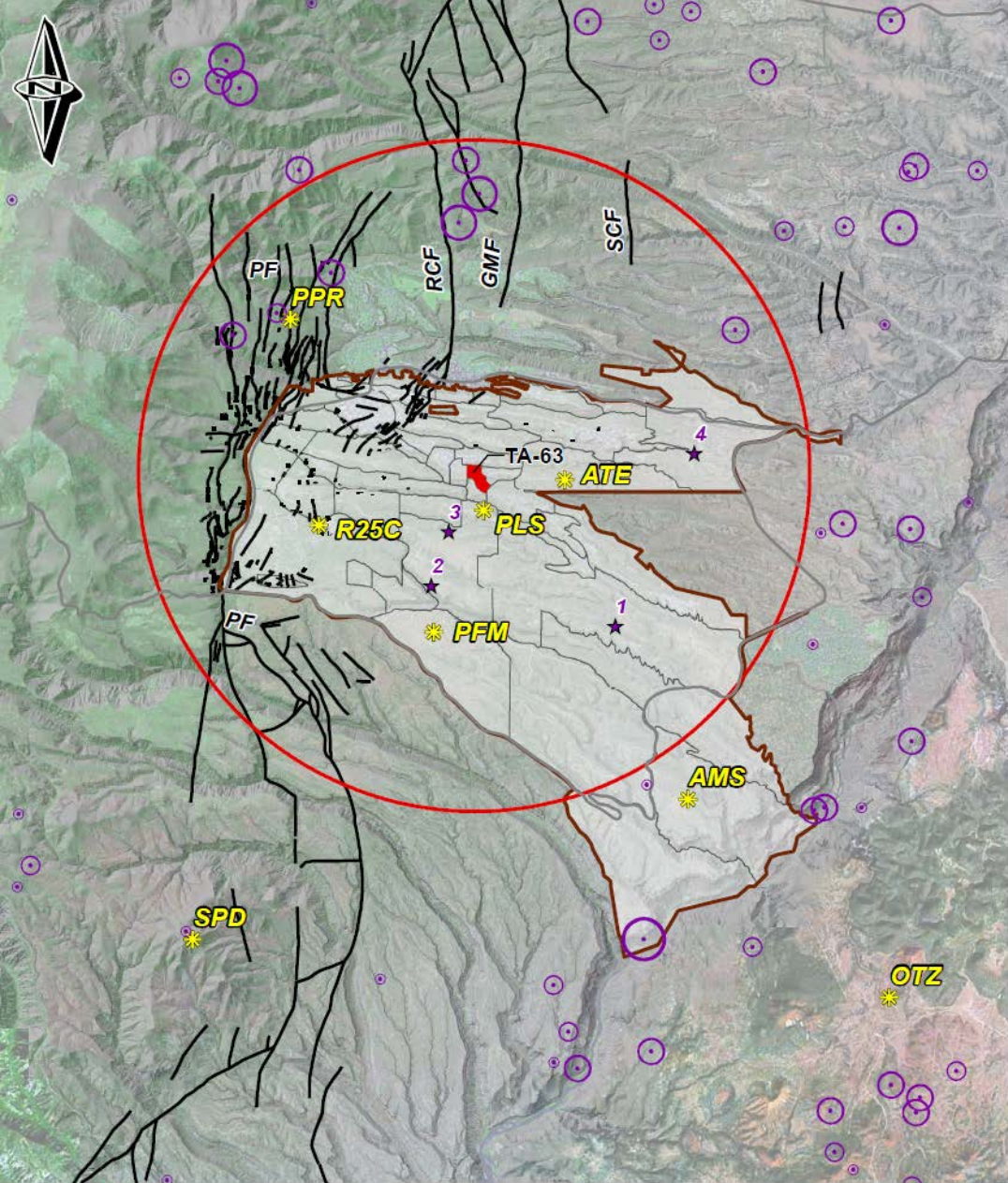
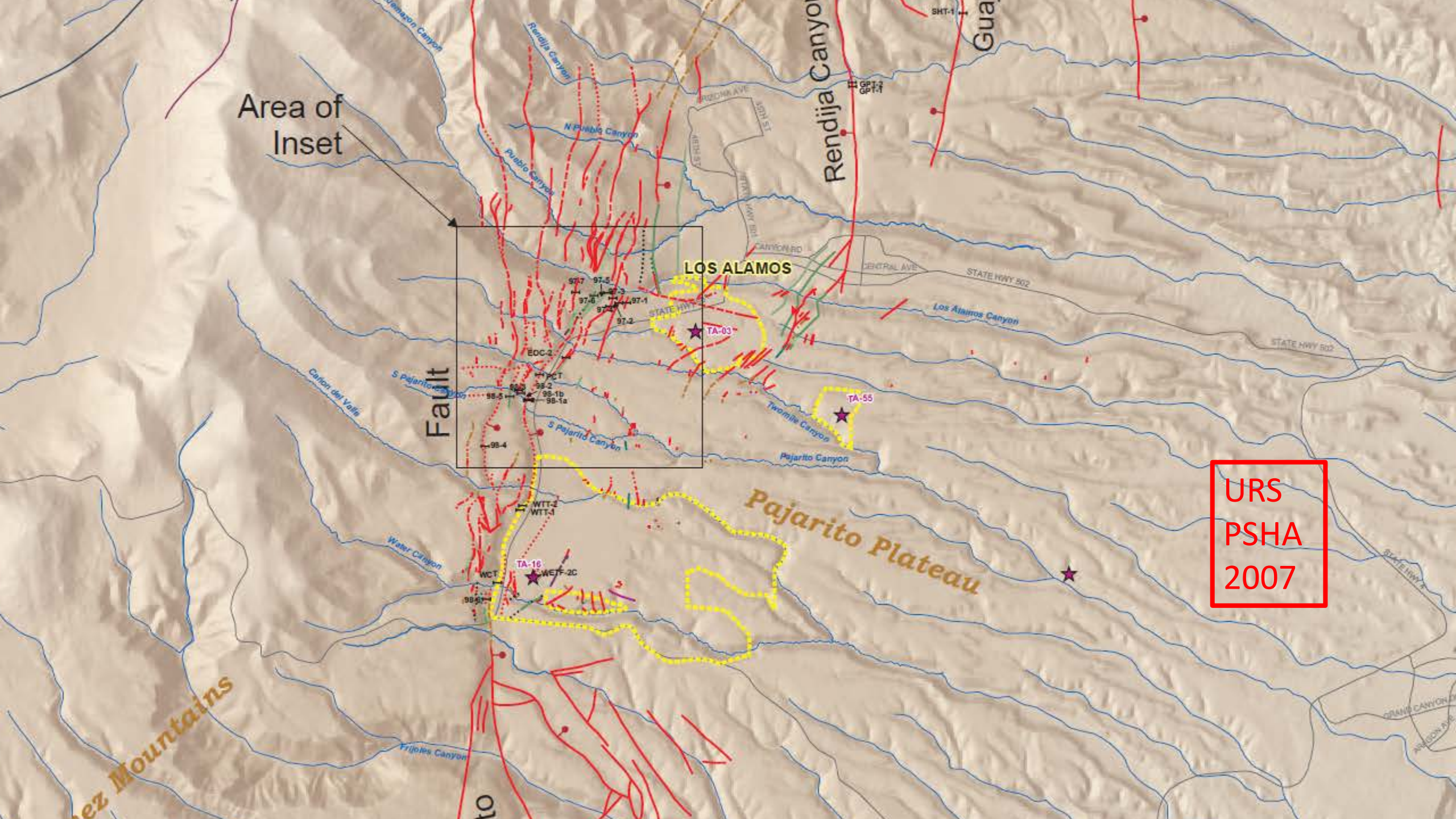


Figure 3. Map showing the Los Alamos National Laboratory (LANL) site and surrounding faults. The map includes a red circle highlighting the LANL site and a brown outline for the TA-63 5-mile buffer. Faults are labeled with abbreviations like PF, RCF, GMF, SCF, PPR, R25C, PLS, PFM, AMS, SPD, and OTZ. Earthquake epicenters are marked with purple stars and circles of varying sizes representing magnitude. A legend at the bottom explains the symbols and provides scale bars in miles and kilometers.

LANL sits on the western edge of the Rio Grande Rift, a graben bounded by more or less vertical faults. The Pajarito Fault System runs N-S along the western edge of LANL.

Faults also run through the LANL site and town. I do not believe that the relatively high density of faults mapped N and S of the lab magically becomes much lower beneath the lab itself. Other LANL publications do show faults (Guaje, Rendija) crossing the entire laboratory from N to S.

There is strong evidence of three earthquakes of 7.0 magnitude or greater in the Holocene. This system has shallow earthquakes (~ 1 mile), with relatively great acceleration (>1 g vertically), comparable to accelerations experienced at Fukushima. Unconsolidated ash layers amplify acceleration, including at TA-55. The rhyolite tuff of the Plateau may fracture almost anywhere, posing risks to cliff-side structures (e.g. the hospital) and to access roads, neither of which can be expected to remain open in any major quake.



Area of Inset

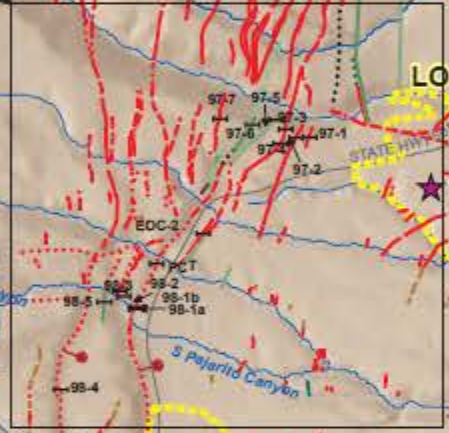
LOS ALAMOS

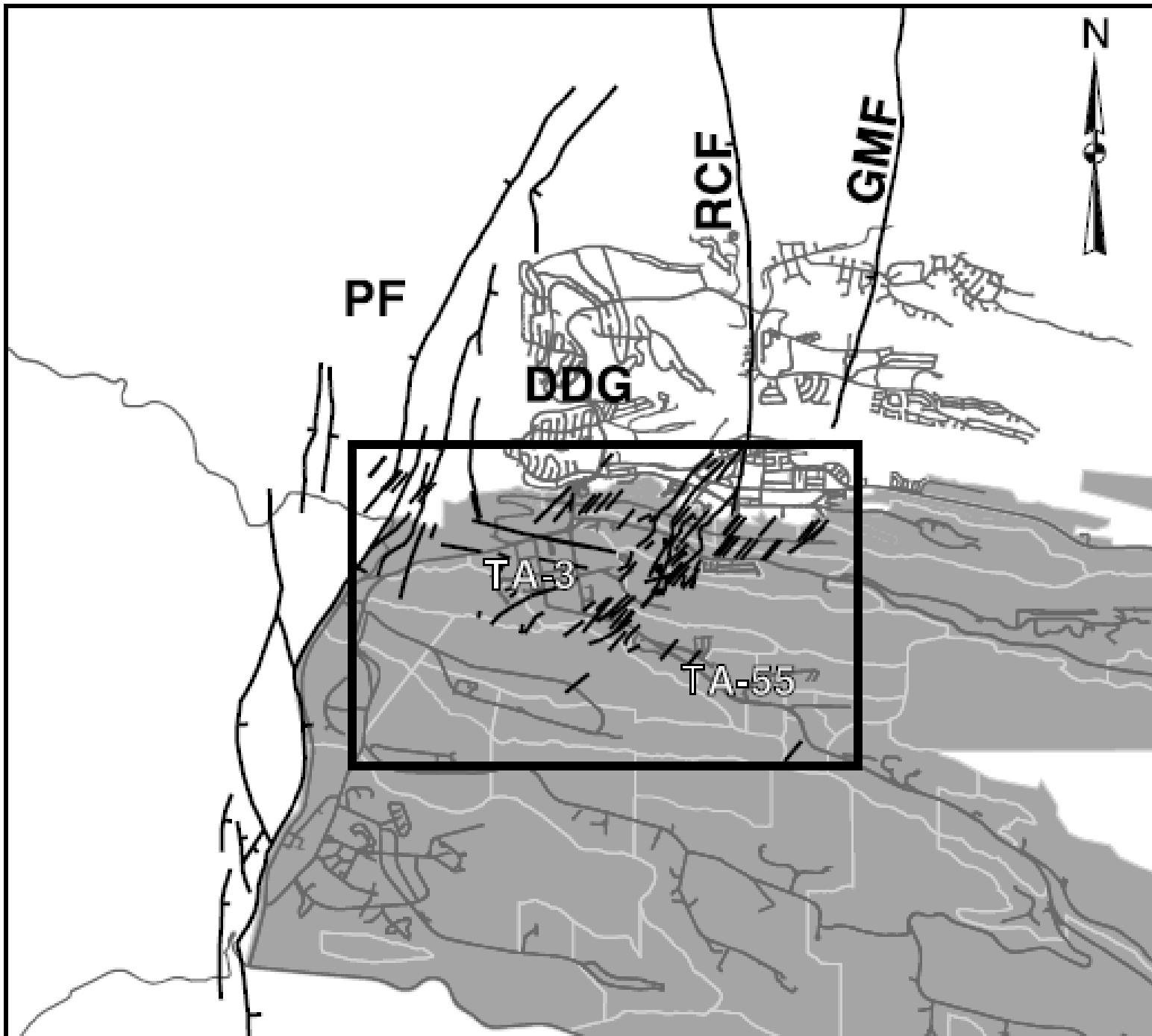
Fault

Pajarito Plateau

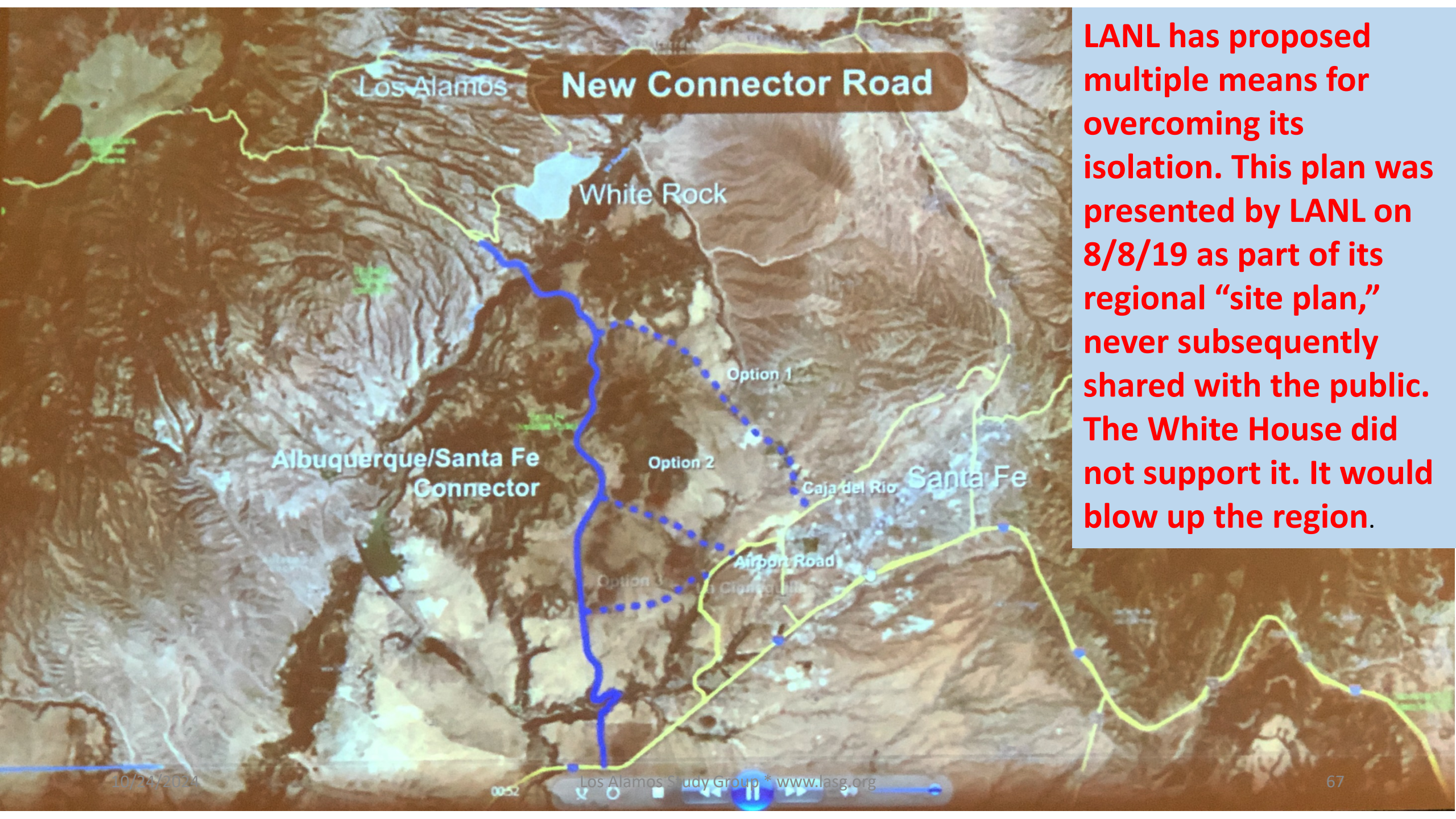
Rendija Canyon

URS
PSHA
2007





Gardner et
al 1999,
LANL



New Connector Road

LANL has proposed multiple means for overcoming its isolation. This plan was presented by LANL on 8/8/19 as part of its regional "site plan," never subsequently shared with the public. The White House did not support it. It would blow up the region.



Proposed Rio Grande
bridge crossing area
looking north, LASG photo
2012.

Any such crossing would be
highly controversial.

[Bigger](#)

**Same plan,
1990 version.**

**The workforce
and congestion
imperatives
behind this wild
plan are non-
trivial, given
LANL's growth,
low availability
of skilled labor,
and lack of local
housing.**



**SANTA FE-
LOS ALAMOS
CORRIDOR
STUDY**

**MONTOSO PEAK ALTERNATE
STEEL TRUSSED ARCH**

VIEW TOWARD SOUTHWEST FROM LOS ALAMOS
NATIONAL LABORATORY-TECHNICAL AREA 33

Los Alamos Study Group * www.lasg.org

EXHIBIT

II-7

10/24/2024

Resilience of LANL pit production

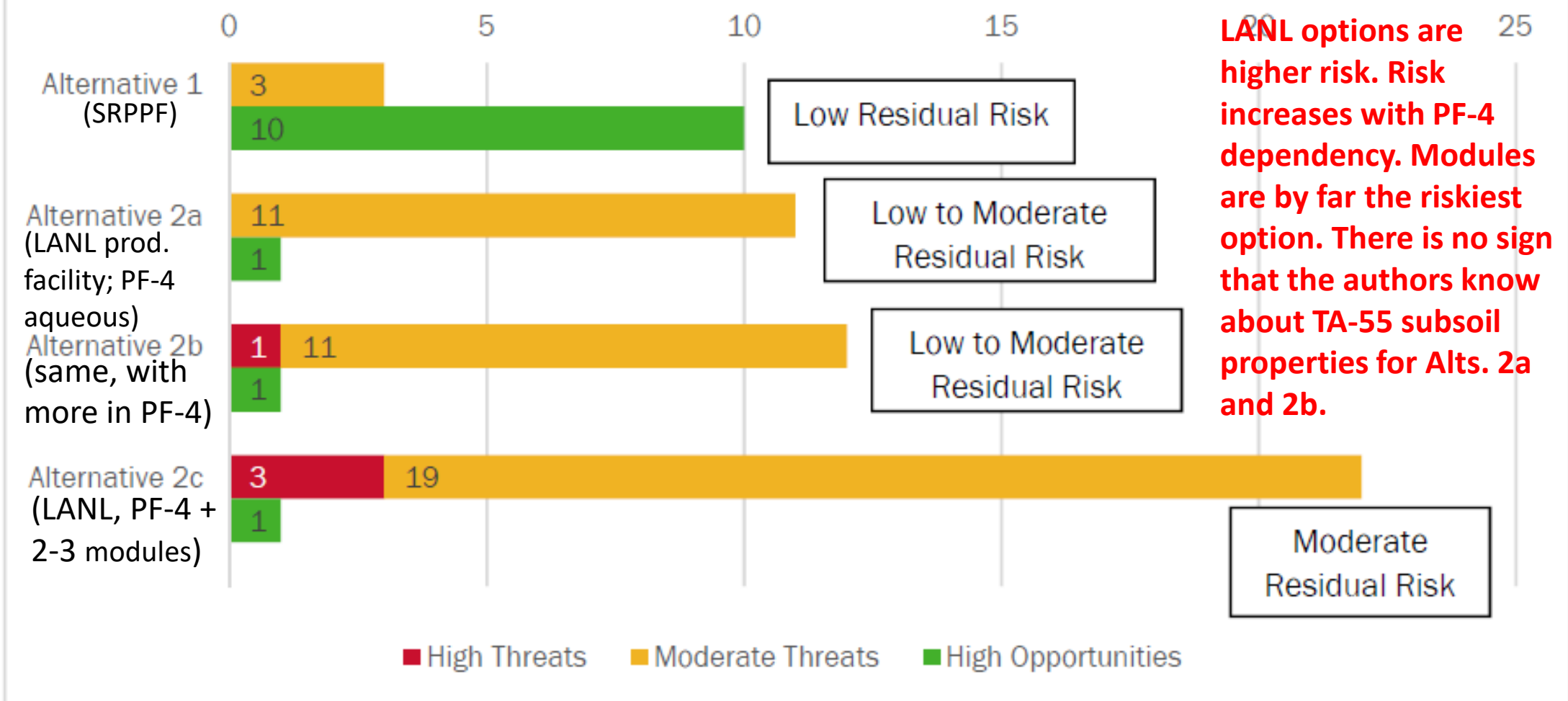
- This topic is largely shielded by SRD and UCNI barriers. LANL analyzed six high-impact uncertainties in 2021 ([Appendix A](#)). See also the risk analyses in the AoA (for the ≥ 80 ppy mission) and the EA (for an additional ≥ 50 ppy at LANL); examples are in the next 2 slides.
- Historically, PF-4 operation has been shut down twice for fairly long periods (in 2004, when the whole lab was shut down, and at PF-4, for ~ 4 years beginning in 2013). Numerous short shut-downs have also occurred; we do not have a tally.
- NNSA's pit production modeling accounts for equipment outages but not facility-wide shutdowns.
- "[CEPE's \[May 2021\] assessment](#)[of LANL pit production plans] concludes that there are significant risks in staffing, program management, production activities, supporting infrastructure, waste management, and other program requirements. The initial plan also provided no analysis describing the impact on all plutonium operations of...CEPE assesses that more work will need to be done to improve the current plan and mitigate risks."

Table 8-2. Summary of results of risk assessment for short list of alternatives ordered from high to low

Risk Category	ID#	Brief Description of Threat	PF-4 Alts.	LANL New	SRS MFFF
High Risks that Discriminate Between Alternatives	C-10	Construction or repair and modifications impact ongoing site or facility operations, or ongoing site or facility activities impact construction or repair and modifications.	Red	Green	Green
	O-1	Pit manufacturing adversely affects other site or facility projects, or other site or facility projects adversely affect pit production.	Red	Green	Green
High Risks that Apply Equally to All Alternatives	C-4	Sufficient line item funds are not available (either in individual fiscal years or in total), resulting in a delay to completion of construction and startup.	Red	Red	Red
	C-8	More stringent interpretations of safety requirements during design and construction require significant facility structural or service system upgrades.	Red	Red	Red
	C-9	Additional security provisions (e.g., clearances, escorts, fences, changes in the design basis threat) beyond those planned are imposed.	Red	Red	Red
Moderate Risks that Distinguish Between Alternatives	C-11	Existing facilities require more work than planned to meet applicable codes and standards (i.e., latent conditions may unexpectedly come into play). Equivalently, unforeseen conditions in existing facilities during repair or upgrades result in more work than planned.	Yellow	N/A	Green
	C-24	Difficulties arise while transferring the MFFF facility licensing basis from NRC to DOE.	N/A	N/A	Yellow
	C-5	Intra-agency and/or inter-agency disputes delay project and introduce extra costs or unwanted restrictions on the project.	Green	Green	Yellow
	C-2	National and/or local policy/public opposition result in delays and extra costs.	Yellow	Yellow	Yellow
	C-20	An external flood occurs during construction.	Green	Green	Yellow
	O-17	An external flood occurs during operation.	Green	Green	Yellow
From NNSA, "Plutonium Pit Production Analysis of Alternatives", (AoA), p. 64. Eliminated alternatives not shown.					
The AoA examined alternatives for an 80 ppy capability. NNSA's present plan includes the option of "surging" to 80 ppy in PF-4. The AoA notes that NNSA has rejected PF-4 as an enduring plutonium production facility (p. 47).					
high risk		moderate risk		low risk	

These discriminating high risks seen in 2017 still apply.

Residual Threats and Opportunities



[EA](#), 2018, p. 4-24

Figure 4-2: Alternative Qualitative Risk Comparison For 50 ppy + an assumed 30 at LANL.

Some fairly recent articles on safety lapses at LANL; time does not permit any analytic treatment

[Government watchdog says LANL could be doing more to prevent glove box contaminant releases](#), *Santa Fe New Mexican (SFNM)*, Apr 17, 2024

[Reports: 2 mishaps at LANL in one day](#), *SFNM*, Apr 8, 2024

- [LANL director addresses rash of safety incidents](#), *SFNM*, Feb 10, 2024
- [Los Alamos glovebox fire sprinklers could cause criticality, safety watchdog says](#), *Exchange Monitor*, Feb 9, 2024
- [Los Alamos National Laboratory logs two more skin-contamination incidents](#), *SFNM*, Feb 5, 2024
- [Los Alamos sees spate of radiological contamination episodes around plutonium facility](#), *Exchange Monitor*, Jan 18, 2024
- [Report: Another LANL worker's skin contaminated](#), *SFNM*, Jan 16, 2024
- [Report: Radioactive contaminants found on Los Alamos National Lab worker's skin](#), *SFNM*, Jan 9, 2024
- [Glove box fire closed part of LANL plutonium facility in November](#), *SFNM*, Dec 19, 2023
- [Glovebox Fire shuts portion of LANL plutonium lab for nearly two weeks](#), *Exchange Monitor*, Dec 15, 2023
- [Glovebox Fire shuts portion of LANL plutonium lab for nearly a month](#), *Exchange Monitor*, Dec 12, 2023
- [Workers Are Getting Paid to Do Nothing at Los Alamos National Laboratory](#), *The Nation*, Nov 9, 2023
- [Chess, cards and catnaps in the heart of America's nuclear weapons complex](#), *Searchlight New Mexico*, Nov 8, 2023
- [Lab contractor cited for 2022 glove box breach](#), *SFNM*, Nov 3, 2023
- [LANL reports glove box breach, tritium drift weeks apart](#), *SFNM*, Nov 1, 2023
- [Eight workers exposed to beryllium dust at LANL, a recurring problem](#), *SFNM*, Sep 27, 2023
- [Safety Lapses at Los Alamos National Laboratory](#), *Searchlight New Mexico*, Jul 13, 2023
- [Triad Hit By DOE With Preliminary Notice Of Violation For 5 Nuclear Safety Issues At Plutonium Facility PF4 In 2021](#), *Los Alamos Reporter*, May 31, 2023
- [Watchdog agency grills LANL, nuclear officials on lab safety](#), *SFNM*, Nov 16, 2022

Key issue: waste production and legacy TRU removal (II) (older slide)

- As of June 2022, there were 12,820 55-gal. drum-equivalents (“drums”) of TRU buried at Area G, roughly 3,000 drums above-ground in tents (insert better number) at Area G, and ~400 drums of Triad TRU stored there also. In addition Triad was/is storing ~2,250 drums, making ~18,470 drums in all.
- New TRU from LANL Pu programs are the primary reason for the remaining large inventory of legacy TRU. Historically, most TRU shipped from LANL to WIPP has been new, not legacy.
- In the event of conflicts, disposal of new TRU from NNSA must be prioritized over legacy TRU. We do not believe NNSA has any realistic plan to remove the legacy TRU from LANL, let alone one that is funded.
- The new Radioactive Liquid Waste Treatment Facility (RLWTF) and Transuranic Liquid Waste Facility (TLWF) are not yet operational (RLWTF) or completed (TLWF). These have been under study and construction for 25 years.
- The new TRU (solid) waste facility was badly designed, inadequately sized, overpriced. Two of these, not just one, are needed to support pit production, according to NNSA in 2017.
- Demolition and disposal of contaminated buildings, e.g. CMR, Sigma, Main Shops, Radiochemistry (TA-48), Ion Beam building and many more. LANL projects over 1,000,000 sq. ft. of building demolition overall. Where will the construction waste go? The low-level waste (LLW)? How much TRU will be generated? When will NNSA budget for this? Eventually, PF-4, WETF, and other nuclear facilities will need to be demolished and disposed.
- To these waste streams, other operational wastes and environmental cleanup wastes must be added.
- What is the future of on-site disposal and closure at LANL? After 30 years, these questions remain up in the air, to keep NNSA’s options open.
- Please note: environmental contamination at LANL was intentional, at every point in time. LANL knew better.

Key issue: waste production and legacy TRU removal (I)

From NNSA, [Assessment of Pit Production at LANL](#), Office of Cost Estimating & Program Evaluation (CEPE), May 2021, obtained by LASG FOIA appeal.

The [Enduring Mission Waste Management Plan for LANL, LA-CP-20-20577](#), Sep 2020, obtained by LASG FOIA, provides no clarity because of the obviously-political redactions. LANL doesn't want the public to know.

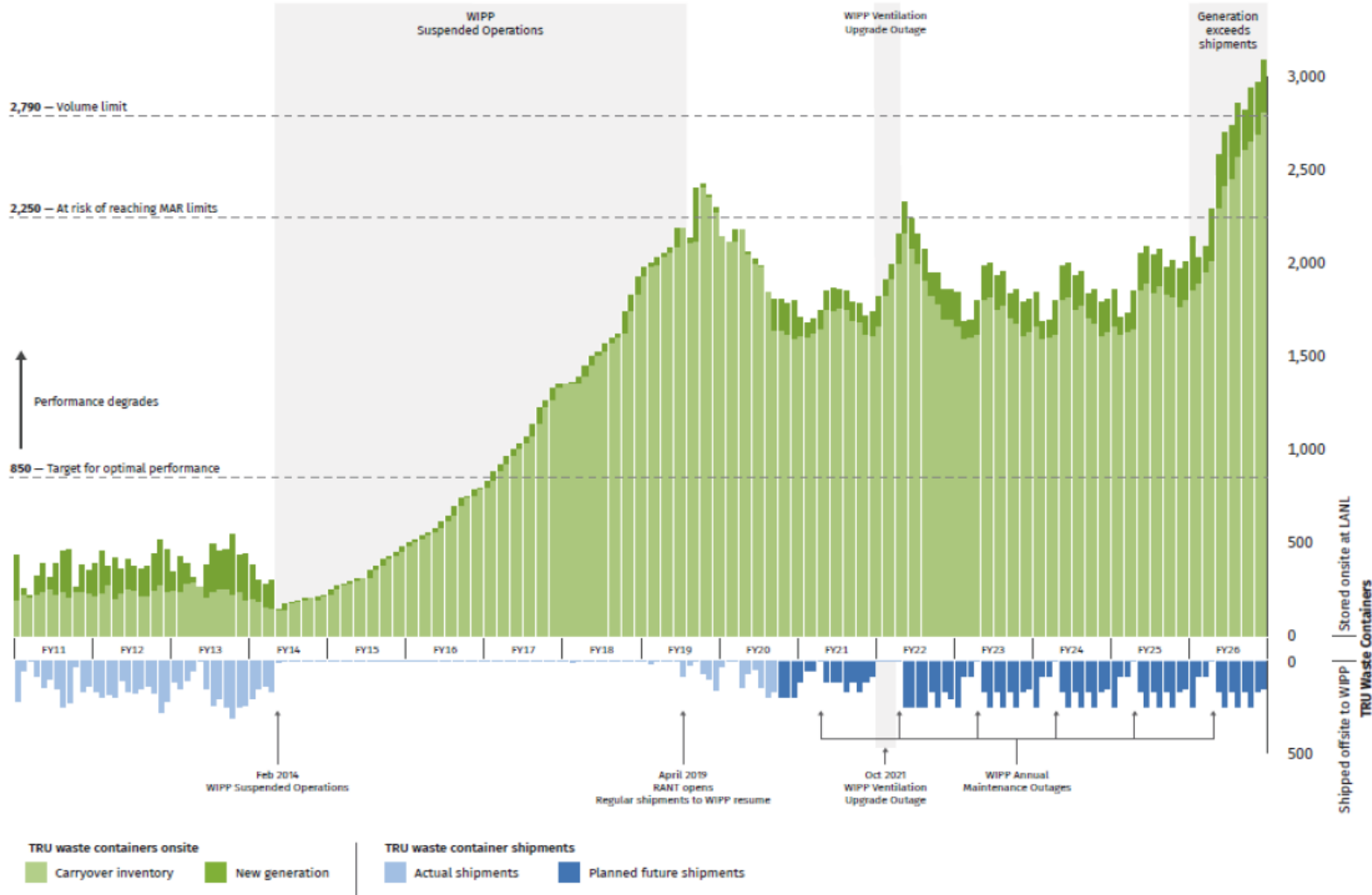


Figure 2: Transuranic (TRU) solid waste containers stored onsite and shipped offsite at LANL, based on forecasting included in the LANL Integrated Strategy.

Key issue: hiring (I)

In its October 2017 and April 2018 studies ([here](#), at p. 13, and [here](#), at pp. 2-6, 2-7), NNSA assumed that LANL could produce 30 pits per year (ppy) during a single production shift. [\[note 2\]](#).

By February 2020 that had changed. In its congressional budget request for FY2021 NNSA admitted for the first time that LANL's plutonium facility would need to run "24/7" to meet its 30 ppy production goal ([p. 194](#)).

In March 2020, NNSA again spoke of "24-hour operations" with the addition of 1,600 full-time-equivalent (FTE) staff members to reach just 20 ppy ([p. 12](#)). Another 400 FTEs would be necessary to reach 30 ppy ([p. 14](#)).

Federal sources told us that as of January 2020 LANL employed about 2,000 full-time equivalents (FTEs) in pit production. By May 2020 LANL employed 2,316 FTEs in pit production ([p. 9](#)). In August 2020 NNSA stated it needed to hire an additional 1,900 FTEs to reach a 30 (ppy) capacity ([p. 15, 17](#)), bringing the total LANL future pit production workforce needed for the 30 ppy mission to at least 4,216 FTEs.

By contrast the 2018 Engineering Assessment (EA) for pit production estimated that to produce all 80 ppy at LANL, LANL would need from 833 to 1,156 total FTEs, including both direct- and indirect-funded activities. Thus, LANL's estimated staffing requirements have grown by more than a factor of four over the past four years, for 38% as many pits. LANL's staffing needs have grown by a factor of 11 per prospective pit produced. Never before in U.S. history has planned baseline pit production been dependent on multiple production shifts. [\[3\]](#)

Key issue: hiring (II)

LANL struggles with employee retention. Voluntary attrition exceeded 7.5% for most of 2019. According to [GAO](#), it was "below 7.5% for all of calendar year 2020 and the majority of calendar year 2021" (p. 24). About half of this is retirements (p. 24). Involuntary attrition will add to this "below 7.5%". Students, postdocs, and craft employees are apparently not included in LANL's headcounts (p. 23). Of note, in its internal [review](#) of LANL pit production plans, NNSA reported that LANL had an annual attrition rate of 8% in 2021 (p. 4).

We have compiled hundreds of negative individual reviews of work at LANL from open sources. And as noted in previous testimony, the Department of Labor has paid survivors of approximately 2,000 unique LANL workers death benefits. Cumulative EEOICPA [benefits paid at LANL](#) approach \$1.5 billion. This is suffering and grief, not economic development.

Quoting again from [GAO](#):

...[NNSA] officials also acknowledged several challenges to attracting and retaining new talent. For example, **NNSA officials stated that Triad has already depleted the local talent pool in northern New Mexico.** Triad is targeting other geographic areas for recruitment, such as the city of Albuquerque. However, it is also competing with large technology companies moving into such areas that can offer high salaries and that do not require staff to commute long distances, according to NNSA officials. DOE's Human Reliability Program also places unique requirements on certain employees, including that LANL staff with access to certain materials, nuclear explosive devices, facilities, and programs meet high standards for reliability and physical and mental suitability. NNSA officials also said that having to maintain security clearances and be subject to random drug testing can deter some potential employees. [emphasis added]

Key issue: hiring (III)

According to a recent NNSA report (“Evolving the Nuclear Security Enterprise,” Sep. 2022), “[t]he NSE is experiencing tremendous workforce attraction and retention issues” (p. 3) nationwide. Further,

One overarching theme from virtually all [of 250 federal and contractor management] interviewees is the challenge of remaining competitive in the current job market, and the difficulties in both attracting and retaining qualified personnel...Some recruitment and retention factors cannot be completely changed, such as **moral dilemmas about nuclear weapons**, desires to transition to full-time remote or work-from-home status, the complications of acquiring or maintaining security clearances, and specific locality preferences. (p. 10, emphasis added)

We will return to the moral issues involved in promoting and producing weapons of mass destruction shortly, as it centrally affects New Mexico’s politics, social development, environment, and economic development.

In the meantime it is important for activists to realize that the moral dimension of nuclear weapons has practical implications, here and now.

Key issue: transportation (I)



Please see: [The troubled logistics of LANL pit production: how will LANL staff and contractors get to work?](#)