

Presentation to the

**Radioactive and Hazardous Materials Committee of the New Mexico Legislature**

**Unprecedented weapons production mission at LANL threatens regional decline, loss of autonomy: what can this committee do?**

Greg Mello, Los Alamos Study Group, November 12, 2021

*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

*We do not believe any group of men adequate enough or wise enough to operate without scrutiny or without criticism. We know that the only way to avoid error is to detect it, that the only way to detect it is to be free to inquire. We know that in secrecy error undetected will flourish and subvert.*

Robert Oppenheimer

*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

## **Prior testimony to this committee:**

- [September 9, 2020](#)
- [August 15, 2018](#)

## **For further background see also:**

- [LANL pit production: fifth failure in progress, presentation, Sep 30, 2021](#)
- [How deep a 'pit' will Biden dig at LANL?, editorial, Los Alamos Reporter, Sep 29, 2021](#)
- [Plutonium warhead factory under construction near Santa Fe, advertisement, Santa Fe Reporter, Sep 29, 2021; similar ad, Albuquerque Journal, Sun, Sep 19, 2021](#)
- [Plutonium expenses based on FY22 Congressional Budget Request, worksheet, Aug 24, 2021](#)
- [NNSA proposes new plutonium processing facility at LANL, press release, Aug 11, 2021](#)
- [Bulletin 281: LANL pit production: fifth failure in progress, Jul 16, 2021](#)
- [Third power line proposed for Los Alamos; environmental assessment process starting, press release, Apr 19, 2021](#)
- [NNSA pit production strategy: no clear goals, plans, or likelihood of success, briefing, Oct 1, 2020](#)

## Key Takeaways (I)

- The title of this portion of the present hearing refers to “resumption” of plutonium pit (plutonium warhead core) production. **Pit production is not being “resumed.” It is being enormously expanded, to an unprecedented degree, in:**
  - Cost: \$18 billion (B) over FY20 to FY30, not including *other* expanding Pu missions
  - Personnel: will require 4,000 full-time equivalent (FTE) operational staff, plus subcontractors.
  - Risks to workers: crowded conditions in old facilities designed for R&D and prototyping; 24/7 production plus construction; schedule pressures; mixed construction, production workers, & scientists; inadequate training of new personnel; no external regulation
  - Risks to surrounding communities: drastic curtailment of legacy waste shipments, potential nuclear and hazardous materials releases from unsafe facilities and practices, traffic accidents
  - Management complexity, as LANL frequently attests in public briefings
  - Physical scale: involving multiple new buildings – including new nuclear facilities needed to prosecute the pit mission in safer and more adequate facilities
  - Resource use (direct and indirect): increased use of electricity & water, impacts on open space
  - Community impacts: traffic, housing, sprawl, negative fiscal impacts, visual degradation
  - Political impacts, with likely losses in regional autonomy, identity, democracy, and sovereignty

## Key Takeaways (II)

- Transport of TRU waste and nuclear materials is fairly safe, radiologically speaking. There's no data to suggest danger. (Spent nuclear fuel is a very different matter.)
- Inquiring about transportation safety may be helpful in understanding the (much) bigger picture.
- Airborne nuclear risks from LANL to faraway communities are minimal to nonexistent. Nearby risks (e.g. to homes) are higher. Risks to San Ildefonso Pueblo lands abutting current waste storage and disposal sites in TA-54 are especially significant, with no end to this situation in sight.
- Cultural impacts can be greater than health physics understands, e.g. in views, in underground contamination, and in other damage to cultural and sacred landscapes. Some damage is irreparable.
- Pit production and other industrial plutonium missions badly damage the legacy TRU waste shipping mission and may render it infeasible not just for a few years but forever. It almost goes without saying that LANL is a permanently contaminated site. "Cleanup" will not be possible in many cases.
- NNSA seeks to construct a large new plutonium facility at LANL in which to conduct additional plutonium missions – at this time, surplus plutonium oxidation, but this mission may change.
- Once started in unsafe old facilities, NNSA will attempt to construct new facilities to retain the pit mission and other plutonium missions. Some of these new facilities have been announced; some have not. The full potential scope of the LANL plutonium missions is not known, or bounded.

## Key Takeaways (III)

- NNSA and LANL are not really sure how to make this mission work at LANL, and in northern New Mexico. Stated plans continually change and do not seem entirely realistic in some cases, especially as regards: worker transportation; safe operations and nuclear material “choreography” in crowded facilities on a 24/7 basis; construction of new nuclear facilities; and (runaway) costs.
- There is no transparency for tribal, state, or local governments about these plans, nor to citizens.
- The nature of LANL is changing. For the most part LANL is not a “lab” any more. Scientists and engineers are now a distinct minority.
- LANL is the greatest institutional consumer of resources and the greatest producer of greenhouse gases in northern NM apart from power plants and the fossil fuel industry. LANL’s operations completely fail DOE sustainability guidelines. LANL is a dirty lab with no real plans to improve.
- The few jobs LANL creates will not touch roughly 90% of the poverty in northern New Mexico, although they will increase inequality. LANL does not bring useful economic development. If it did, you’d see it by now.
- Pit production is the largest project in the history of NM by far. At \$18 B, it is more than 15x the cost of the Manhattan Project in NM (\$1.14 B) and more than the construction of all the interstate highways put together. [Sentence updated late 2021:] It is 10x NM’s expected part of the new money in the recent infrastructure bill (48% of \$3.7 B).

11/12/2021

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## Recommendations (I)

- Demand transparency for the State, tribes, local governments and citizens. Go around NNSA and LANL, which have never been and will never be candid. For example, request the:
  - *LANL Integrated Strategy* (annual iterations? FY20 is available);
  - *LANL Site Plan* (annual iterations?);
  - *Independent Assessment of the Plutonium Strategy of the NNSA* (Institute for Defense Analyses, 2019);
  - Critical Decision Zero (CD-0) documents for the “Pit Disassembly and Processing Project;”
  - CD-1 documents for the Los Alamos Plutonium Pit Production Project (LAP4);
  - LANL “Master Asset Deep Dive” planning documents; and
  - LANL transportation, utilities, and housing plans; records of LANL’s and NNSA’s engagement with private parties to realize these plans.

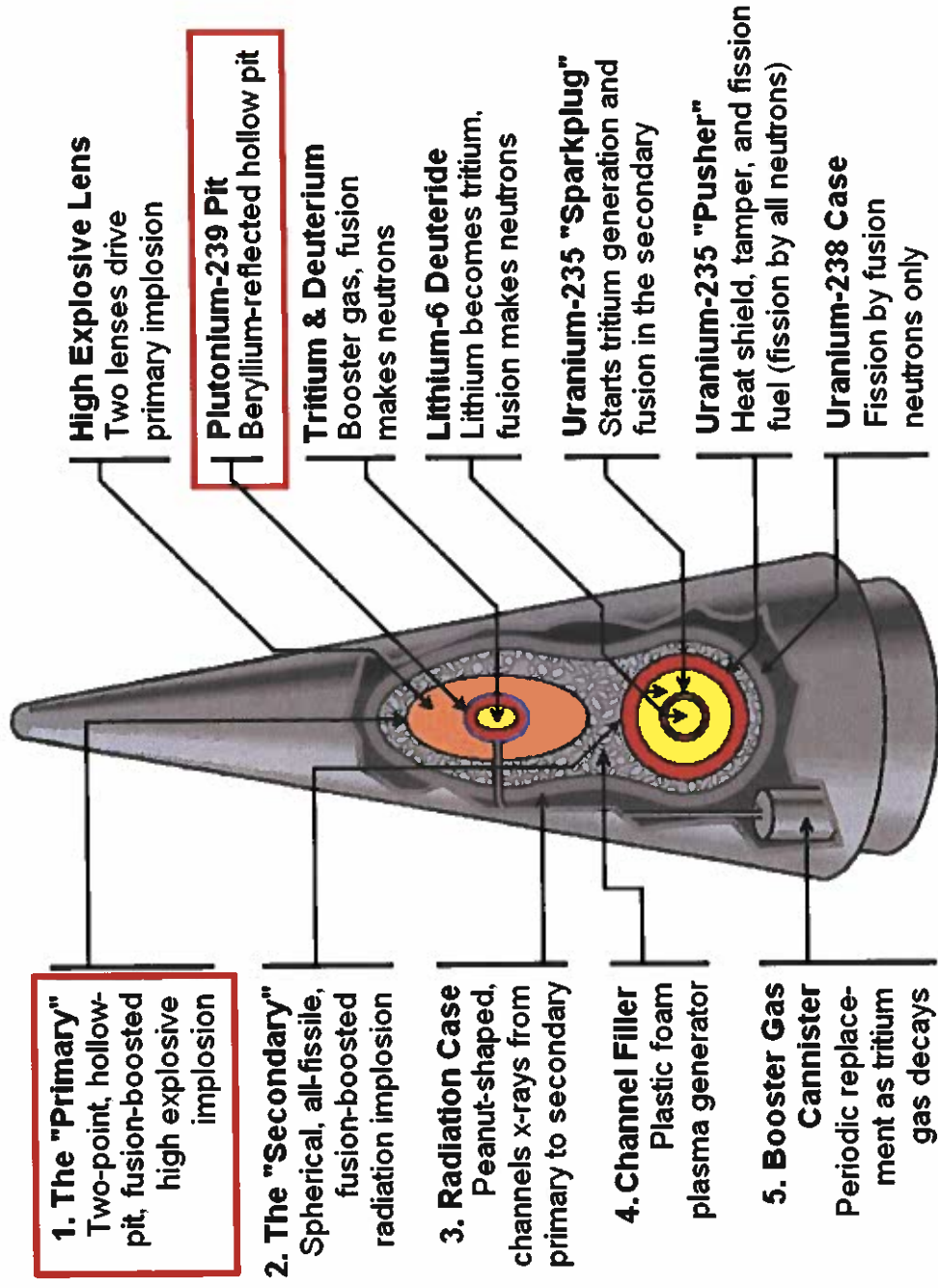
Some of these documents can be requested from the White House as well as congressional committees. Unclassified plans should be supplied in full and in redacted form for public release.

- Request a pause to authorizations and appropriations pending release, to the State, of these and any other plans pertaining to the future of northern and central New Mexico, and pending subsequent public meetings regarding these plans (next slide).

## Recommendations (II)

- Demand that NNSA conduct public meetings once these plans are available to interested parties, engaging with the White House and congressional committees for leverage to make this happen.
- Send a delegation from this committee to Washington to meet with President Biden to demand a pause in current plans until democratic processes are in place to publicly review whether these plans are in the best interests of tribes and New Mexico citizens and governments.
- Obviously, this committee cannot conduct any oversight or conduct any other function relative to this huge project unless it has these plans. Oral presentations and vague slide presentations, especially if conducted in secret, are entirely inadequate for a project of such historic magnitude.
- Do not settle for offers to conduct a new Site-Wide Environmental Impact Statement (SWEIS) as long as progress continues on this project. DOE NEPA practice is to offer project “scenarios” which obscure what is actually going on while providing legal cover for new projects later. Proceeding with projects during NEPA analysis is fundamentally contrary to NEPA in any case.
- There may be other ways to acquire transparency as regards these programs but I do not see them right now. I recommend choosing the most straightforward and open actions, those which bring as much of the truth of the situation into the full light of day as possible, as soon as possible, prior to irreversible federal commitments.
- What’s key is to realize that you do have ample political power, and you could use it.

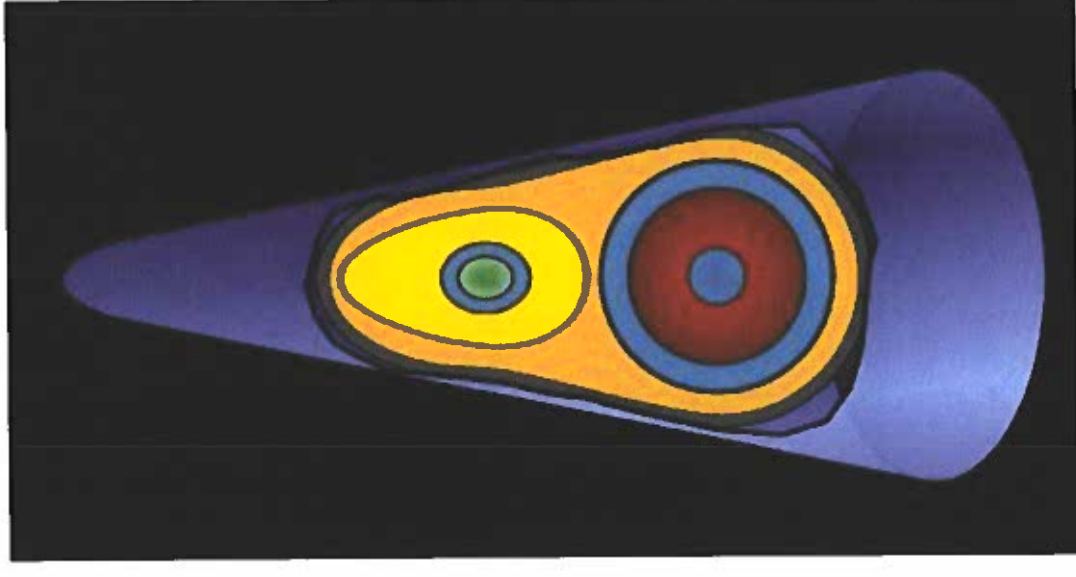
## W88 Warhead for Trident D-5 Ballistic Missile



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Sources for illustrations: Wikipedia





## 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 detailed 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).

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 ([p. 204](#)) and current high-end cost estimate of [\\$3.9 B](#) show it is but a fraction of the total pit production effort, which reliable sources tell us LANL has estimated to cost \$18 B over the current decade.

At present, LANL has no actual pit production capacity at all, beyond making developmental pits. In FY23, NNSA (meaning LANL, in the 2020s) is [required](#) to make one actual “War Reserve” pit, in FY24 10 pits, in FY25 20 pits, and in FY26 30 pits, which is the minimum rate LANL is required to maintain after that date. Upon information and belief, neither NNSA nor LANL expect to be able to exceed the 30 ppy *minimum* annual rate at LANL for the foreseeable future. This may translate to an *average* rate in the vicinity of 41 ppy ([pp. 23, 51](#)).

## **LANL pit production is a gigantic program.**

- For cost comparisons with past construction in New Mexico, see next slide. Only construction of all of New Mexico's interstate highways *combined* approaches (but does not reach) its financial scale.
- Its cost is \$18 B / \$3.7 B or 4.9x the size of the new federal infrastructure bill spending in New Mexico.
- It involves hiring at least 2,000 additional LANL staff members plus hundreds of construction subcontractors. Upon information and belief, thousands of personnel at LANL are currently working on this project.
- It exceeds the capacity of the LANL site itself, leading to the acquisition of more than 200,000 sq. ft. of office and laboratory space outside LANL. LANL must also construct several new buildings to conduct this mission, including new nuclear facilities for handling, storing, and processing plutonium.
- Its commuter needs exceed regional road capacity, leading LANL to propose a fleet of coach-class buses to bring 2,000 to 3,000 workers to the site daily from locations across central and northern NM.
- LANL's temporary and permanent housing needs exceed accessible housing. LANL is negotiating with at least three Pueblos to establish new trailer parks ("man camps") for temporary workers.
- LANL has sought, and we believe will seek again, a new high bridge over White Rock Canyon with connecting highways through the Caja del Rio to Hwy 599 and I-25.
- Not strictly due to pit production, LANL seeks a new power line through the Caja del Rio.
- Pit production will greatly increase production of TRU waste at LANL, badly impeding legacy cleanup.

| New Mexico's largest public infrastructure investments in relation to LANL pit production capital and operations this decade, FY2020 – FY2030 (now \$18 billion: ~4x growth in 3 yrs) |           |                           |                    |                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------|--------------------|--------------------|
| (Costs best available; Engineering News Record cost index used early years, CPI later)                                                                                                |           |                           |                    |                    |
| Project                                                                                                                                                                               | Year      | Cost Then (\$M)           | Cost in 2021 (\$M) | % LANL pit project |
| Elephant Butte Dam, NM                                                                                                                                                                | 1916      | 5.2                       | 262                | 1.5%               |
| (Golden Gate Bridge, CA)                                                                                                                                                              | 1937      | 35                        | 1,003              | 5.6%               |
| San Juan Chama Diversion                                                                                                                                                              | 1964      | >35                       | >321               | >1.8%              |
| Cochiti Dam, NM                                                                                                                                                                       | 1975      | 94.4                      | 406                | 2.3%               |
| LANL TA-55 PF-4                                                                                                                                                                       | 1978      | 75                        | 251                | 1.4%               |
| I-40 + I-25 + I-10 highways, NM (treated here as one project)                                                                                                                         | 1956-1995 | ~7.4 M/mile, 2006 dollars | Ballpark 9,207     | 51%                |
| Big I Interchange, Albuquerque                                                                                                                                                        | 2001      | 290                       | 455                | 2.5%               |
| San Juan Chama drinking water project, Albuquerque                                                                                                                                    | 2008      | 280                       | 334                | 1.9%               |
| Railrunner Heavy Rail Extension to Santa Fe (incl. track lease)                                                                                                                       | 2008      | ~400                      | ~477               | 2.7%               |
| LANL DARHT (very approximate)                                                                                                                                                         | ~2008     | ~400                      | ~477               | ~2.7%              |
| SNL MESA Complex                                                                                                                                                                      | 2008      | 516.5                     | 616                | 3.4%               |
| Current cost of 4kW PV kit, 780,000 NM households @ ~\$7,000                                                                                                                          |           |                           | 5,460              | 30%                |
| Additional 5,000 teachers @\$60,000/yr for 10 years                                                                                                                                   |           |                           | 3,000              | 16.6%              |

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This could be refined further but the details are immaterial to the larger point.

Make no mistake, this is to be a huge expansion, politically dominating all others. It is 10x the “[new money](#)” (48% of \$3.7 B over 10 years) in

NM investment expected from the new Biden infrastructure bill.

It will dominate our politics, attitudes, and limit institutions, and limit future possibilities in myriad ways. It will define the region.

# NNSA and LANL seek new nuclear facilities, including plutonium facilities

## 34 NA Pit Disassembly and Processing, LANL

|                                                            |                                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------|----------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PARS ID / DOE Project Number:<br>CE or PMA / Project Owner | 1201<br>Turk D.<br>Barker, P.    | TBD<br>Hulse, J. | <p>On July 9th, 2021, the Project Management Executive (PME) approved Critical Decision (CD)-4, Approve Mission Need, with a rough order of magnitude (ROM) cost range of \$18 to \$3.4B and a completion schedule range of FY 2031 to FY 2035.</p> <p>This building is NOT in LANL's \$18 B pit production budget. It is likely to be much more expensive than shown, given recent cost inflation in similar cases. Nominally oriented toward the surplus plutonium mission, this could easily change after the project begins.</p> |
| PM Analyst                                                 | Not Assigned                     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| FPD / Certification:                                       | CD0                              | 07/09/2021       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Current CD / Date Approved                                 | \$1,000.0M                       | \$3,400.0M       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| CD-0 Cost Range, Low-High                                  | 09/30/2031                       | 09/30/2035       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| CD-1 Cost Range, Low-High                                  |                                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| CD-4 Date Range, Low-High                                  |                                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Last Peer Review Date:                                     |                                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Next CD / Next CD Planned Date:                            | CD1                              | 09/30/2023       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 35 NE                                                      | Versatile Test Reactor (VTR) INL |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| PARS ID / DOE Project Number:<br>CF or PMA / Project Owner | 1158<br>Turk D.                  | 21-E-200         | <p>The integrated project team (IPT) anticipates completion of the final Environmental Impact Statement (EIS) by October 2021. Negotiations with the selected Design/Build contractor continue with a goal of the design portion</p>                                                                                                                                                                                                                                                                                                 |

From NNSA plans [here](#), p. 98. These two proposed nuclear facility projects would support pit production.





**PF-4 was built in 1978 for R&D, not production. It is crowded, inside the building and out, requiring round-the-clock production to reach even 20 ppy.**



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

**DNFSB will discuss PF-4 safety issues today.**

**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).**

**PF-4 is close to residences.**



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## Safety: “In the sober light of day, what the hell are they thinking?”

(Senior federal official, describing the safety aspect of pit production plans at LANL to me, 10/26/21)

### Program pressures create unsafe conditions.

- Recent accidents have been serious; others, potentially serious. See [here](#) for a small window into evolving issues.
  - “The PF-4 overflow [of water into the inner ventilation system, a glovebox, floors, and the basement] paused the mission and represents a serious conduct of operations failure,” [LA-UR-21-27999, p. 13](#).
  - “[LANL’s improperly stored nuclear safes raise larger concerns](#),” *Santa Fe New Mexican*, 11/1/21.
- Decades of past practices, captured in complicated, crowded, hardware in a contaminated facility containing tons of plutonium, must be changed. Cultural transformation may be even harder. LANL is trying to become a factory.
- Now and henceforth, work must be done through the night, which is inherently dangerous, as well as the day.
- A demographic transition is underway. Half of LANL’s staff has ≤5 yrs tenure. Many operators are newly-trained.
- Construction and installation of new equipment for new activities must be done alongside existing program work.
- As noted, the facility itself is crowded. There are specific design and capacity limitations that affect production work.

### LANL has a long track record of safety problems.

- [1,600 DOL-certified fatalities at LANL through mid-July 2015](#); likely 2,000 by now if the previous annual rate applies.
- 17,668 claims have been filed, of which 7,430 (42%) have been paid, representing 6,927 unique workers. Claims paid total \$1.292 B for LANL as of this week (see DOL EEOICP [here](#)).

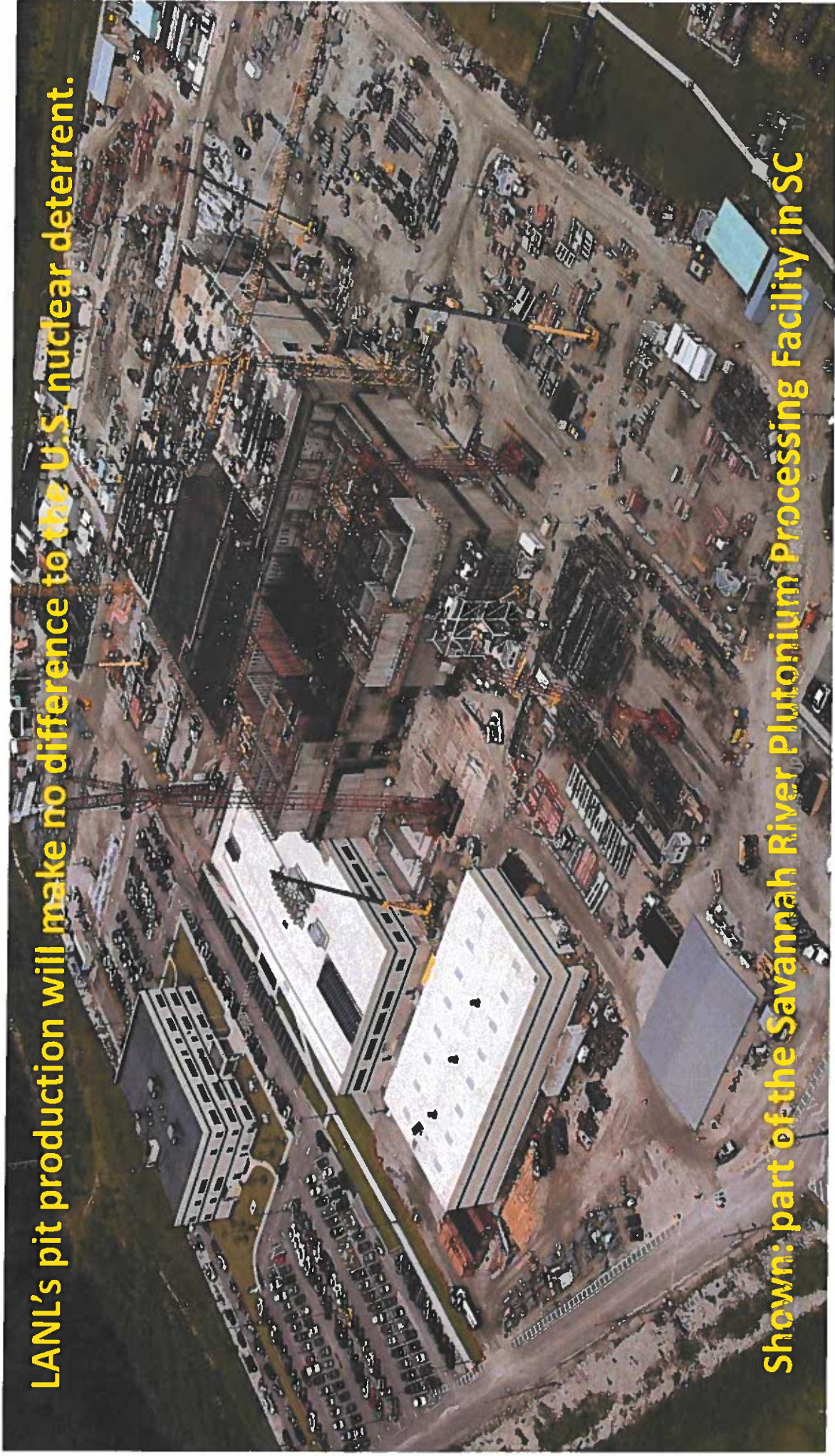


## **LANL foresees large increases in energy and resource consumption. Not even considering contamination and nuclear waste, LANL is a dirty lab.**

- LANL is expected to double its energy use over the coming decade.
- LANL will fail to meet DOE goals for energy efficiency.
- LANL will fail to meet DOE goals for water use efficiency.
- LANL is unlikely to conduct any climate change vulnerability assessment, despite DOE guidelines.
- LANL may build an on-site 10 MW solar field but if so this would provide only 4% of its needs by 2031.
- More than half of LANL's electricity currently derives from coal-fired generation. There are no clear commitments to renewable energy in future, only to power purchase agreements meeting vague criteria.
- NNSA is proposing a \$300 million "Electrical Power Capacity Upgrade" project at LANL ([p. 365](#)), including a new 115 kV transmission line across the Caja del Rio. LANL consumes 80% of the energy supplied to the Los Alamos Power Pool (LAPP).
- Back-of-envelope calculations suggest LANL commuting entails very roughly 175 million road miles per year. With deliveries, etc. ~200,000,000 vehicle-miles/year might be a good guess.
- We can be sure LANL is the largest single cause of greenhouse gas emissions in a wide region.
- For references and more see: [LANL releases 2021 "Site Sustainability Plan" for "rapidly changing and growing mission"](#), 2/24/21 and ["Third power line proposed for Los Alamos," 4/19/21.](#)



LANL's pit production will make no difference to the U.S. nuclear deterrent.



Shown: part of the Savannah River Plutonium Processing Facility in SC



**PIDAS** (Perimeter Intrusion Detection and Assessment System)

Future

## Potential Retaining Walls

**When completed, SRPPF can make all the pits required.**

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# Questions?

Thank you for your time and attention.



November 13, 2021

Sen. Jeff Steinborn, Chair  
NM Radioactive & Hazardous Materials Committee

(Originally sent via email)

Dear Chairman Steinborn --

Thank you for the opportunity to address the committee yesterday and if there is an opportunity to convey that gratitude to the other committee members please do so.

I'm sorry I forgot to bring copies of my slides and appreciate Shawna's last-minute help in that regard.

I also forgot that my slides weren't automatically synchronized with the display, which I hope was not too confusing.

I appreciated the committee members' good questions and comments.

#### **Community views, or facts?**

One remark I did not make for the sake of time -- and because it is subtle -- is this. What I presented to you were the facts of the situation as best as I can discern them. References back to publicly-available government documents were provided, but readers do have to use the links provided in those references to find those sources. I distinguished the last two slides from the previous ones, which I said were my opinion. I could offer fact-based arguments for those final opinions but it would have taken half an hour.

My point is that I brought the committee facts for the most part, and my expert opinion as a trained scientist, engineer, regional planner, and nuclear weapons expert for the balance. I wasn't speaking as a community member, but as a trained fact-finder in service to your committee.

The topic is large, the gap in public knowledge great, and the time available short. I had to be very brief -- "conclusory" is the word a lawyer might use. This was regrettable but unavoidable.

I am afraid it is easy to unconsciously fall into a post-modern perspective where "everyone has their own truth." It's encoded in the agenda topic of "community concerns." If everybody has their own truth, others are not responsible for it. But if it's a truth known to us in common -- "con-science" -- it might impel us to act, from our shared duty of care, our conscience. That's quite different.

#### **Followup on transparency**

When you brought up security clearances I had a new idea as to how the Committee, State government, and citizens could get an appropriate measure of transparency into these historic plans. You could litigate to get them in federal court, or request the Attorney General to do so.

We have some experience with this kind of litigation, having filed and won several lawsuits under the Freedom of Information Act (FOIA). It is my opinion that the NNSA and Triad would be quite forthcoming to you or the AG, because they cannot but acknowledge the legitimacy of your interest and concern. In

short, they would settle rather than face the negative publicity associated with a legitimate request from the State of New Mexico.

Another approach would be for the State to join FOIA litigation as a plaintiff or *amicus curiae*.

The legal time involved would be minor.

For us on the other hand FOIA litigation is quite a major expense in both dollars and time.

I don't know what other alternatives you have, except the political ones I mentioned in my talk, if you want to know more about the largest project in the history of New Mexico -- which the Committee still knows next to nothing about, despite its huge import.

Sincerely,

Greg Mello

PS: I was too conservative in my talk in the comparison of the federal spending in New Mexico in the LANL pit production project, vs. the "Build Back Better" federal infrastructure legislation that I think will be signed this coming Monday. Roughly half of the \$3.7 billion which our congressional delegation claims will be spent in New Mexico over the decade as a result of this legislation is not really "new money," but extrapolations of existing programs and spending (see [here](#) and [here](#)). So the new money is closer to 1/10th, rather than 1/5th, of what LANL proposes to spend on plutonium pit production in this decade. I hope this is as shocking to you as it is to me. Now I am going to invoke "community views:" it is indeed extremely shocking to many people, not just me. I honestly don't know how long governments can retain their claims to legitimacy with such priorities.



Presentation to the

## Radioactive and Hazardous Materials Committee of the New Mexico Legislature

### ***“Waking the Wolf” – Expansion of Nuclear Weapons Development and Production at Los Alamos National Laboratory (LANL) Will Lead to Economic, Social Stagnation and then Decline, Intractable Environmental Problems***

Greg Mello, Executive Director, Los Alamos Study Group, September 9, 2020

*Every gun that is made, every warship launched, every rocket fired signifies, in the final sense, a theft from those who hunger and are not fed, those who are cold and are not clothed.*

*This world in arms is not spending money alone. It is spending the sweat of its laborers, the genius of its scientists, the hopes of its children. The cost of one modern heavy bomber is this: a modern brick school in more than 30 cities. It is two electric power plants, each serving a town of 60,000 population. It is two fine, fully equipped hospitals. It is some fifty miles of concrete pavement. We pay for a single fighter plane with a half million bushels of wheat. We pay for a single destroyer with new homes that could have housed more than 8,000 people.*

Dwight Eisenhower, [Address to the American Society of Newspaper Editors](#), 4/16/53



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Blog: [Forget the Rest](#)



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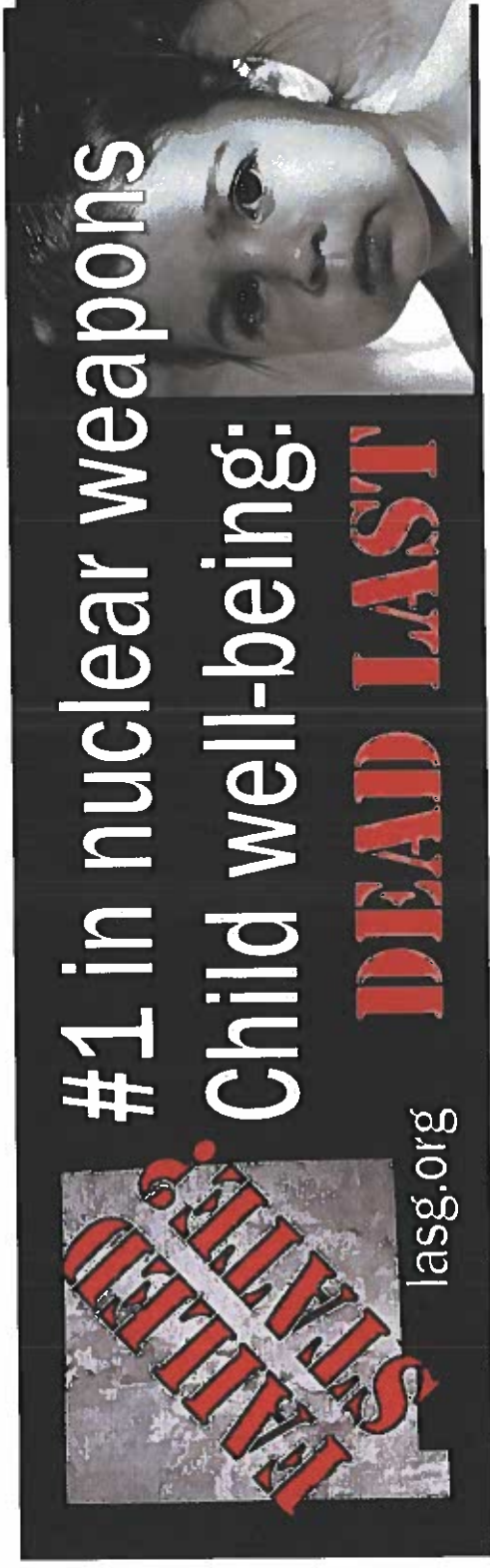
9/8/2020

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## Our main concerns in a nutshell

1. The proposed LANL expansion is huge – approximately twice as large as when I spoke to this committee two years ago ([slides](#), [summary](#), [handouts](#)). As one senior federal official said to us, we are “waking the wolf” of unbridled nuclear weapons production, with attendant safety and environmental problems.
2. LANL’s expansion is being driven by industrial plutonium warhead core (“pit”) production, the most dangerous and polluting nuclear weapons mission of all. LANL is to be a large-scale production site.
3. Pit production comes with a raft of intractable safety, environmental, and security problems, as well as a host of regional impacts that together will negatively mark northern New Mexico forever.
4. We concur with the concerned [comments](#) of the Environment Department (NMED) (also [here](#)).
5. The scale of work, required facilities, and resulting regional impacts of this expansion are now secret.
6. There is no useful, current, or accurate environmental and economic impact analysis.
7. Please see the list of major impacts and federal decisions in our [Letter to New Mexico Environment Department re: Need for Site-Wide Environmental Impact Statement \(SWEIS\) at LANL](#), June 29, 2020.
8. Some senior federal and congressional officials, and the Los Alamos Study Group, find no evidence that LANL can safely and securely execute this growing program. Nor is it actually necessary for existing U.S. weapons.
9. New Mexico risks being left even farther behind states which invest in more useful technologies, careers, and infrastructure. This will worsen when – not if – the nation begins cutting useless weapons programs..



Current LASG billboard on I-40 westbound at San Jon. We are trying to get your attention. Don't shoot the messenger.

"While a recent jobs report painted a more positive employment picture nationally, White said New Mexico – **the only state to post a significant decline in its labor force in the last monthly update** – may have a long road to recovery." ("[In 2020, A Labor Day like no other](#)," *Albuquerque Journal*, 9/7/20, emphasis added)

What precisely makes New Mexico unique in its low political and economic performance? Several factors contribute, but a politics of nuclear mesmerization is certainly one: **"The labs will lead us." Wrong. The labs will use us.**

## Unprecedented Concern from Los Alamos County Elected Officials

"LANL, DOE and NNSA must do better if they want to be viewed as a trustworthy institution or as a sincere regional partner. LANL consistently wants and takes from this community. Not only do they take, they expect us to give. We give up our downtown as they take our retail spaces and subject our few surviving businesses to ever-increasing rents and increased burdens – all the while complaining that this town doesn't offer enough for them to recruit the minds they so desperately want," Maggiore said.

He said it is increasingly clear that LANL and NNSA have no interest in being real partners with Los Alamos County or any of its surrounding communities.

"It is clear they don't have our best interest at heart – it's highly questionable that they even have their own long-term interests at heart. Scratch that – it's not even that they don't have their own best interests at heart – they don't even have them in mind," Maggiore said. "Their proposed solution to our housing shortage is to build a \$1 billion, if not more, bridge across the Rio (Grande) so their employees who live in Albuquerque can have shorter commutes – local environment and existing residents be damned."

He said that's not partnership, that in fact it's the exact opposite.

"We have neighboring communities that with a far smaller investment would yield far higher returns on both the political goodwill front and the local regional economic impact front," Maggiore said.

He said if LANL should deal in good faith with anyone, it should be with Los Alamos County.

"I'm giving notice that anything that comes before us to benefit LANL without directly benefitting us or our surrounding communities at least twice as much as it benefits them, is a non-starter for me. Their bad faith dealings have gone on long enough," Maggiore said. "It's increasingly clear in all their actions that they don't care for us, our environment or our neighbors. I find it incomprehensible and utterly unnerving that an institution made a whole branch of government devoted to nuclear weapons and stockpile stewardship can be so shortsighted and selfish. It makes me question any decisions that come out of an organization so inadequately morally compassed."

(["Los Alamos County Councilor Slams DOE/NNSA For Denial Of Land Transfer Request"](#), Los Alamos Reporter 7/28/20). Two other councilors generally agreed with these comments. [Video](#) (10 minutes).

## What can be done?

- **Require transparency**, including not just RHMC and NMED – which we don't have now -- but also local governments, tribes, other agencies, and the public.
- **Demand a new, open SWEIS process**, conducted by environmental and economic professionals, not weapons administrators and lawyers.
- **Require stronger oversight from NMED**. Throw burdens of proof back to LANL and NNSA. NMED cannot afford to do their work.
- On an emergency and long-term basis, **NM must train and employ young people and the unemployed in a different mix of jobs weighted toward essential human and environmental needs and community resilience in all its forms**. The State must place its thumb on the scale in preference for youth and families. There are enormous unmet needs in our communities. “High-paying” jobs that do not create useful goods and services in the NM civilian economy will hurt NM through inequality, emigration, despair, continued educational failure, lack of available services, and self-harming behaviors. The present two-tier economy will be perpetuated, with the lower portion (~80%, the source of most consumer demand) constantly eroding. LANL hasn't and won't fix this.
- NM, the US, and the world now face a “Long Emergency.” There will be no return to “normal.” **The greatest danger we face is being sold “a bill of (fake) goods”** – e.g. poor educational priorities – that places NM even farther behind in the work and careers that will sustain our communities and families in the years ahead.
- Making plutonium pits (at roughly \$15-20 million each at LANL, about 100x their weight in gold), will do absolutely nothing for this state except bring pollution and poverty, and undermine the independence and creativity of our precious civil society institutions, from education to local and state government and all the rest. **We need to get our minds and hearts out of the labs.**

# What does LANL do?

| Los Alamos National Laboratory (LANL) spending, current and proposed, \$ billions |                 |             |                 |             |
|-----------------------------------------------------------------------------------|-----------------|-------------|-----------------|-------------|
| LANL M&O contractor: Triad, LLC                                                   | FY 2020 enacted | % total     | FY 2021 request | % total     |
| Weapons programs                                                                  | 1.93            | 59%         | 2.91            | 71%         |
| Nonproliferation programs                                                         | 0.29            | 9%          | 0.31            | 8%          |
| Safeguards & security                                                             | 0.15            | 5%          | 0.03            | 1%          |
| Environmental Mgmt                                                                | 0.03            | 1%          | 0.03            | 1%          |
| DOE office of science                                                             | 0.09            | 3%          | 0.06            | 1%          |
| Energy & other programs                                                           | 0.09            | 3%          | 0.02            | 0%          |
| Work for others (WFO) (assumed unchanged)                                         | 0.35            | 11%         | 0.35            | 9%          |
| <b>Total Triad</b>                                                                | <b>2.93</b>     | <b>89%</b>  | <b>3.71</b>     | <b>91%</b>  |
| LANL cleanup (N3B)                                                                | 0.19            | 6%          | 0.19            | 5%          |
| Los Alamos Site Office (LASO) (federal)                                           | 0.17            | 5%          | 0.18            | 4%          |
| <b>Total LANL</b>                                                                 | <b>3.29</b>     | <b>100%</b> | <b>4.08</b>     | <b>100%</b> |

As of 8/20/20, LANL says it has 13,137 employees:

- Triad: 9,397 (67% university degreed, 21% PhD)
- Guard force (Centerra-LA): 281
- Subcontractors: 478 (part- or full-time?)
- Students: 1,323 (presumably few are full-time)
- Unionized craft workers: 1,160
- Postdocs: 498

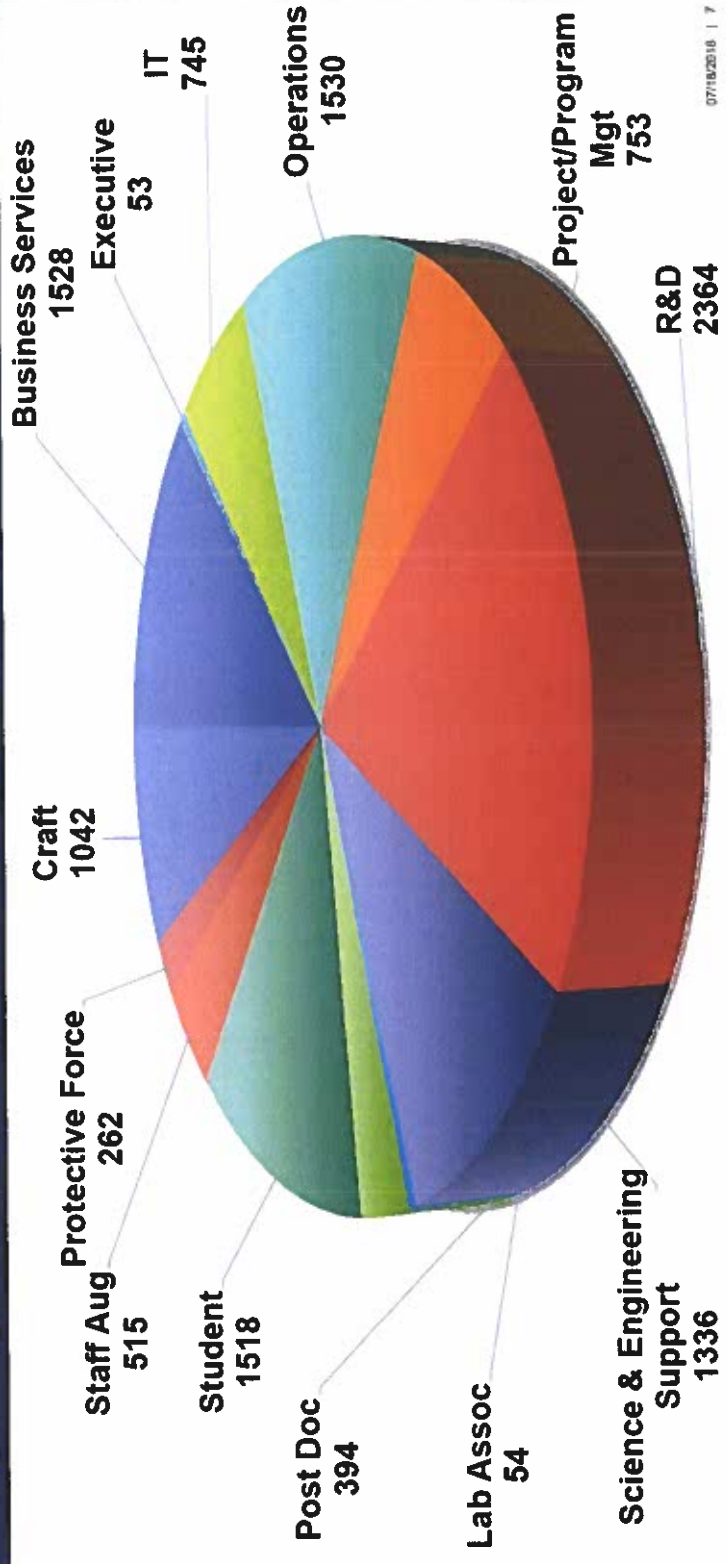
This does not include N3B, its subcontractors, or LASO

Sources:

- <https://www.lanl.gov/about/facts-figures/index.php> (retrieved 8/20/20)
- <https://www.lasg.org/budget/FY2021/doe-fy2021-laboratory-table.pdf>



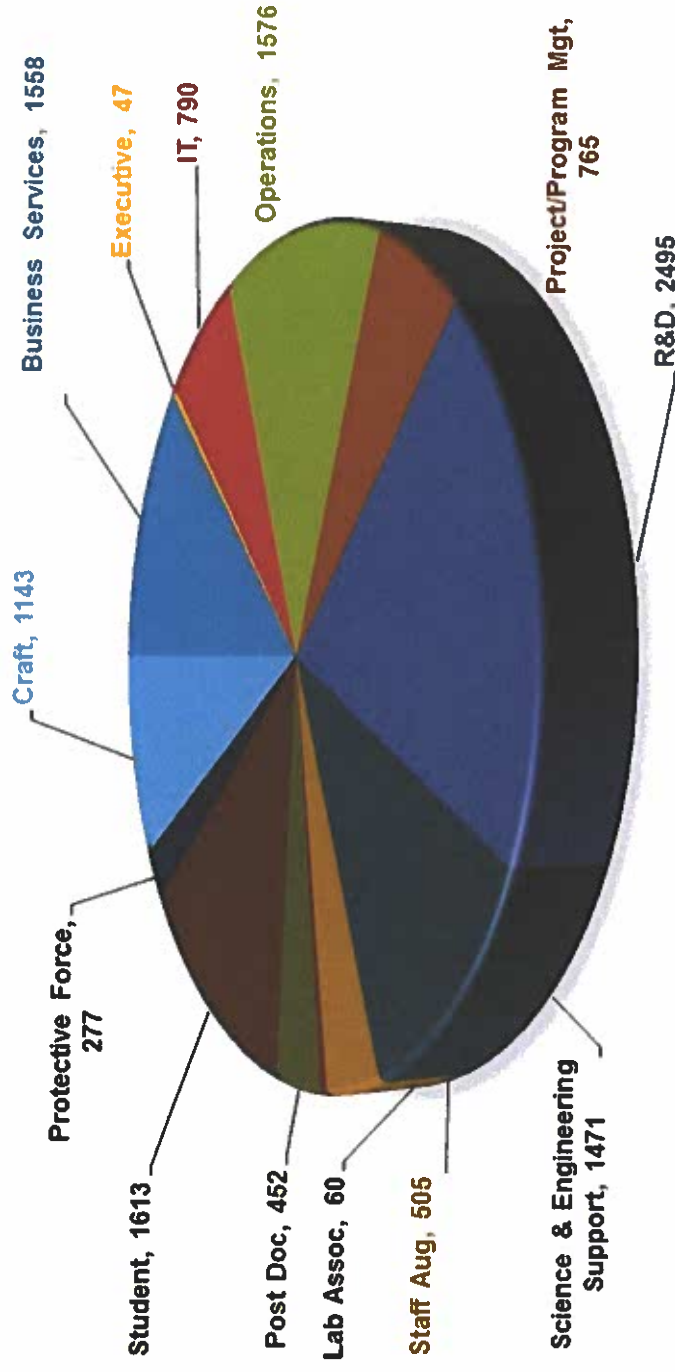
# 12,094 People: Our strengths are the diversity and quality of our employees



07/18/2018 | 7

Breakdown of LANL workforce presented to RHMC August 2019. Employment figures were erroneous. See next slide.

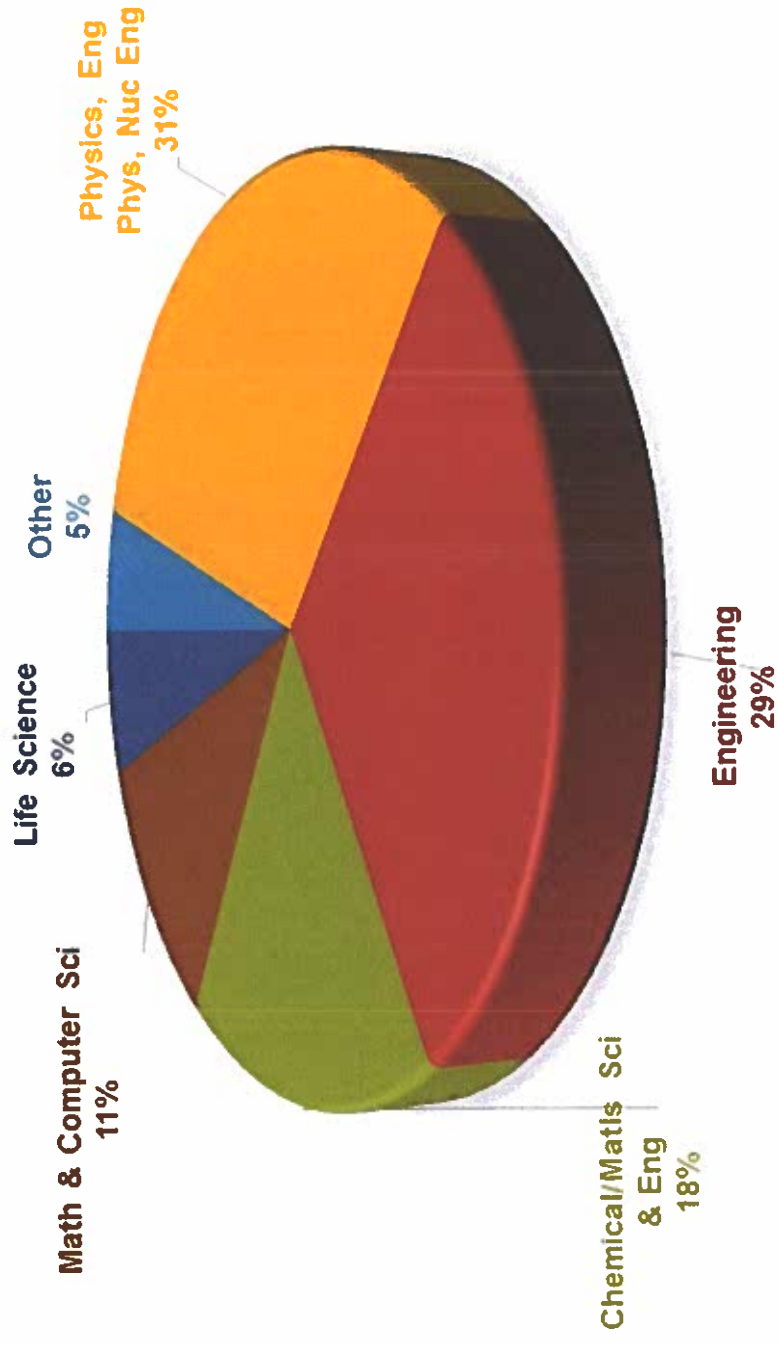
Los Alamos Workforce: 12,752



Same  
breakdown, July  
2019, one month  
earlier: 658 more  
employees.

From  
<https://www.lanl.gov/about/facts-figures/talent.php>

## R&D SCIENTISTS & ENGINEERS



From  
<https://www.lanl.gov/about/facts-figures/talent.php>

## **There is no federal plan for pit production at LANL. There are only secret contractor proposals and reports. New Mexico can have no clear idea of what is proposed.**

“However the committee remains concerned that NNSA has not prioritized the development of a resource-loaded integrated master schedule that includes all pit production-related, project-related and program activities as recommended by the GAO and does not appear to have plans to complete such a schedule until after it would have had to achieve certain pit production milestones” [in 2023-2025]...

“Given the NNSA’s continuing challenges in constructing large complex nuclear facilities on time and on budget, coupled with the extremely constrained timeframe and planned use of expedited processes and procedures, the risk of not meeting pit production milestones is high.” (House Appropriations Committee [Report](#) on FY21 Energy and Water Appropriations, p. 140)

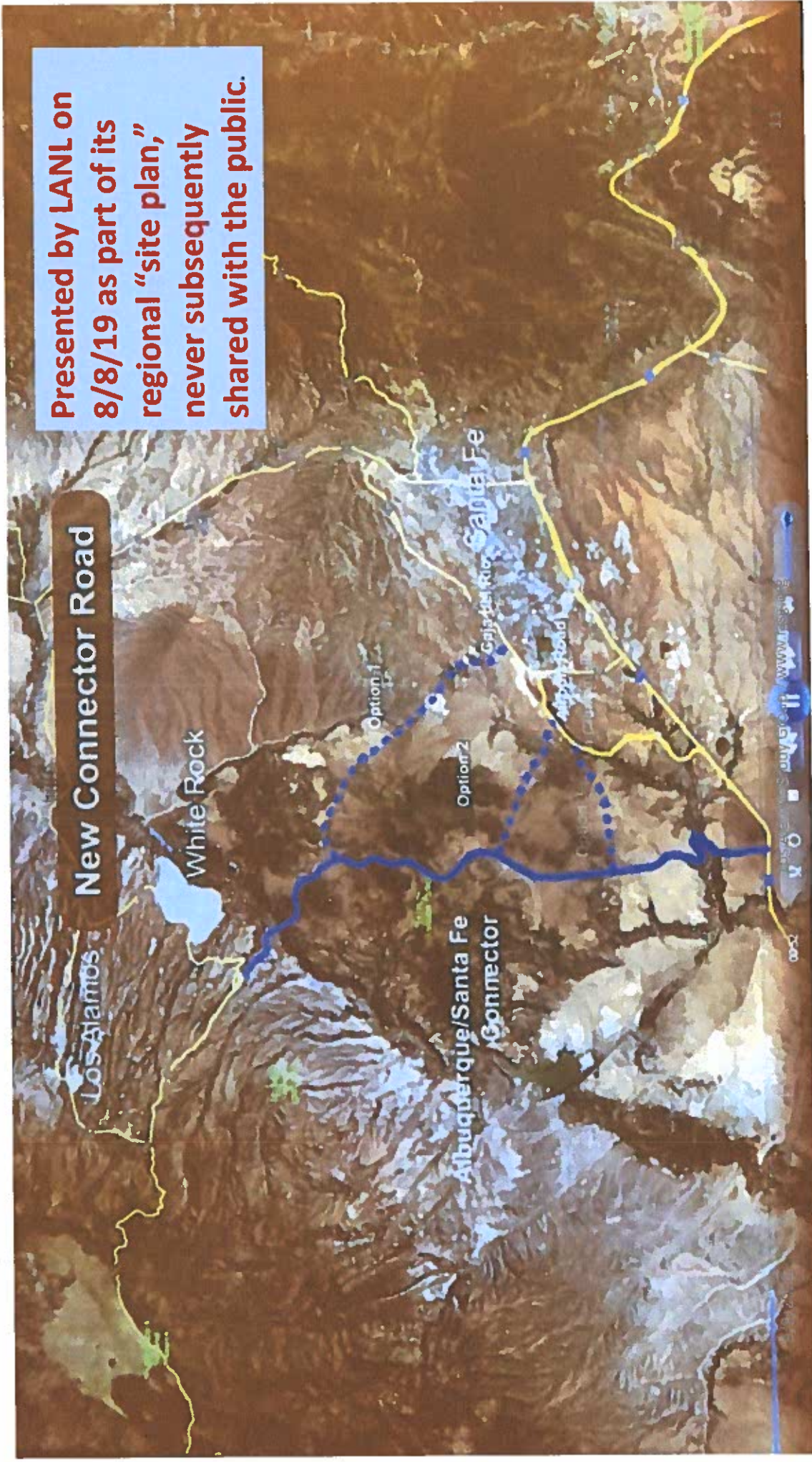
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“The Los Alamos Reporter last week requested information from the NNSA Los Alamos Field Office as to what plan is being followed by NNSA with regard to pit production at Los Alamos and was told by a spokesperson that **LANL’s proposal** to meet NNSA’s mission for expanded pit production as well as a Pit Production Report submitted to Congress are Unclassified Controlled Nuclear Information.” (“[House Appropriations Committee Wants NNSA To Submit Plans, Schedules For Pit Production](#),” *Los Alamos Reporter*, 7/13/20)

**That is, NNSA’s “plan” is actually a contractor proposal, and it is effectively secret. The Legislature might be able to see it in a special room after signing a statement not to reveal anything in it to the public. NMED might be able to get it under similar conditions. But what you be shown?**



Presented by LANL on  
8/8/19 as part of its  
regional "site plan,"  
never subsequently  
shared with the public.





Seven months  
earlier...

New Mexico Department of Transportation  
Major Investment Projects of Regional Significance  
(dollars in millions)

| District 6        |        |                                                                                                                         |
|-------------------|--------|-------------------------------------------------------------------------------------------------------------------------|
| I-25              | \$ 250 | Adding 3rd lane on I-25 between Bernalillo and Santa Fe.                                                                |
| NM 170            | \$ 20  | Adding shoulders and performing pavement preservation on 18 miles from Farmington to the Colorado state line.           |
| Los Alamos Bypass | \$ 67  | Construction of 15-16 miles of additional roadway and an additional crossing over the Rio Grande.                       |
| U S 64            | \$ 225 | Improve 2-lane sections and widen shoulders on various segments from the Arizona state line to the District 4 boundary. |
| U S 491           | \$ 18  | Pavement preservation and shoulder widening on 15 miles of roadway from Shiprock to the Colorado state line.            |

\*Project costs are based on formula calculations and are intended to provide an initial estimate only. Costs are not intended for programming or financing.

Source: NMDOT and LFC Files

STATE OF NEW MEXICO  
Report of the Legislative Finance Committee  
to the Fifty-Fourth Legislature  
January 2019  
For Fiscal Year 2020  
FIRST SESSION  
Volume 3  
[https://nmlegis.gov/Entity/LFC/Documents/Session\\_Publications/Budget\\_Recommendations/2020RecommendVolIII.pdf](https://nmlegis.gov/Entity/LFC/Documents/Session_Publications/Budget_Recommendations/2020RecommendVolIII.pdf)



Proposed Rio Grande  
bridge crossing looking  
north, LASG photo 2012

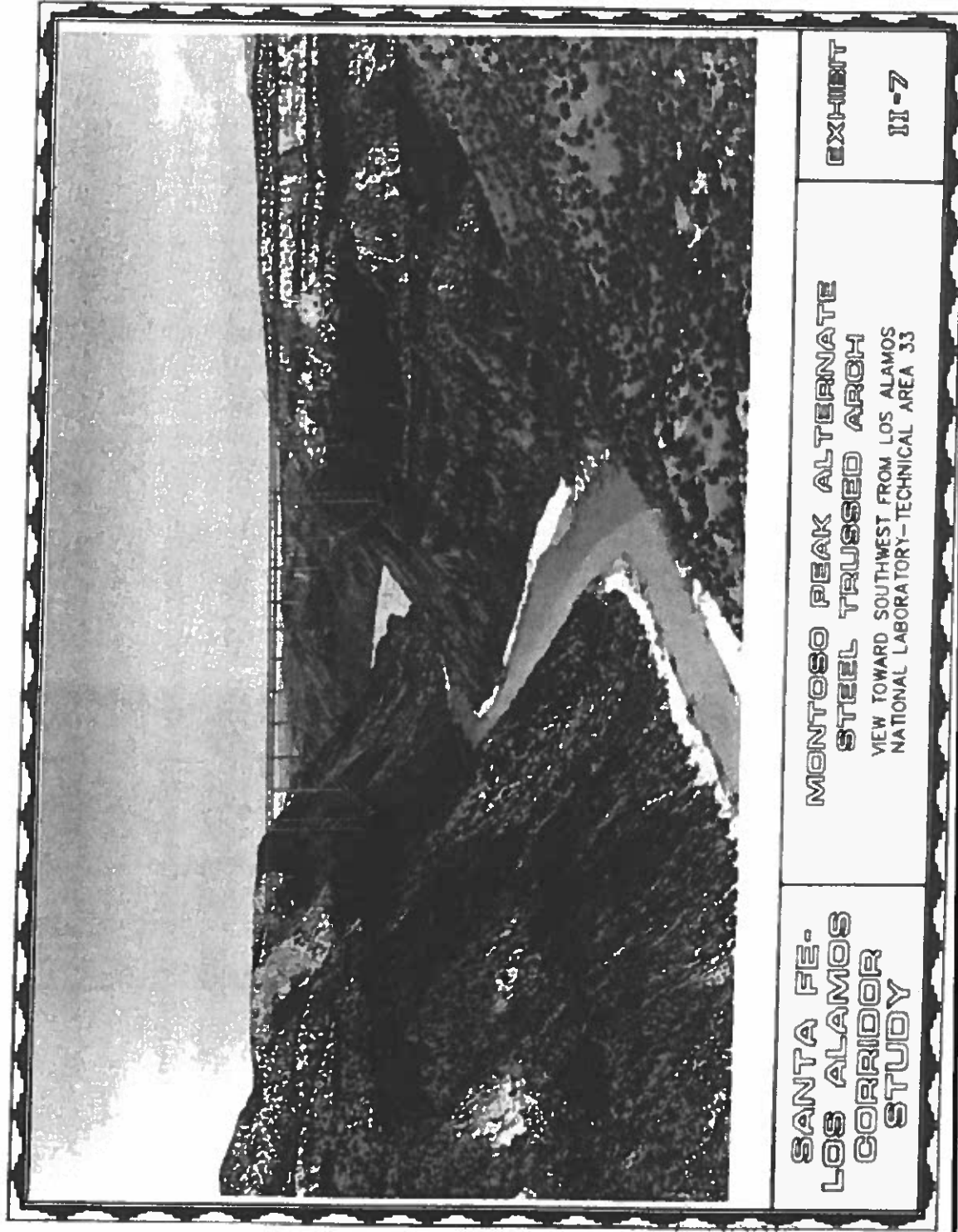
[Bigger](#)

9/8/2020

Los Alamos Study Group \* [www.lasg.org](http://www.lasg.org)

Same plan,  
1990 version.

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



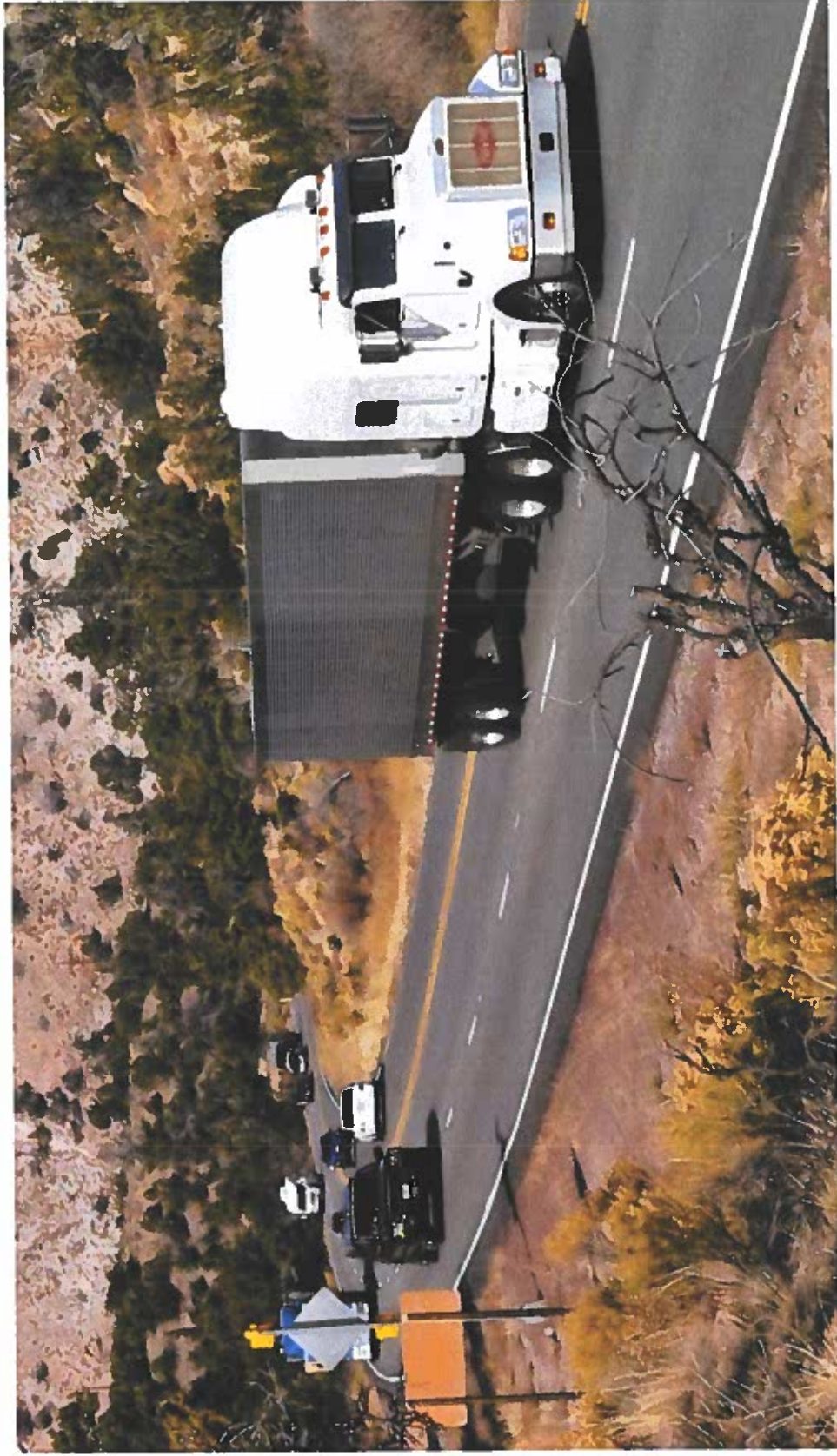
SANTA FE-  
LOS ALAMOS  
CORRIDOR  
STUDY

MONTOSO PEAK ALTERNATE  
STEEL TRUSSED ARCH  
VIEW TOWARD SOUTHWEST FROM LOS ALAMOS  
NATIONAL LABORATORY-TECHNICAL AREA 33

EXHIBIT

II-7





**Nuclear materials convoy, main Hill road (photo: *Los Alamos Monitor*, Carol Clark)**

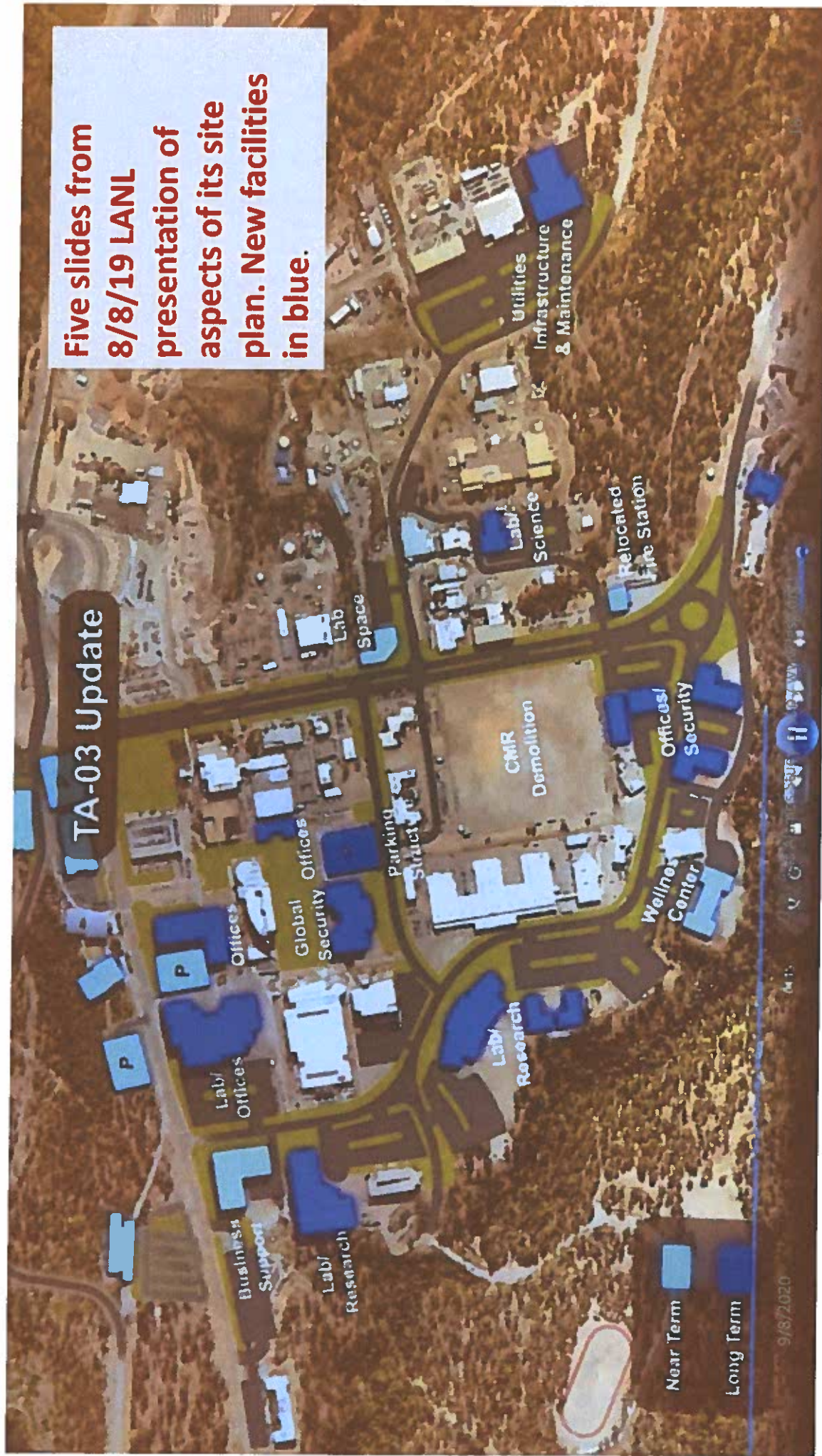
9/8/2020

Los Alamos Study Group \* [www.lasg.org](http://www.lasg.org)



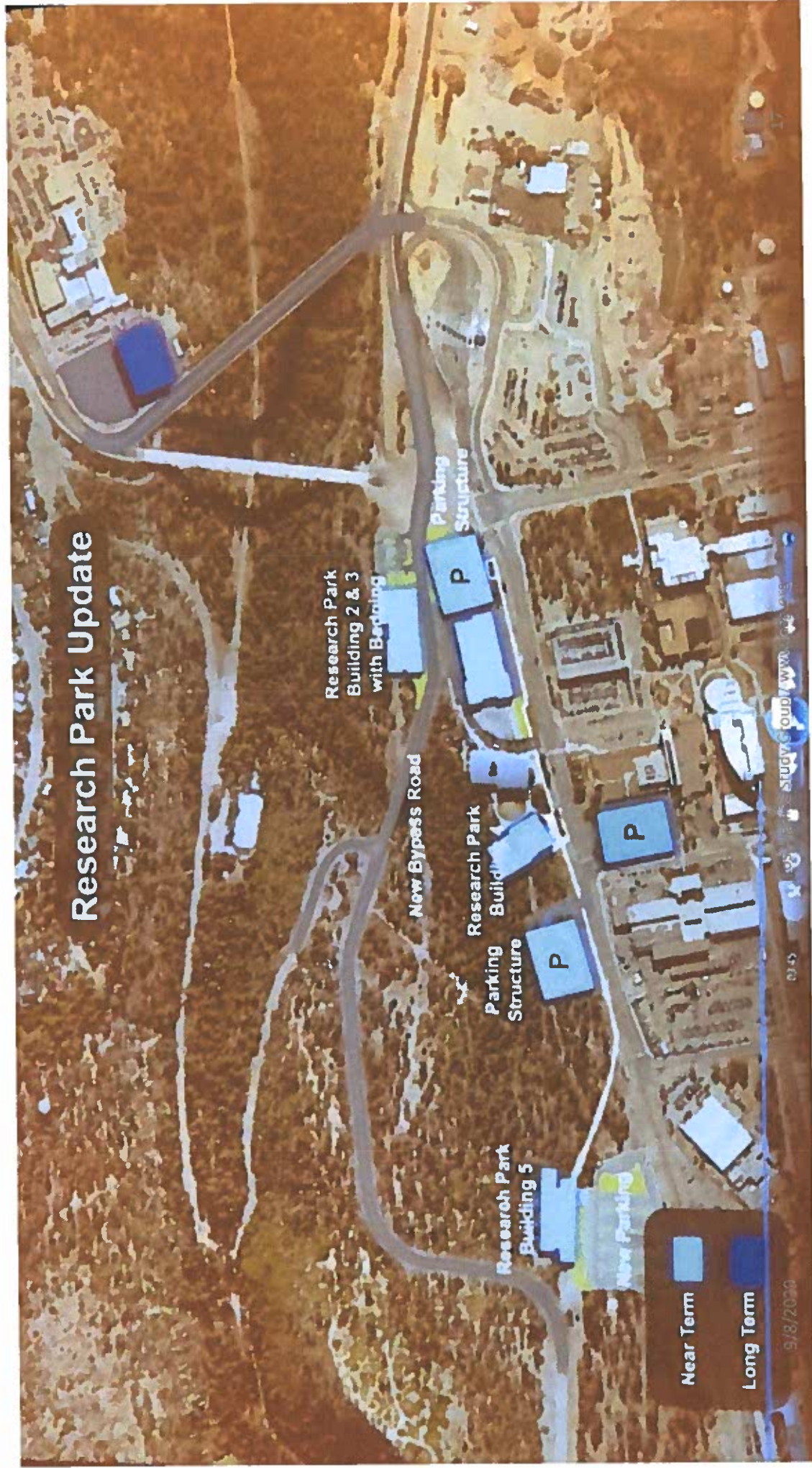
## TA-03 Update

Five slides from  
8/8/19 LANL  
presentation of  
aspects of its site  
plan. New facilities  
in blue.





# Research Park Update





# Shipping/Receiving Complex

BANDELIER  
NATIONAL MONUMENT  
(TSANKAWI)

EAST JENEZ ROAD

DEPARTMENT  
OF ENERGY

Turning and  
De-Cat Lane  
Focused Traffic Intersection  
LANE / Public Vehicles Turning

Distribution  
98,000 S.F.

Dog Kennel

Office Building  
22,000 S.F.

Fleet Building  
1972 Species

PUEBLO DE SAN  
ILDEFONSO INDIAN  
RESERVATION

NEW MEXICO

9/8/2020

02.56

U U

Study Group / www

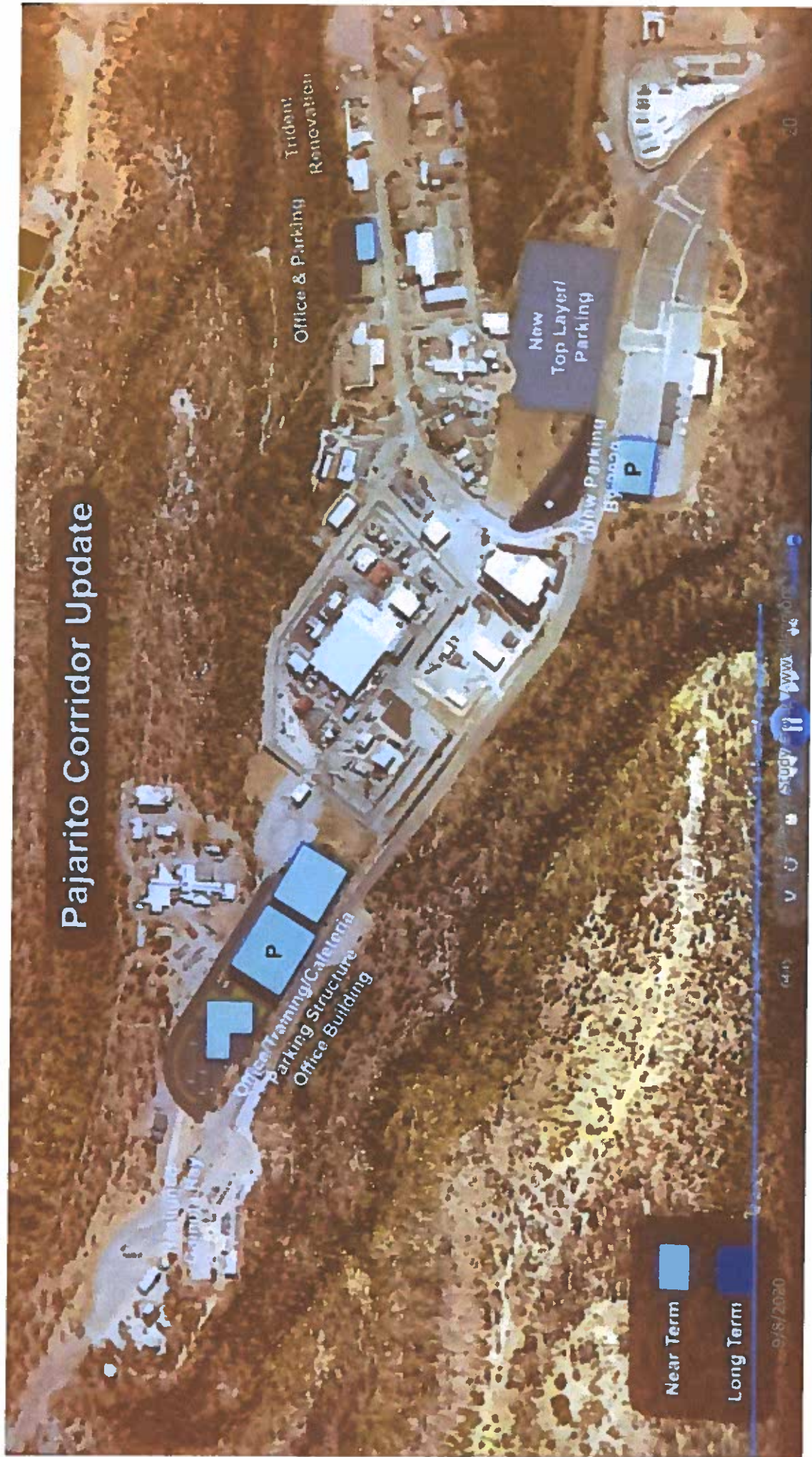


## Future Campus Update





# Pajarito Corridor Update



Near Term

Long Term

9/8/2020

WWW

Study

WWW

WWW

WWW

WWW

WWW

WWW

WWW

WWW

WWW

WWW

WWW

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WWW

WWW

WWW



| New Mexico's largest public infrastructure investments                              |           |                           |                    |              |
|-------------------------------------------------------------------------------------|-----------|---------------------------|--------------------|--------------|
| In relation to LANL capital projects (LCPs) planned, FY2020 – FY2030 (\$13 billion) |           |                           |                    |              |
| (Costs are best available; dates mostly at completion)                              |           |                           |                    |              |
| Project                                                                             | Year      | Cost Then (\$M)           | Cost in 2019 (\$M) | Percent LCPs |
| Elephant Butte Dam, NM                                                              | 1916      | 5.2                       | 262                | 2%           |
| (Golden Gate Bridge, CA)                                                            | 1937      | 35                        | 1,003              | 8%           |
| San Juan Chama Diversion                                                            | 1964      | >35                       | >321               | >2%          |
| Cochiti Dam, NM                                                                     | 1975      | 94.4                      | 406                | 3%           |
| LANL TA-55 PF-4                                                                     | 1978      | 75                        | 251                | 2%           |
| I-40 + I-25 + I-10 highways, NM (treated here as one project)                       | 1956-1995 | ~7.4 M/mile, 2006 dollars | Ballpark 9,207     | 71%          |
| Big I Interchange, Albuquerque                                                      | 2001      | 290                       | 455                | 4%           |
| San Juan Chama drinking water project, Albuquerque                                  | 2008      | 280                       | 334                | 3%           |
| Railrunner Heavy Rail Extension to Santa Fe (incl. track lease)                     | 2008      | ~400                      | ~477               | 4%           |
| LANL DARHT (very approximate)                                                       | ~2008     | ~ 400                     | ~477               | ~4%          |
| SNL MESA Complex                                                                    | 2008      | 516.5                     | 616                | 5%           |
|                                                                                     |           |                           |                    |              |

Make no mistake, do not be distracted by details: this is to be a huge expansion that will dominate all investment in NM.

It will dominate our politics, attitudes, and institutions, and limit our future possibilities in myriad ways.

## **The National Nuclear Security Administration's (NNSA's) August 20, 2020 final Supplement Analysis (SA)**

- Not an environmental impact statement (EIS) or Site-Wide EIS (SWEIS)
- Written to justify not undertaking a SWEIS. Lawyers, not scientists and engineers, controlled content.
- Written to obscure and deceive, not reveal (see next slide for example)
- It is useless as real-world environmental analysis.
- Cursorily examines projected future impacts of one LANL program with while omitting all others.
- The proposed action is nowhere clearly defined; it has approximately doubled over the past two years. Impacts are to be minimized by the “honor system” only.
- No alternatives to the undefined action are proposed or analyzed.
- Environmental and LANL conditions and context that were assumed in 2008 no longer apply.
- Compares projected impacts of the (vague, evolving, partial) proposed action with projected impacts of obsolete, rejected alternatives from the now-distant past. Neither are in the real world. In NNSA’s “Alice In Wonderland” approach, the Red Queen declares that today’s impacts are not worth examining because estimates (not measurements) of one or two decades ago were...written in reports.
- There is no process of agency, tribal, legislative, or public input and peer review.
- No mitigation plan is proposed.
- With no well-defined action proposed, there is no basis for a well-defined decision.

## **What this means is that New Mexico is being assigned the dirty work of the nuclear weapons complex – with no say and no environmental analysis.**

Despite this great scale and scope and magnitude of impacts, there is no SWEIS or any other EIS planned.

There is a SWEIS planned for the relatively benign Lawrence Livermore National Laboratory (LLNL), the “clean lab” that will supervise our “dirty” pit production.

There is also an EIS underway for pit production in that bastion of environmental progressivism, South Carolina.

The pit mission cannot be fully politically separated from efforts by the Department of Energy (DOE), contractors, and others to open a consolidated interim storage site for spent nuclear reactor fuel near Carlsbad. This is also a highly-impactful endeavor that would, if brought to fruition, gravely damage the future of New Mexico. For numerous reasons we believe that this waste, once brought, would never leave.

***This state is being marked for nuclear production and pollution. It could become a nuclear colony.***

**The legislature, or the Governor, could effectively request a SWEIS, which would provide NMED, other cabinet agencies, and the RHMC some insight into the impacts ahead, as well as commit NNSA to fund mitigation measures, should these plans proceed.**



**Some specific impacts from the Study Group's [letter to NMED re: Need for SWEIS at LANL](#), 6/29/20 (6 slides)**

- NNSA seeks to hire thousands (net) of new staff at LANL over the coming five years. LANL is poised to dramatically change into something never seen before. Triad, NNSA's management and operating contractor, has publicly discussed the fact that impacts of these expansion decisions will be regional and significant -- in terms of traffic congestion, housing, possible new roads and bridges, and possible secondary LANL campuses.
- The road network and housing markets are already stressed. A powerful factor not present or foreseen in 2008 is the fact that many LANL retirees are staying in the Los Alamos community and so a much larger fraction of the LANL workforce now commutes. In other words, the retiring Cold War demographic bulge is consuming much of the available housing, with regional effects.
- A common phenomena across several kinds of environmental impacts is that the Pajarito Plateau is in many ways "full": increases in environmental pressures result in greater-than-linear impacts. Examples are traffic slow-downs stretching miles every day near White Rock; the relatively abrupt need for 5,000 additional housing units (according to Los Alamos County's latest housing report), greatly expanding the County's total housing stock and population; contemplated urban development in wildlife corridors and open space areas; planned construction almost adjacent to the Tsankawi portion of Bandelier National Monument, and much more). *Qualitative* changes in impact, and *kinds* of impacts, are reasonably expected to occur.

9/8/2020

Los Alamos Study Group \* [www.lasg.org](http://www.lasg.org)

**(Impacts, continued)**

- LANL has described a \$13 billion dollar construction program over the coming 10 years, which would nearly double the replacement value of LANL as a whole. This program is more than six times the size of the Manhattan Project in New Mexico, in constant dollars. Some \$5.5 billion is already programmed over the coming five years. LANL's public presentations have shown dozens of new buildings. In constant dollars, planned LANL construction over the decade exceeds the original cost of the interstate highway system in New Mexico. Just one building now being outfitted as a nuclear facility -- formerly the Radiological Laboratory, Utility, and Office Building (RLUOB) -- will be more costly than any single construction project in the state. **It is almost incomprehensible that a brand-new program on such a scale -- involving processing, transporting, storing, and disposing tons of some the most dangerous materials known to humanity -- could proceed without an full environmental impact statement.**
- The plutonium warhead core ("pit") mission is particularly impactful. Yet as we heard again Thursday from a senior analyst for Congress, there has been no final (signed) agency decision as to what the plan for this mission actually is, in detail (despite a long-past statutory deadline requiring one). (This a theme of our comments on the DSA, as noted above.)
- In the 2008 SWEIS, NNSA assumed LANL's plutonium missions would have access to a large, brand-new, safer plutonium facility at Technical Area (TA-) 55. That building was never constructed. No firm plan for constructing any such building has been revealed since then.

### **(Impacts, continued)**

- Despite this we believe, and sources in government also said to us this week, that there are plans for new nuclear facilities at TA-55, despite their conspicuous absence from the DSA. All options for pit production at LANL examined in NNSA's pit production Engineering Assessment involved new nuclear facilities at TA-55.
- As revealed in LANL's DSA, NNSA proposes to operate its plutonium facility on a 24/7 basis. This has important safety and indirect environmental implications, not discussed anywhere.
- The 2008 SWEIS failed to account for the incompetent lower horizon of Unit Three of the Tshirege Member of the Bandelier Tuff ("Qbt3L"), present across LANL and of signal importance in any plans to construct new or replacement nuclear facilities on the south portion of TA-55, the only portion available for construction. The geologic and seismic properties of this stratum necessitated a complete redesign of the then-proposed Chemistry and Metallurgy Research Replacement Nuclear Facility (CMRR-NF) to meet the nuclear safety requirements of 10 CFR 830. The proposed underground production modules (inexplicably absent in the DSA) would not meet those standards, according to NNSA's Engineering Assessment. That is why they would be underground. We believe NNSA has not taken the geologic situation at TA-55 or indeed at LANL as a whole on board.



**(Impacts, continued)**

- According to a December 2019 report of the Defense Nuclear Facilities Safety Board (DNFSB), Building PF-4 does not adequately protect the public. Existing environmental analyses (e.g. the 2008 SWEIS) assume it does. Is not adequately protecting the public an acceptable environmental standard?
- NNSA has formally applied to develop a 64-acre (or larger) parcel in central Santa Fe. While this proposal has seemingly been rejected, the City of Santa Fe says aspects of this proposal are still under active consideration (and hence cannot be revealed). It unclear whether parallel NNSA and LANL proposals for development off Hwy 599, or in Espanola, or elsewhere, are active. LANL and NNSA representatives are on record as considering them. If they are reasonable alternatives they need to be analyzed in a SWEIS.
- NNSA is formally considering giving approximately 3,500 acres of national park quality land in LANL, in a known wildlife migration corridor, for the purposes of mixed residential, commercial, and light industrial development. The purpose of this possible transfer and development is to facilitate LANL's overall expansion. As such, it needs to be examined in a SWEIS.

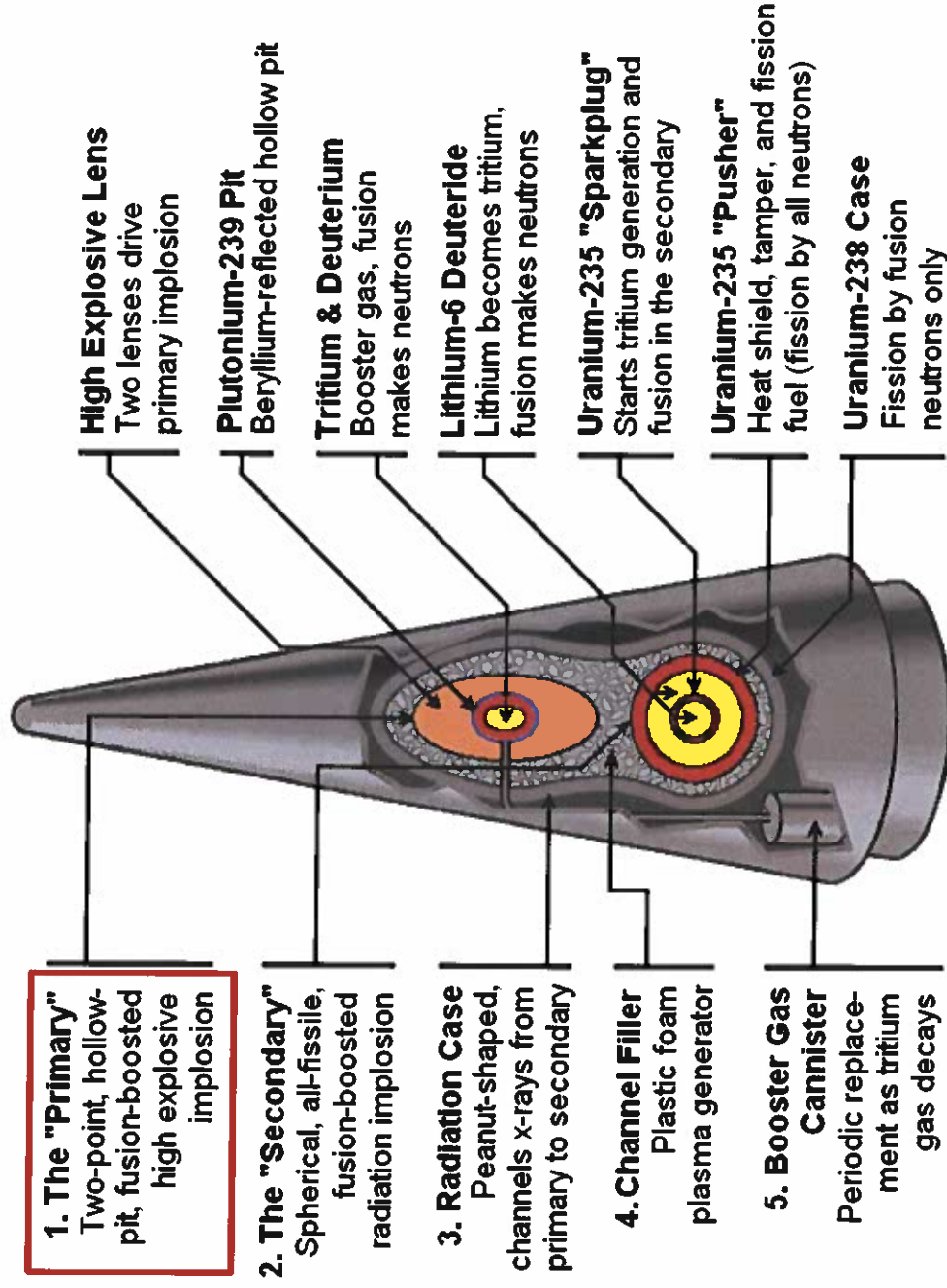
### **(Impacts, continued)**

- It is not just pit production (the subject of the DSA) which is expanding at LANL; decisions to expand other programs are being made as well. It is impossible to judge the combined and cumulative impact of these decisions without a SWEIS.
- There are approximately 20,000 drums of transuranic (TRU) waste at LANL -- about 18,000 at Area G (buried and aboveground) and about 2,000 elsewhere. With the advent of pit production, there is no longer a clear disposal pathway for these drums. The indefinitely-continued presence of these drums adjacent to Indian sacred lands -- which drums are being managed with more than a 100-fold lower assumed accident release fraction than similar TRU drums elsewhere at LANL -- raises significant environmental justice concerns.
- The maximum electrical load at LANL has approximately doubled over that foreseen in the 2008 SWEIS, necessitating a planned \$300 million capacity upgrade project, which began this year but is currently paused until the fall of 2023. The nature -- let alone impact -- of this project is nowhere publicly described. The relative environmental impacts of reasonable alternatives are nowhere discussed.

**(Impacts, continued, final slide)**

- LANL has pitched a new high bridge over White Rock Canyon, to be connected by roughly 25 miles of new highway, most of which would pass through the Caja del Rio lands of the Forest Service and Bureau of Land Management. At the moment, it appears that this project is on hold indefinitely, but the primary impetus for the project -- better tapping the Albuquerque-area labor market, especially for construction crafts, while also avoiding traffic congestion for Santa Fe area commuters -- is strong. At the moment, this audacious proposal stands as a reminder of the wide social and environmental impacts of LANL's proposed expansion. The proposed land transfer to Los Alamos County is part of an alternative solution to that same "mission need," in NEPA terms.
- The Senate Armed Services Committee and NNSA are now both contemplating a major change in plutonium missions housed in PF-4, namely to terminate surplus plutonium disposition activities there, in order to liberate the space those missions occupy to make room for additional pit production. (See: [GAO: Surplus Plutonium Disposition: Processing of surplus plutonium warhead cores \("pits"\) at Los Alamos is uncertain, may conflict with production of new pits](#), Oct 28, 2019.) This and related transportation and storage of plutonium, and related TRU waste management, have significant environmental impacts. This set of decisions, involving multiple sites and states, merits examination under NEPA, including at LANL.
- In 2008, understanding of the climate crisis was far less mature than it is today. NNSA's plans -- far more extensive than considered in 2008 -- also have larger climate impacts than was known then.

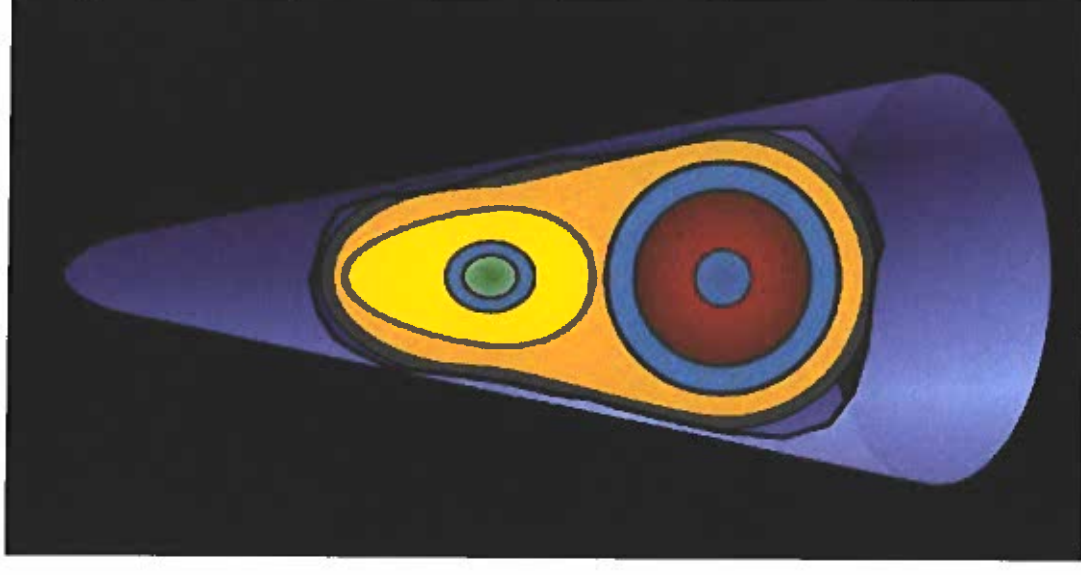
# W88 Warhead for Trident D-5 Ballistic Missile



9/8/2020

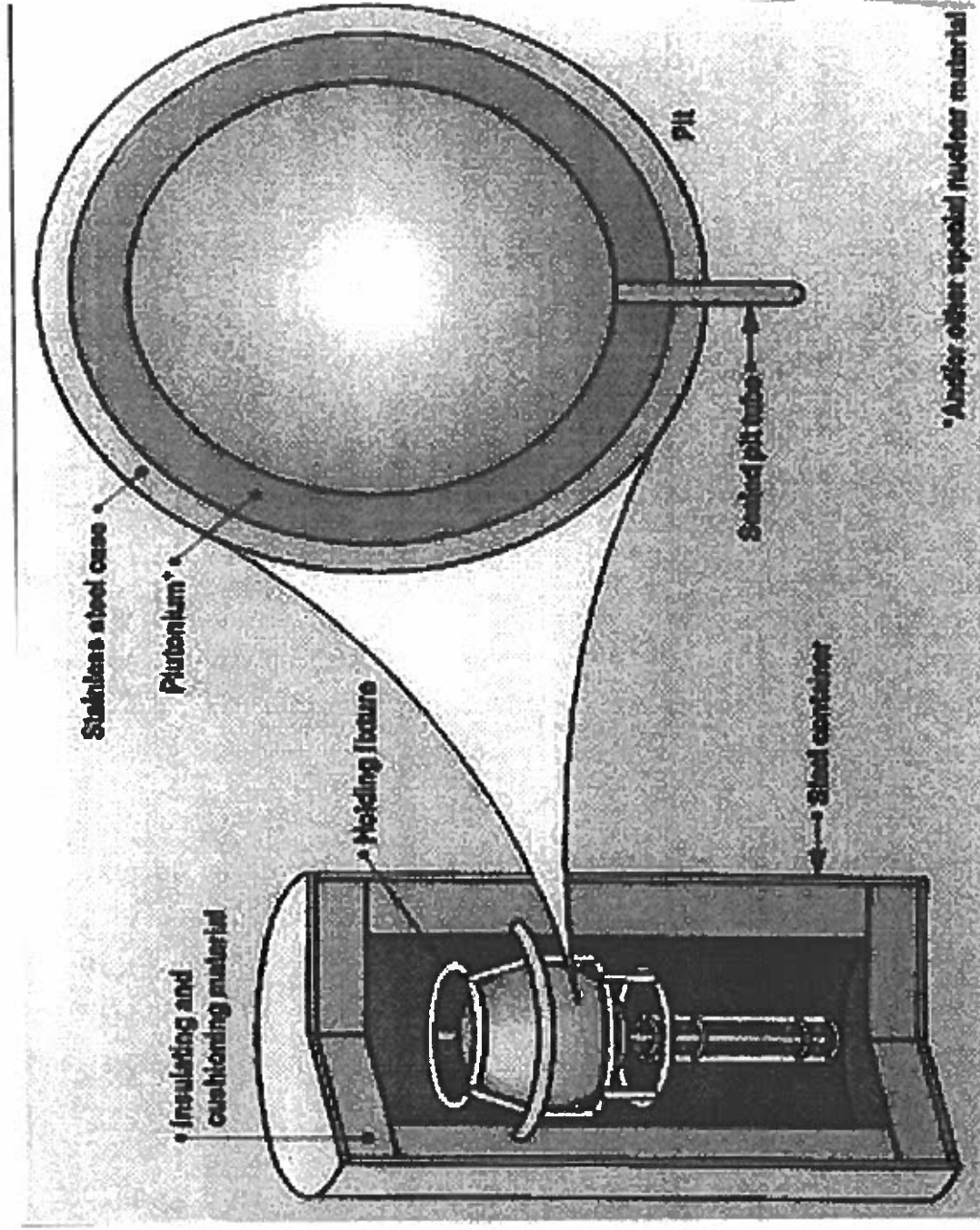
Los Alamos Study Group / [www.lasg.org](http://www.lasg.org)

Sources for illustrations: Wikipedia



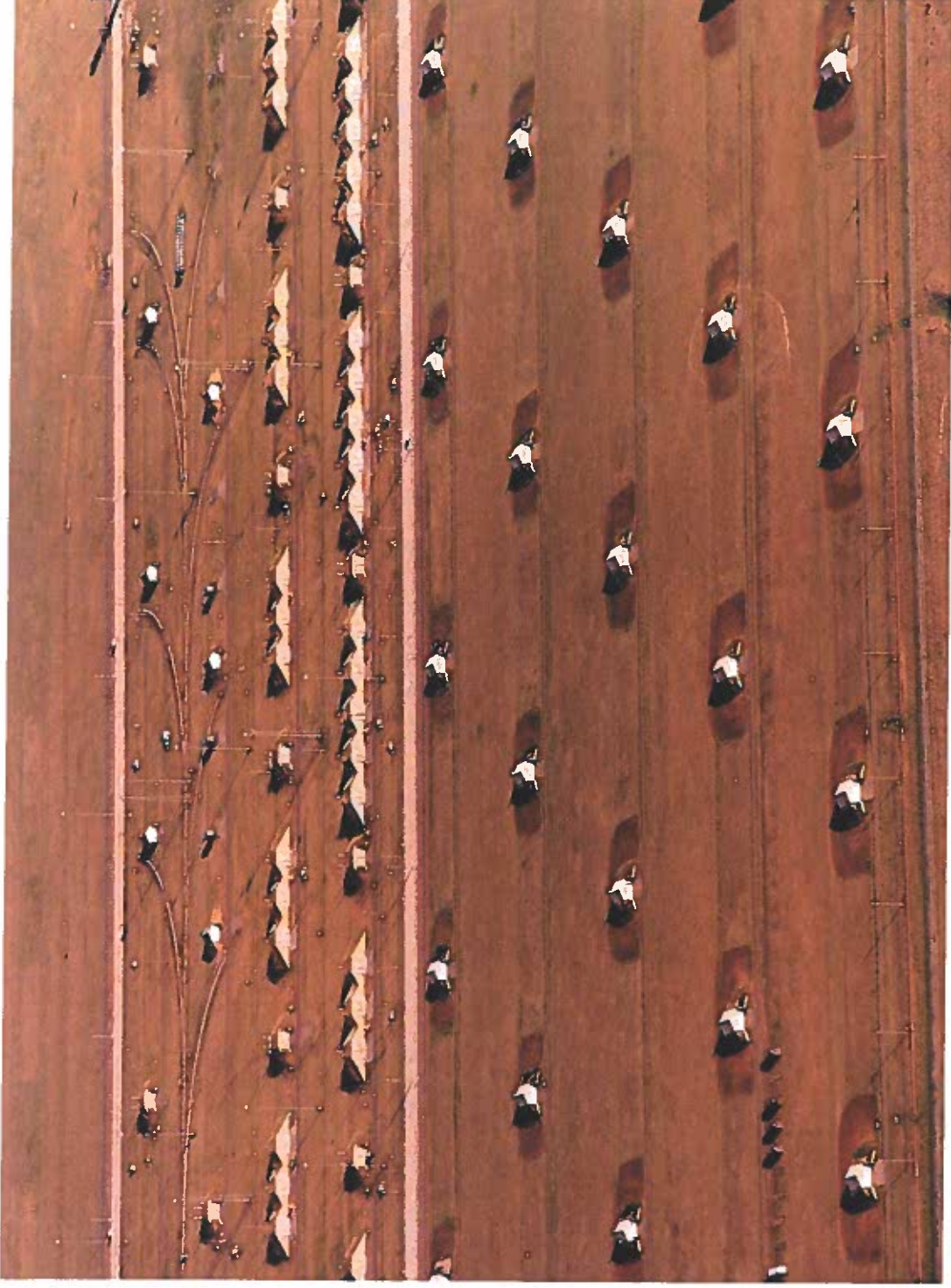


## How pits are stored.



9/8/2020

Los Alamos Study Group / [www.lasg.org](http://www.lasg.org)

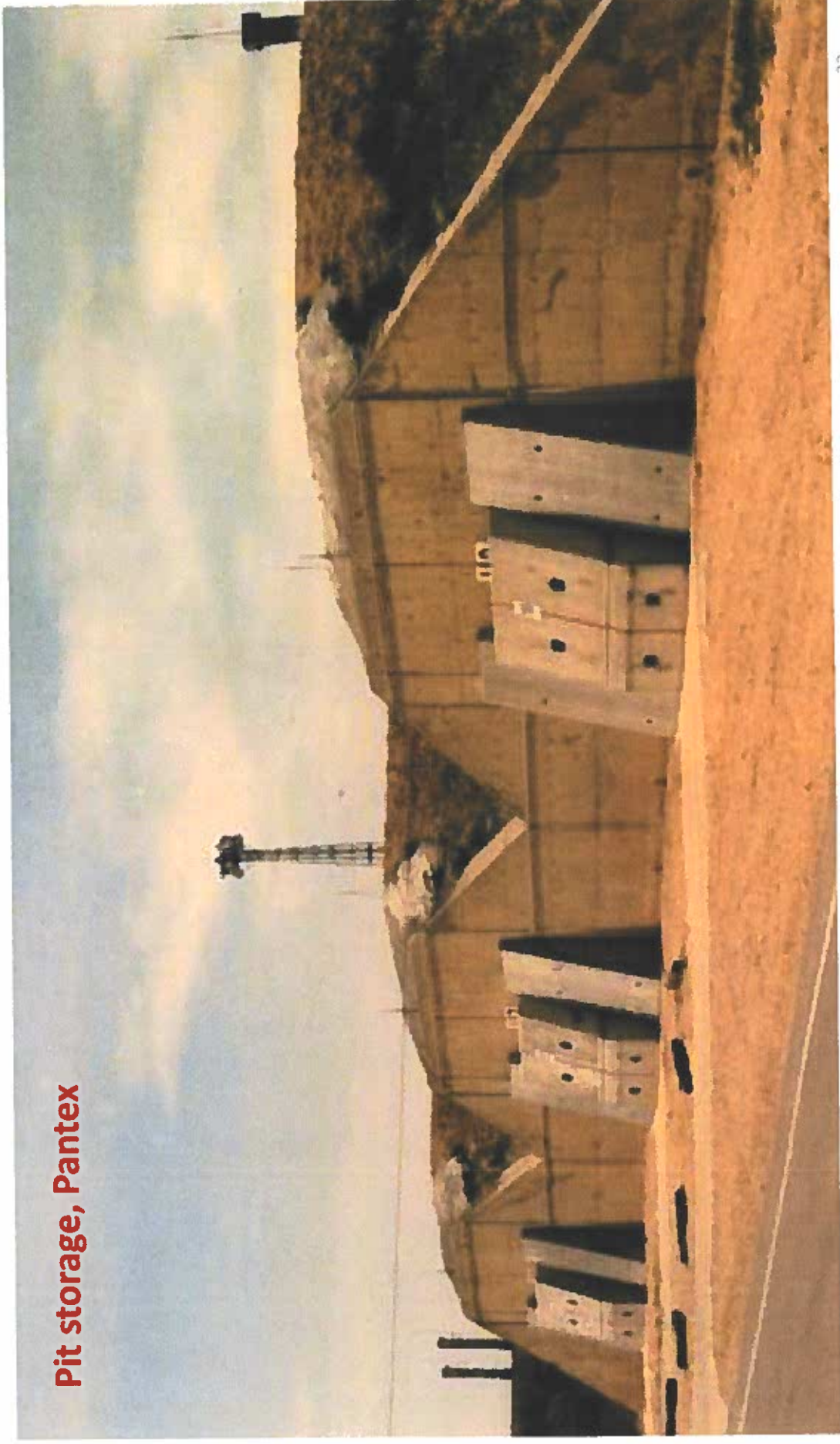


**Pit (top section) and warhead storage at the Pantex Plant near Amarillo, TX (LASG photo, 2000).**

**There are >5,000 usable pits here. With those in current and retired in warheads, there are about 11,000 usable pits.**



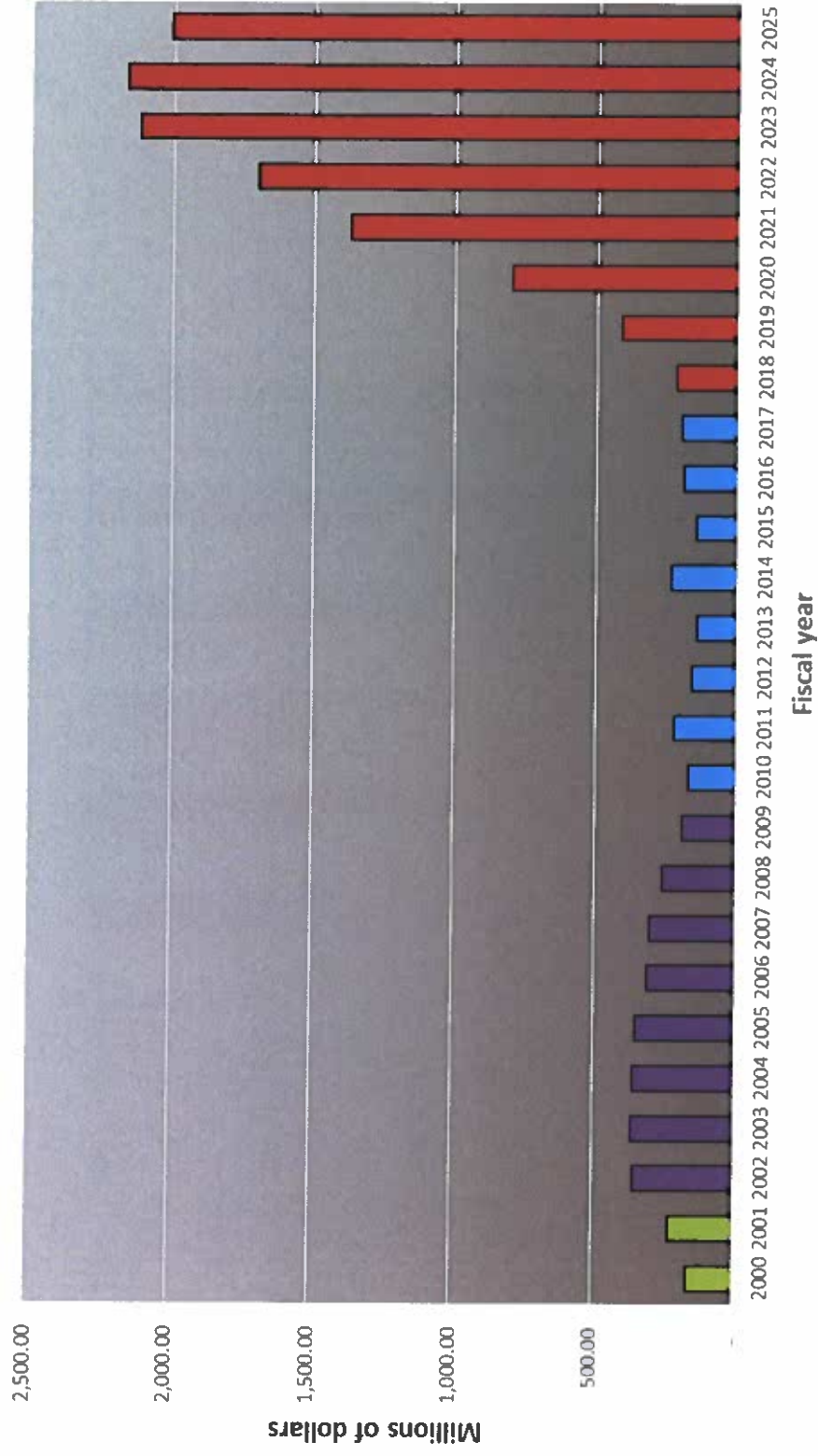
## Pit storage, Pantex



9/8/2020

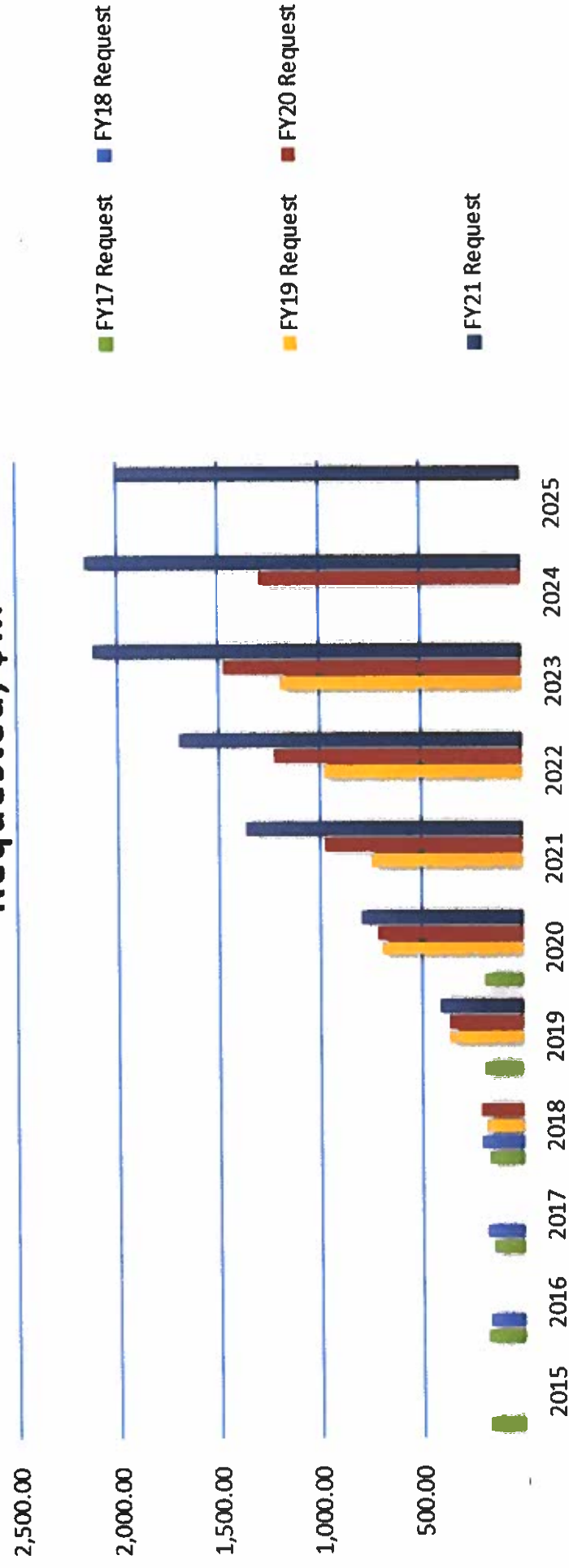
Los Alamos Study Group / [www.lasg.org](http://www.lasg.org)

**Plutonium modernization & prior comparable programs**  
**FYs 2000 - 2020 in constant 2020 dollars; FY 2021 & after, then-year dollars requested.**  
**Source: DOE budget requests. Chart by Los Alamos Study Group.**





## Plutonium Sustainment & Pit Production Spending, Actual & Requested, \$M



# "Plutonium Modernization" Spending, Actual and Proposed by Site, \$M (omits other Pu-mission-supporting LANL construction, funded separately)

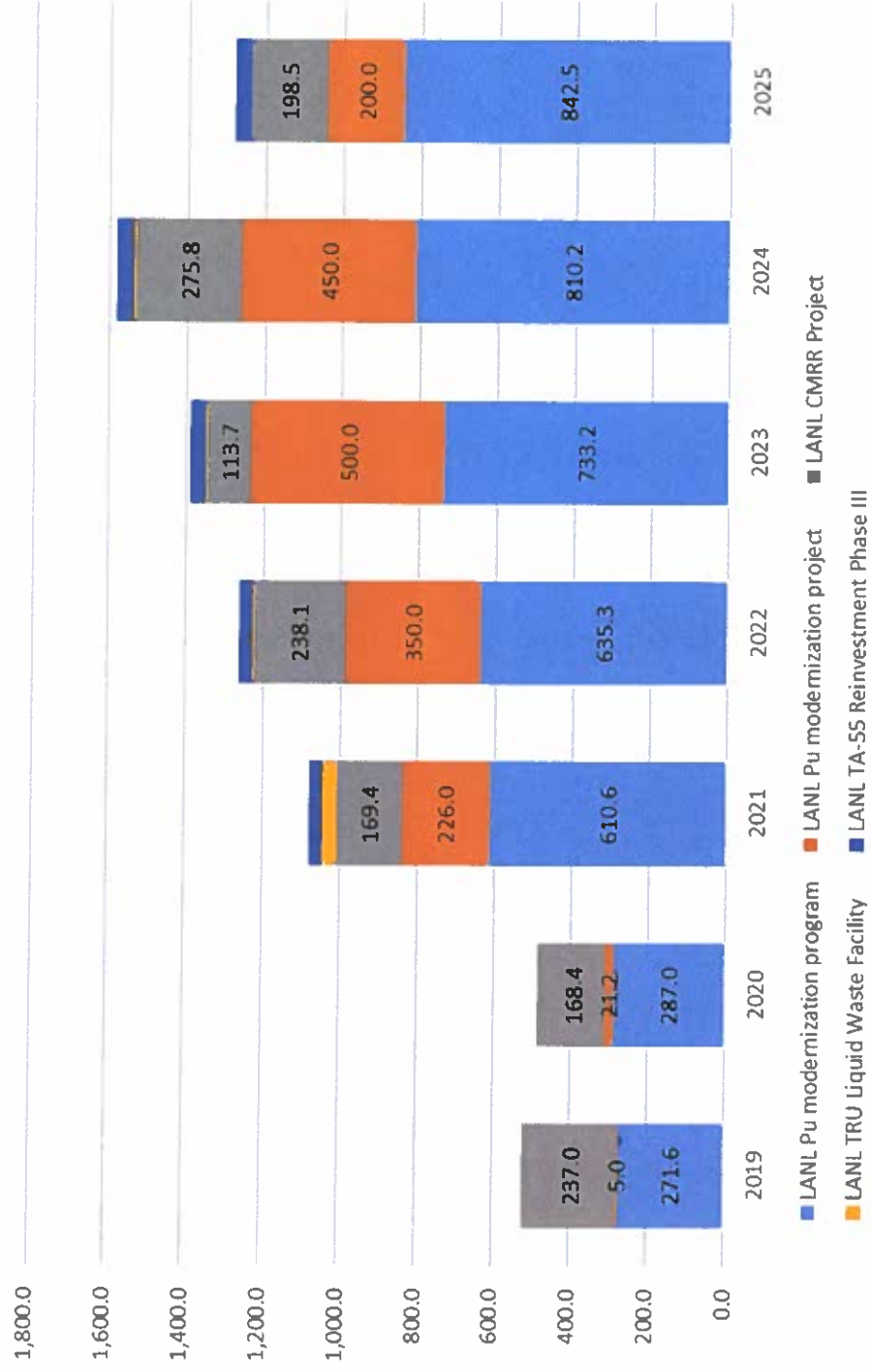


## LANL "Plutonium Modernization" Spending, Actual and Proposed, \$M



**Does not include supporting construction projects.**

## LANL "Plutonium Modernization" with Selected Supporting Construction Cited by Senator Heinrich, \$M





| CURRENT                      |                              |                                        | NEAR FUTURE                |                              |                                        |
|------------------------------|------------------------------|----------------------------------------|----------------------------|------------------------------|----------------------------------------|
| Delivery System              |                              | Nuclear Weapon<br>(Bomb or<br>Warhead) | Delivery System            |                              | Nuclear Weapon<br>(Bomb or<br>Warhead) |
| Platform                     | Vehicle                      |                                        | Platform                   | Vehicle                      |                                        |
| <b>SEA</b>                   |                              |                                        |                            |                              |                                        |
| Ohio-class<br>SSBN           | Trident II<br>D5 LE1<br>SLBM | W76-0, W76-1,<br>W76-2, W88            | Columbia-<br>class<br>SSBN | Trident II<br>D5 LE2<br>SLBM | W76-1,<br>W76-2, W88                   |
|                              |                              |                                        | TBD                        | SLCM                         | TBD                                    |
| <b>LAND</b>                  |                              |                                        |                            |                              |                                        |
| MMIII ICBM                   |                              | W78, W87-0                             | GBSD                       |                              | W87-0, W87-1                           |
| <b>AIR</b>                   |                              |                                        |                            |                              |                                        |
| B-2A Bomber                  |                              | B83,<br>B61-7/11                       | B-21<br>Bomber             | LRSO                         | B61-12, W80-4                          |
| B-52H<br>Bomber              | AGM-86<br>ALCM               | W80-1                                  | B-52H<br>Bomber            | LRSO                         | W80-4                                  |
| <b>DUAL-CAPABLE AIRCRAFT</b> |                              |                                        |                            |                              |                                        |
| F-15E DCA                    |                              | B61-3/4                                | F-35A DCA                  |                              | B61-12                                 |

Figure 3.8 Current and Near-Future Nuclear Deterrent

**Overview of US nuclear weapons, current and planned, as of late 2019. A “W93” SLBM warhead was added in early 2020. The W93 would almost certainly be a LANL-led project.**

**Others such as hypersonic weapons (next slide), may also be in conceptual development.**

From DoD, *Nuclear Matters*, 2020 edition

## [Air Force Eyes Adding Nuclear-Armed Hypersonic Boost-Glide Vehicles To Its Future ICBMs](#)

**At present, all other hypersonic weapons of this type that the US military is developing are conventionally armed.**

[By Joseph Trevithick](#)

[August 19, 2020, The War Zone](#)

The U.S. Air Force is at least researching what it might take to develop a nuclear-armed [hypersonic boost-glide vehicle](#) with a range equivalent to a traditional intercontinental ballistic missile, or ICBM. This vehicle could potentially go on top of the service's future [Ground-Based Strategic Deterrent](#) ICBMs, which are now in development. Publicly, the hypersonic weapons programs [now in progress](#) across the U.S. military [are all conventionally-armed](#). [Aviation Week](#) was first to report on this potential nuclear hypersonic weapon effort on Aug. 18, 2020, based on information the Air Force Nuclear Weapons Center had included in a request for information posted online six days earlier. That document, which was marked "For Official Use Only" and has since been taken offline, outlined seven potential upgrade tracks for an ICBM with a "modular open architecture."

| Table 1: US Nuclear Weapons Modernisation, Costs & Schedule<br>as of 1 May 2020 (Los Alamos Study Group) |                                     |                               |                                                  |                                                                                  |
|----------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------|
| Bombs (B) or Warheads (W)                                                                                | Fiscal year (FY)<br>2020 cost (\$M) | FY 2021<br>requested<br>(\$M) | Total programme<br>cost (billions of<br>2020 \$) | First production unit or first<br>deployment, estimated<br>completion year (ECY) |
| B61-12 life-extension program (LEP)                                                                      | 792.6 (2, 111)                      | 815.7 (2, 111)                | 9.9 (3, 8-37 & 11, 4)                            | 2022; ECY 2026 (2, 120)                                                          |
| B61-12 Tail Kit Assembly                                                                                 | 100.0 (7, 4-2)                      | 50.0 (7, 4-2)                 | 2.0 (6, 2)                                       | 2020 (6, 2)                                                                      |
| B61-13 LEP                                                                                               | none                                | none                          | 22.5 (3, 8-41)                                   | 2038                                                                             |
| B83-1                                                                                                    | 51.5 (2, 111)                       | 30.8 (2 p 111)                | n/a                                              | as of 2018, to be retained indefinitely<br>(3, 1-5)                              |
| W76-1 LEP (for SLBMs)                                                                                    | n/a                                 | n/a                           | 4.2 (3, 8-16)                                    | completed in 2019 (1, 8)                                                         |
| W76-2 Modification (Mod) (for<br>SLBMs)                                                                  | 10.0 (2, 111)                       | n/a                           | 0.76 (3, 8-36)                                   | Feb 2019 (3, 2-38); deployed Dec 2019                                            |
| W80-4 LEP (for USO cruise missile)                                                                       | 898.5 (2, 111)                      | 1.0 (2, 111)                  | 12.0 (11, 4)                                     | 2026; ECY 2031 (2, 120)                                                          |
| W87-1 Mod for CBM, former W78<br>replacement or W1 (3, 1-4)                                              | 112.0 (2, 111)                      | 541.0 (2, 111)                | 14.8 (11, 4)                                     | 2030 (2, 121); ECY 2038 (11, 8)                                                  |
| MX21A aeroshell for W87-1                                                                                | 65.7 (14, 22)                       | 112.8 (14, 22)                |                                                  | 2030                                                                             |
| W88 Alteration (AR) 370                                                                                  | 304.2 (2, 111)                      | 256.9 (2, 111)                | 2.75 (11, 4)                                     | 2021; ECY 2025 (2, 120-122)                                                      |
| W89/M17 SLBM Next Navy Warhead,<br>former W2 (3, 2-45)                                                   | 0                                   | 53.0 (2, 111)                 | 17.6 (3, 8-41)                                   | 2034 (3, 8-46); ECY 2041 (11, 8)                                                 |
| Future strategic missile warhead LEP,<br>former W3                                                       | 0                                   | 0                             | 18.6 (3, 8-41)                                   | 2037 (3, 8-46)                                                                   |
| Bombers & Dual-Capable Aircraft (DCA)                                                                    |                                     |                               |                                                  |                                                                                  |
| B-2A Spirit Defensive Management                                                                         | 3,057 (5, 143)                      | 337 (7, 8-3)                  | 1.91 (16, 763)                                   | June 2022 (5, 143)                                                               |
| System Modernisation                                                                                     |                                     |                               |                                                  |                                                                                  |
| B-21 Raider (Long-Range Strike<br>Bomber, US-6)                                                          | 3,000 (7, 4-2)                      | 2,800 (7, 4-2)                | 102.8 (13, 53)                                   | 2025 (6, 2)                                                                      |
| B-52H (replacing engines, upgrading<br>radar, avionics, & NCS systems)                                   | 2,116 (5, 167)                      | unknown                       | unknown                                          | November 2025 (5, 167)                                                           |
| F-15 Eagle DCA (upgrade passive<br>active warning & survivability<br>systems - EPANWS)                   | 47.3 (16, 2)                        | 170.7 (16, 2)                 | 4.0 (17)                                         | 2019 (16)                                                                        |
| F-16 DCA Mid-Life Upgrade                                                                                | 18.8 (10, 39)                       | 57.6 (13, 43)                 | unknown                                          | n/a                                                                              |
| F-35A DCA (expected to replace F-<br>16)                                                                 | 70.0 (7, 4-8)                       | 11.0 (7, 4-4)                 | unknown                                          | Nuclear certification expected 2024<br>(7, 4-4); deployment 2025 (8, 40)         |
| Missiles                                                                                                 |                                     |                               |                                                  |                                                                                  |
| Ground-Based Strategic Deterrent<br>(GBSD) (to replace Minuteman III)                                    | 557.5 (4, 5-19)                     | 1,525 (4, 5-19)               | 85-150 over 30 years<br>(19, 2)                  | 2029; ECY 2036 (6, 2)                                                            |
| USO cruise missile - replaces AGM-<br>869 ALCM                                                           | 712.5 (4, 5-21)                     | 474.4 (4, 5-21)               | 10.8 (6, 2)                                      | 2026 (14, 41)                                                                    |
| B83 ALCM                                                                                                 | 1,189 (4, 5-15)                     | 1,191 (4, 5-15)               | 19.0 (13, 53)                                    | February 2037 (7, 4-8); ECY 2040 (15, 3)                                         |
| Trident II D-5 Submarine-Launched<br>Ballistic Missile (SLBM) Life-Extension<br>(LSLE)                   |                                     |                               |                                                  |                                                                                  |
| Sea-Launched Cruise Missile, Nuclear<br>(SLCM-N) (15, 12)                                                | 5.6 (1, 10)                         | none                          | unknown                                          | Analysis of Alternatives (AoA)<br>currently underway (12, 12)                    |
| Ballistic Missile Submarine                                                                              |                                     |                               |                                                  |                                                                                  |
| Columbia class ballistic missile<br>submarine (SSBN)                                                     | 2,480 (7, 4-2 & 2,<br>694)          | 4,470 (7, 4-2 &<br>2, 694)    | 139.0 for 12 subs (6, 2)                         | 2031 (6, 2); ECY 2043, if purchase<br>one/yr                                     |
| Nuclear Command, Control and Communications (NC3)                                                        |                                     |                               |                                                  |                                                                                  |
| NC3                                                                                                      | 3,500 (7, 4-8)                      | 7,000 (18, 1)                 | 195.0 over 30 years<br>(13, 17)                  | ECY 2037 (14, 20)                                                                |

9/8/2020

Los Alamos Study Group / [www.lasg.org](http://www.lasg.org)

Request for FY21: **\$44.5 billion (B) for nuclear weapons**, not including \$1.7 B for naval reactors and \$5.0 B for environmental cleanup, \$51.2 B in all.

This includes **\$15.6 B for warheads**—a 25% increase over FY20 and a 40 per cent increase over FY19—as well as \$28.9 B for nuclear weapons in DoD, a 32% increase over 2 years.

In 2017, CBO estimated the 30-year cost of US nuclear weapons at \$1.24 trillion (T) (\$1.32 T now). Of this, 28% (\$352 B) was in DOE (for warheads) and 72% (\$890 B) was in DoD (for everything else). Of the total, \$400 B was for modernisation; the balance was for operations and sustainment of existing forces.

This figure did not include DOE's legacy environmental liabilities. In 2018, DOE estimated its warhead-related liabilities at \$541 B (\$573 B now). Despite cleanup investments, these liabilities have grown at an average rate of \$31 B/year are roughly **\$600 B today**.

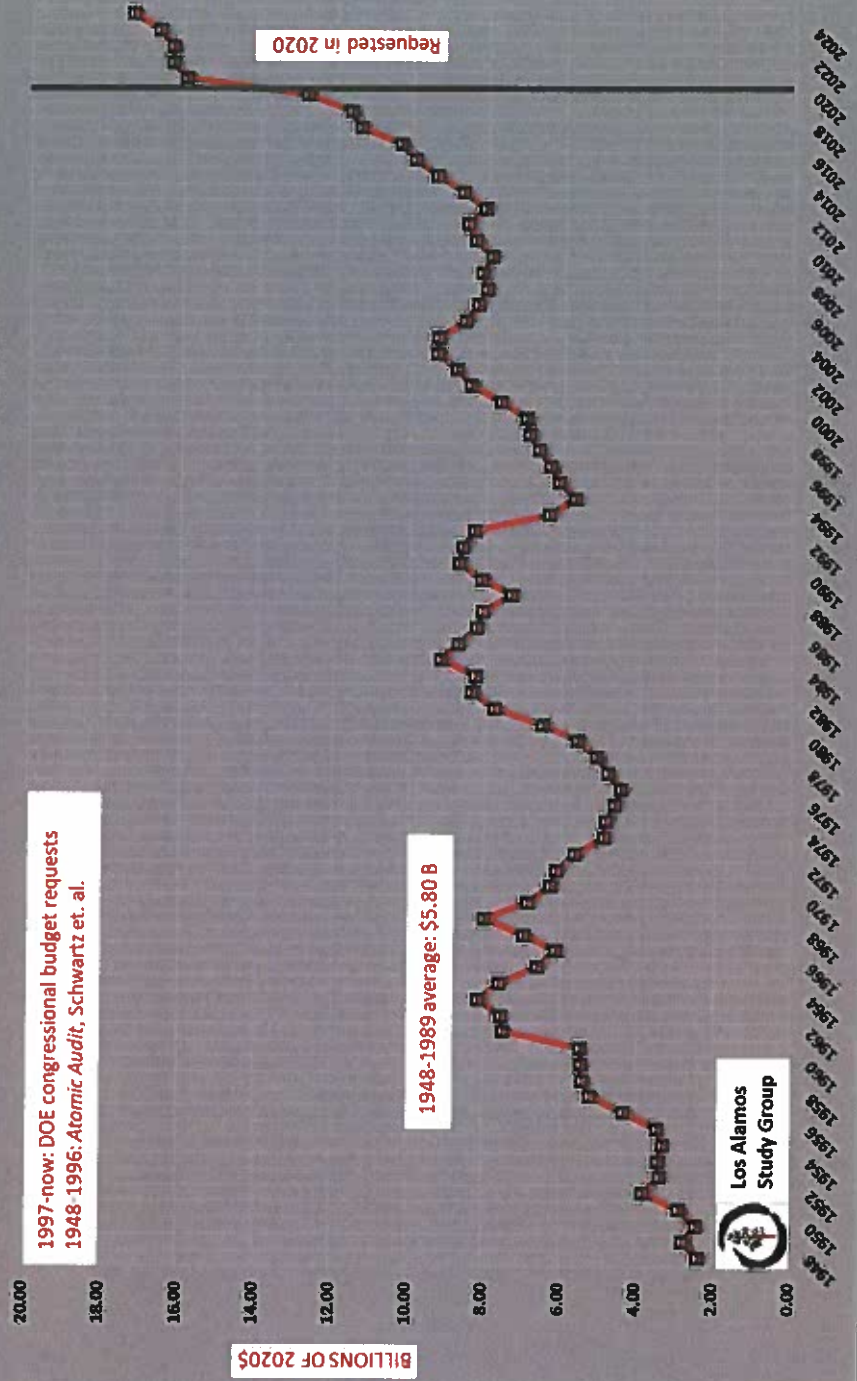
With environmental costs, CBO's 2017 estimate of 30-year US nuclear weapon costs would expand to \$1.92 T in 2020 dollars.

Considering the cost growth seen so far, the present-value cost of sustaining, deploying, and modernising US nuclear weapons over the next 30 years will be **greater than \$2 trillion**.

This 30-year sum comes to more than US **\$15,460 per US household**. The average annual cost of US nuclear weapons over the next 30 years is at least \$67 B/year, including environmental costs, or at least US \$44 billion/year—**\$5 million per hour, 24/7**—without those costs, and without interest on the federal debt used to finance these programmes.

(condensed from: [Update on US Nuclear Weapons Modernization for the International Disarmament Community, May 13, 2020](#)).

**AEC/ERDA/DOE/NNSA Annual Spending for Nuclear Weapons Research, Development, Testing, and Production: NNSA Weapons Activities with administrative costs included; constant 2020\$;  
 ≥FY21 requested, in then-year \$. Updated 2/28/20.**



9/8/2020

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Previous slide: DoD components of nuclear weapons modernization; general discussion of vast overall nuclear weapon expense.

This slide: Unprecedented expansion of NNSA warhead budget.

Backstory: Trump was blackmailed by bomb advocates as possible impeachment loomed.



# Cascading crises, in the U.S. and elsewhere

- “Normal” was illusory before the Covid-19 pandemic. Recession had already started.
- A tremendous transition is being forced upon us, right now. We have to pick which side we are on, and get active or be washed away.
  - Climate collapse (drought, storms, sea levels, fires, famines, refugees, oceanic collapse). These are certain.
  - Oil supply: provisionally peaked worldwide in Nov. 2018 (background) & in the U.S. in 2019. Both peaks will be permanent as depletion continues apace while demand and drilling collapse for 1+ years (at best).
  - No clear end to the current pandemic, which continues worldwide and in the U.S. It may get worse in the fall.
  - Permanent job and business losses, recession without recovery, financial predation and disaster capitalism, debt explosion, housing “apocalypse,” stagflation (e.g. Roach) or depression (e.g. Morgan, Smith, Williams), more positive “degrowth,” restructuring if “we” can seize the moment; it is in these economic issues where the greatest political potential for change lies, as unprecedented inequality is actually rising further and more dominoes fall.
  - Government failures, loss of legitimacy, ~~risk of~~ civil unrest.
  - Aggressive claims for federal priority and extra funding by the national security state, in the face of forced (sooner or later, no longer optional) reassessment of national priorities, selective failures in meantime. Rising demands for new national security and domestic priorities – but with what success, and when?
  - Risk of wars of all types including nuclear war as US empire wanes but still flexes muscle, resources grow scarcer.

## **Why we think the pit mission is incompatible with national survival and eventually will be abandoned.**

The scale of the U.S. financial and political commitment to its military, and to modernizing its very large nuclear arsenal, are almost certainly incompatible with successful passage through the converging crises we face, which will ripen further and become more obvious to all in the 2020s.

To the extent our cascading crises affect citizens personally, the political consensus supporting nuclear weapons investments – especially what will be perceived as *excessive* investments – are likely to weaken.

If we imagine today that in addition to the thousands of warheads we have we need new ones, whether in 10 years or in 20 years, we imply national priorities which will very likely doom us even in the absence of major wars, the risks of which are rising rapidly precisely because of a mistaken militaristic paradigm of national security into which the U.S. has placed so much faith and investment.

Global warming, for example, threatens the very existence of the United States. A whole-of-government response is needed for national survival. Responding successfully to this crisis in the context of other crises we face will require a massive redirection of national security investments and attention.

Looking further ahead to 2060, when we expect the U.S. stockpile of pits to begin to age out, global warming, if not successfully mitigated, will be making large parts of the U.S. largely uninhabitable, including much of New Mexico. Selective abandonment of vulnerable coastal areas, including cities and parts of cities, will be underway. Other crises will have matured in the 2020s and 2030s, some widely anticipated and others less so. The upshot is that the U.S. and the world has only so long to eliminate nuclear weapons before the priorities they embody and represent seal our fate as a nation and civilization. In short, we must get rid of *our need for pits* long before 2060 or pits will get rid of us, one way or another.

# Why pit production is unlikely to succeed

- During the (first?) Cold War, pit production was conducted in a “heroic” mode that sacrificed workers, public safety, and the environment. If the “heroic mode” is the only way pit production, and other plutonium processing missions, can be successfully conducted under real-world production pressures, it may be unsupported by society, and infeasible.
- Unlike during the Cold War, the nation, its people, and specific geographic locales (including most of New Mexico) now face crises, some of which are existential, that have nothing to do with nuclear deterrence. The patriotism that was once the “glue” of the nuclear weapons enterprise, despite the best efforts of NNSA and contractor management, may now be generally directed elsewhere even if nuclear weapons funding can be maintained – which may not be possible either or for long. Overall, it may not be possible to successfully pursue complex, dangerous, expensive missions for any length of time which are not highly valued by society generally.
- Rephrasing, the near-term budgetary and management crises faced by the nuclear weapons enterprise are the tip of a larger iceberg of troubles that is gradually drifting into view. The current program of record, not just in pit production but more broadly in nuclear weapons modernization, is likely to be inexecutable for coercive, managerial reasons that may only be fully apparent in hindsight. It is not a question of if, but of when and how, nuclear weapons modernization programs, including pit production, go “off the rails.”

(This slide and previous adapted from [The Great Transformation: Nuclear Weapons Policy Considerations for the 116th Congress](#), May 6, 2019)

## **Realities of the LANL site: why LANL in particular can't do industrial plutonium**

**It will be very difficult or impossible for LANL to establish industrial plutonium missions, especially industrial pit production at any scale, for a multitude of reasons, all of which are largely independent of senior management. These factors are negatively synergistic in ways proven to be difficult to predict or prevent.**

- The site's industrial, cultural, and educational isolation, which increases costs and creates program risks;
- LANL's dissected topography, which dramatically increases costs and places firm limits on construction;
- LANL's R&D culture and identity, necessary to protect in order to attract young scientists and engineers, especially given LANL's isolated location; LANL's identity is not one of a high-hazard industrial facility;
- LANL's culture of grandiosity, arrogance, and entitlement, a product of LANL's nuclear weapons mission and its lack of accountability, its secrecy, its isolation, its relatively high formal educational attainment, its large salaries and generous benefits, and locally, its relatively low taxes, splendid local government finance and therefore excellent schools and much else of genuine community accomplishment and value relative to its New Mexico surround; the point is that LANL's culture is one where "delusional optimism" (Flyvbjerg, op. cit.) and "normal accidents" have thrived, for fundamental reasons;
- The unconsolidated sediments that underlie TA-55 and other LANL sites, which together with the site's considerable seismicity (next bullet) increase costs and limit construction options;



## **Why LANL in particular can't do industrial pits or plutonium, continued**

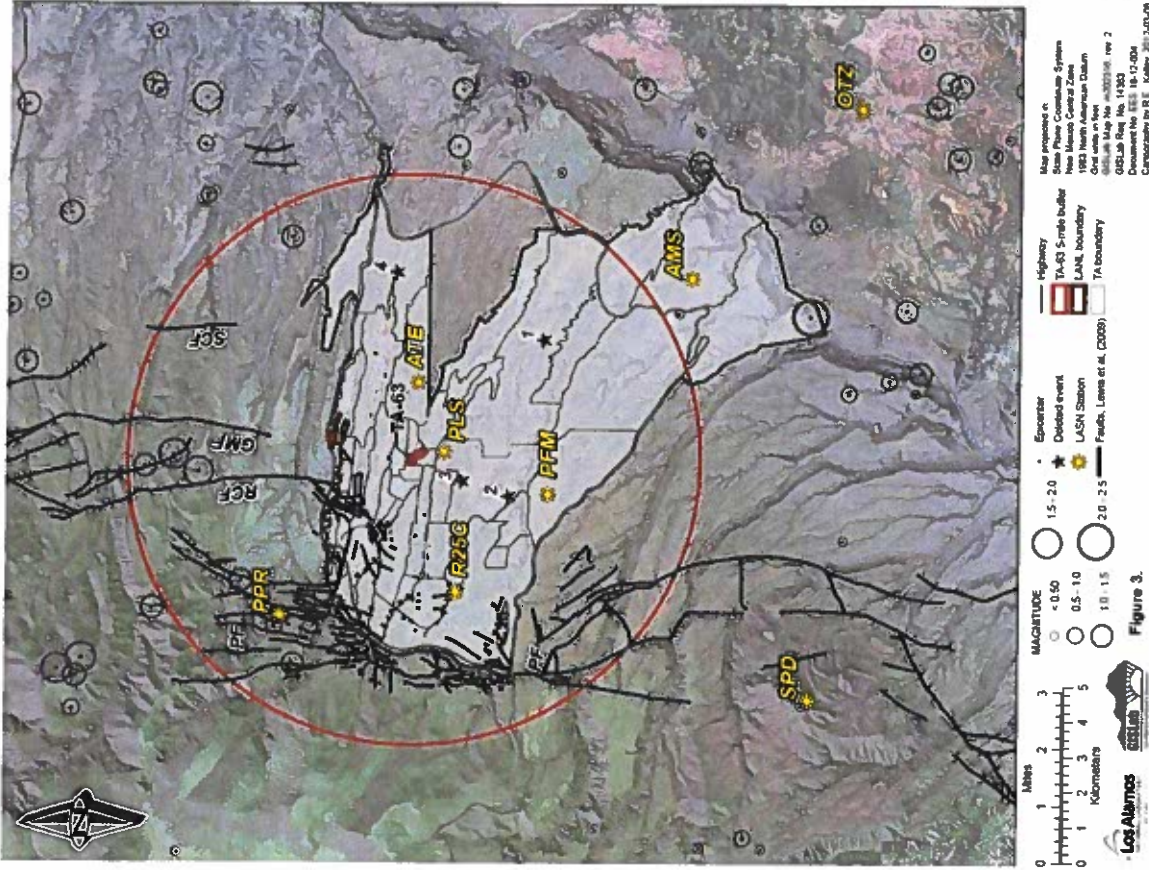
- LANL's high seismicity, a problem that is amplified by known active on-site faults and hence possible ground rupture, the shallow location and high acceleration of earthquakes from them, seismic amplification from unconsolidated sediments, and the structural incompetence of all the rock at LANL;
- LANL's legacy nuclear facilities, which were built for R&D and of limited size; most of these will soon (relative to this long mission) be at, or are already past, their reliable, safe, and useful lives; these include PF-4, the Main Shops, and Sigma, all of which are to have greater or lesser roles in pit production; tearing these facilities down will also be disruptive to a greater or lesser extent.
- The concatenation of difficulties and strain on various LANL support systems posed by multiple industrial plutonium missions at PF-4 (pit production, PuO<sub>2</sub>, Pu-238); the challenge of the RLUOB-NLUOB conversion;
- A political environment conducive to corruption, partly of LANL's own making as we see in the case of the Regional Coalition of LANL Communities (RCLC), again contributing to a lack of accountability;
- A very high incidence of drug use and associated crime linked to systemic poverty and inequality ("the aura of apartheid") in the region;
- The relative lack of a qualified regional workforce and the relative lack of post-secondary educational and vocational institutions in the region;
- The reality of prior, living Pueblo traditions and religious claims to "LANL" lands and waters; and
- The incompatibility of industrial plutonium operations with powerful local cultural aspirations and values.

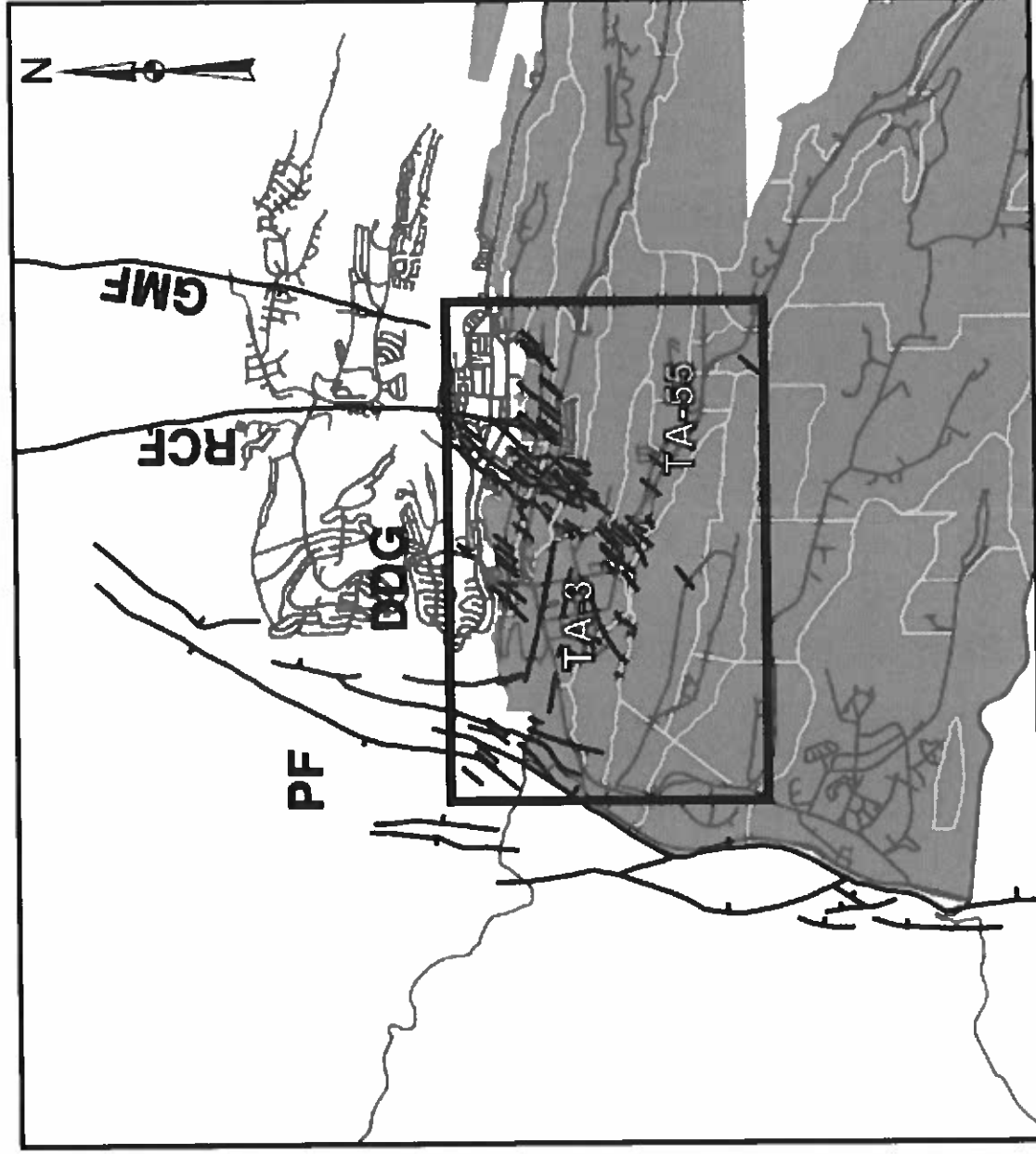
## Three slides on LANL's seismic situation:

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 (pumice) 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.





Gardner et  
al 1999,  
LANL







## **LANL worker safety: on a collision course with powerful other agendas**

- Historically LANL, like the rest of the nuclear warhead complex, has not been a safe place for workers. Thousands of workers died nationwide, tens of thousands sickened, and hundreds of thousands died from the fallout from nuclear testing (["US nuclear tests killed far more civilians than we knew," Quartz, 12/21/17](#)). Tens of thousands of soldiers, sailors, and airmen were exposed as well, with many deaths.
- Nationwide, the Department of Labor has approved 93,353 claims so far, out of 128,207 unique worker cases, under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA).
- At LANL, claims have been filed for 6,557 unique individual workers; 5,102 of these cases have been paid. As of July 2015, claims on 1,599 unique worker death cases at LANL had been paid. (Energy Employees Claimant Assistance Project, personal communication). \$1.08 billion has been paid to former and current LANL workers under EEOICPA, out of more than \$18.4 billion nationwide.
- These deaths and morbidity result from what University of Chicago sociologist Joe Masco has called "the heroic mode of production." Right up to the present day, the "efficiency" of nuclear weapons production during the Cold War is a model and a standard in many influential governmental and advisory minds.

## LANL worker safety (continued)

- There is no external regulation of worker safety at DOE facilities, nor is any contemplated; imposing “ordinary” regulation of worker safety in the nuclear weapons industry has always been and still is widely seen as threatening national security.
- Nuclear-complex-wide, current trends in nuclear safety are not positive. This is also true at LANL, the recent history of which has been one of periodic shocking disregard to the most elementary safety procedures and rules.
- LANL is subject to “normal accidents” (cf. Charles Perrow) – it is the kind of institution where such accidents occur.
- LANL does not and *cannot* fully self-identify as a high-hazard nuclear or industrial facility.
- We believe changing LANL’s basic identity and culture will neither be successful nor enough despite the best will in the world. There are too many determinants – geographic, political, geotechnical, social – that lie outside LANL’s institutional control.
- The highly-professional Defense Nuclear Facilities Safety Board (DNFSB) is not a regulator, does not have an explicit worker safety mandate (neither nuclear nor otherwise), has been under sporadic attack from without and within for almost two decades, and is too small to even visit most LANL facilities.

**\*\*\* Presentation ends here. \*\*\***

Presentation to the

## Radioactive and Hazardous Materials Committee of the New Mexico Legislature

### Production Expectations vs. Site Realities and Worker Safety at Los Alamos National Laboratory (LANL): A Recipe for Regional Decline

Greg Mello, Executive Director, Los Alamos Study Group

August 15, 2018



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8/14/2018

Los Alamos Study Group \* [www.lasg.org](http://www.lasg.org)

## **This presentation**

1. LANL production mandates, current and proposed
  - a. Pits (please see [http://www.lasg.org/MPF2/first\\_page.html](http://www.lasg.org/MPF2/first_page.html) for more detail)
  - b. Plutonium dioxide production from for mixed-oxide (MOX) fuel or to dilute and dispose at WIPP (D&D) (see [http://www.lasg.org/Disposition/disp\\_main.html](http://www.lasg.org/Disposition/disp_main.html) for more detail)
  - c. Heat source (Pu-239) and other missions, which cannot be “gapped.”
2. NNSA’S 2017 and 2018 pit production analyses
3. Realities of the LANL site
4. LANL worker safety: on a collision course with powerful other agendas
5. Environmental liabilities: is pollution an asset? Are LANL’s environmental liabilities decreasing, or increasing?
6. A recipe for regional decline
7. What can be done?





# LANL TA-55:

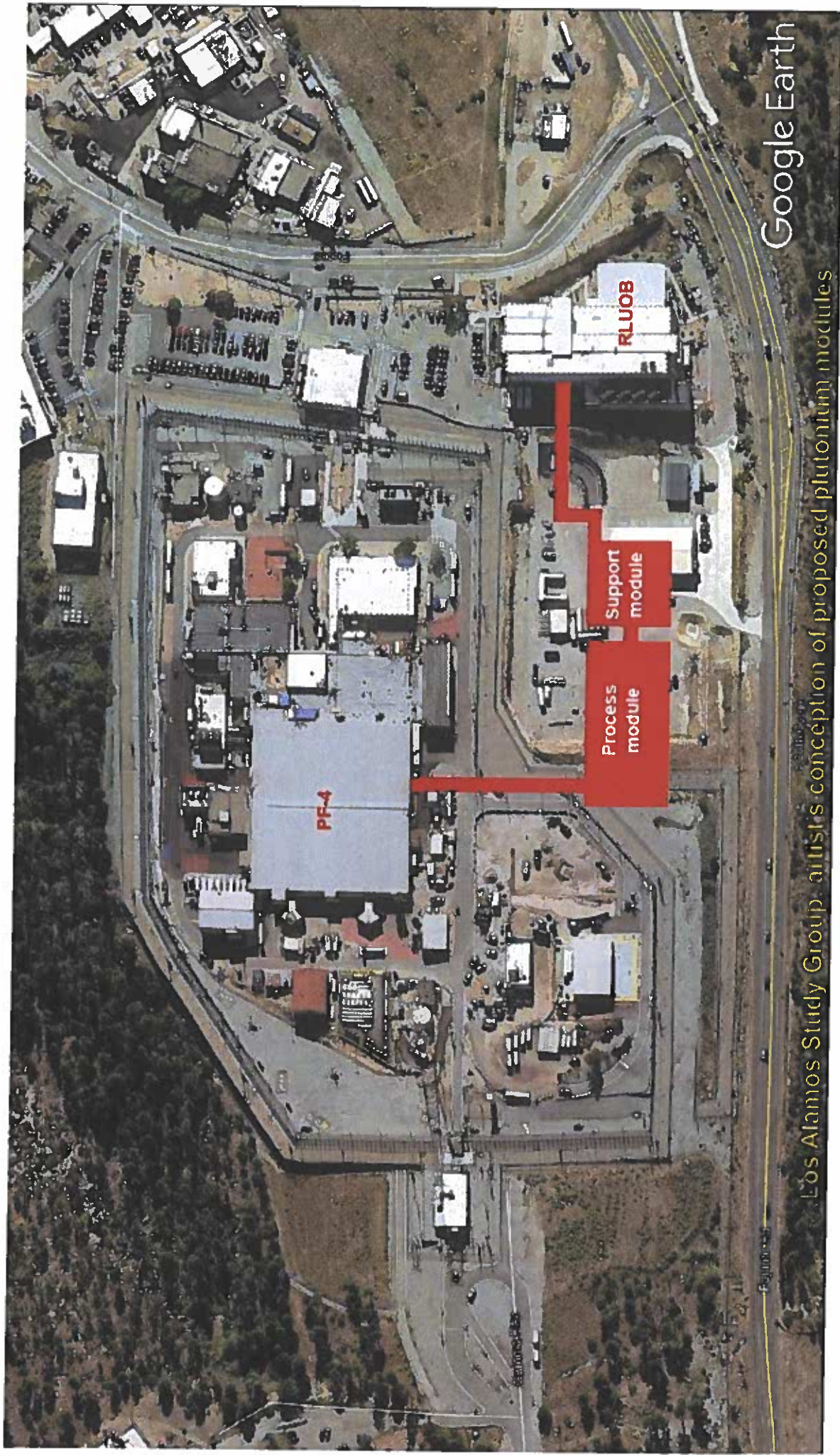
1. PF-4, 60K ft<sup>2</sup> labs, HC2
2. RLUOB, 20K ft<sup>2</sup> labs, HC3 proposed
3. Two proposed underground modules and tunnels, each 5K ft<sup>2</sup> labs, HC2
4. Brand-new fixture assembly bldg, not shown
5. Former proposed CMRR-NF footprint
6. Temporary sheds
7. PF-3 (cold shops)
8. Pajarito Canyon
9. Mortandad Canyon
10. Area C nuclear, chemical dump
11. TA-50 WCRR
12. TA-50 liquid waste

Los Alamos Study Group, artist's conception of plutonium modules

8/14/2018

Los Alamos Study Group \* [www.lasg.org](http://www.lasg.org)





Google Earth

Los Alamos Study Group: artist's conception of proposed plutonium modules

Figure 1.1





Los Alamos Study Group, artist's conception of proposed plutonium modules

## Pre-2018 LANL pit missions

- Basic missions (unambiguous value within current program objectives, low to moderate cost, low to moderate management risk, and engender little controversy):
  - a. Pit surveillance
  - b. Pit aging studies
  - c. Targeted plutonium science
  - d. Retain production skills via pilot or demonstration production; transmit skills
  - e. Retain production technologies and develop them as needed
  - f. Inspect, reuse, & if needed repair (rebuild) pits – 90 pits per year (ppy) at LANL
- Rapid post-2024 ramp-up to industrial production of new pits required:

2015 National Defense Authorization Act (NDAA): produce 1 War Reserve (WR) “W87-like” (difficult) pit by 2023, 10 by 2024, 20 by 2025; 30 by 2026; demonstrate, for 90 days, an 80 ppy capacity by 2027 (or as late as 2029 for cause).

Industrial pit production – production of 100s to 1,000s of pits – has contested value and urgency, high cost and risk, and a track record of failure.
- LANL had not made a modern WR pit prior to 2007. In 2007-2012, LANL made a total of 29 WR pits. LANL is currently legally limited to a capacity of 20 ppy under the National Environmental Policy Act (NEPA).



## Pre-2018 LANL pit missions: comments

- Don't take these (unfunded) authorization requirements too seriously. Affected parties sometimes do and sometimes don't.
  - The 90-day, 80 ppy demonstration by 2027 (or 2029) has been omitted from official discourse.
  - The executive branch requirement for "50-80" ppy and now, "at least 80" ppy by 2030 will be almost impossible to achieve by that date, according to NNSA.
- In 2017, the National Nuclear Security Administration (NNSA) completed a careful study of pit production alternatives ("[Final Report for the Plutonium Pit Production Analysis of Alternatives](#)," [October 2017](#), "[AoA](#)"). NNSA hired Parsons Engineering to conduct a subsequent study ("[Pu Pit Production Engineering Assessment](#)," [April 2018](#), "[EA](#)").
- Neither the 2017 AoA nor the 2018 EA favored LANL for industrial pit production, especially the former, a more careful study.
- NNSA, in the AoA, characterizes current pit production capacity at LANL as 10 ppy.

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                                         |
| <b>Total</b> | <b>30*</b>                                     | <b>21*</b>                         | <b>2*</b>                             | <b>7</b>                                  |

\* 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)



## Pit Production Strategy and Progress

- To sustain plutonium infrastructure and establish capabilities to resume production of war reserve pits, NNSA is:
  - Investing over \$1B from FY19 – FY23 to sustain current operations and achieve 30 pits per year (ppy) production capability by 2026
  - Investing over \$2B in construction projects to replace CMR capabilities and reconfigure space to support production
  - Analyzing options, consistent with DOE O 413.3B, for long-term infrastructure needs to support the 80 ppy requirements and other mission needs
- Progress:
  - Safely resumed operations in PF-4 after a 3-year operational pause
  - Began construction activities for the first two CMRR subprojects:
    - RLUOB Equipment Installation Phase 2 (REI2)
    - PF-4 Equipment Installation Phase 1 (PEI1)
    - Both are on schedule and under budget
  - Fabricated two development pits in FY17; will build four development pits in FY18
  - Completed the Plutonium Pit Production Analysis of Alternatives in FY17

**Summary of  
Current Program  
of Record at LANL  
  
(from NNSA, AoA  
briefing slides,  
Nov. 2017)**

## **New August 13, 2018 FY19 NDAA mandate (§3120, “Plutonium pit production”)**

- Makes LANL the “Plutonium Science *and Production* Center of Excellence” for the US, a new identity;
- Requires the NNSA and LANL to “implement surge efforts to exceed 30 [ppy] to meet Nuclear Posture Review and [unstated other] national policy,” a dramatic new requirement;
- Requires the Pentagon “in consultation with NNSA” to assess the strategy to manufacture “up to 80 [ppy] at Los Alamos through the use of multiple labor shifts and additional equipment at PF-4” until underground “modular” facilities are completed to increase capacity still further;
- Requires NNSA production planning to default to LANL unless a 2030 deadline, known to be virtually impossible, is miraculously met in South Carolina,
- Requires NNSA to assess possible conflict between pit production and LANL’s other planned industrial plutonium mission, namely the processing of surplus pits to produce tens of tons of plutonium dioxide for disposal;
- Requires NNSA to produce two detailed plans for pit production at LANL, one for production of 30 ppy by 2026, the other for production of “31-80” ppy by 2030; and
- Requires the Nuclear Weapons Council to annually certify that the NNSA plan to produce 80 ppy is “on track,” and requires NNSA to produce a backup or recovery plan if that certification is not forthcoming.



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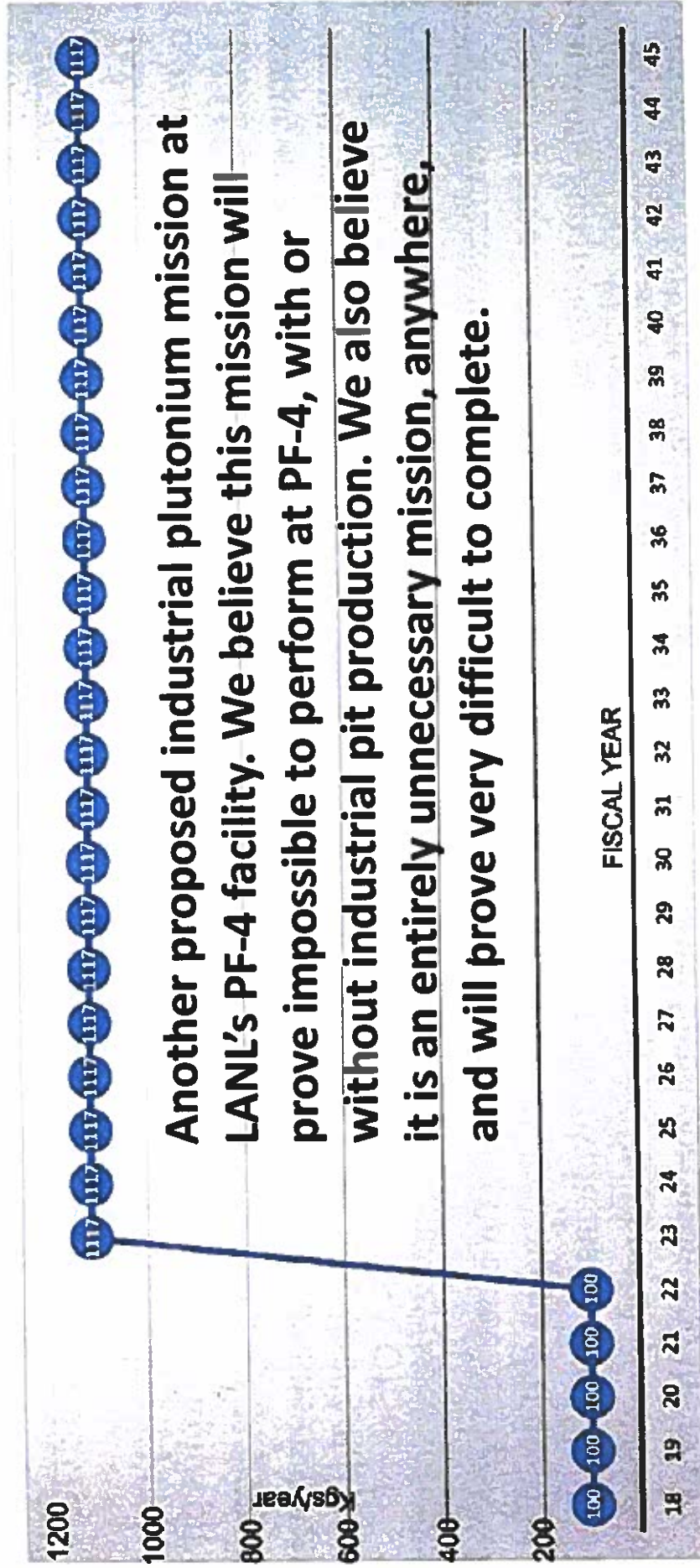
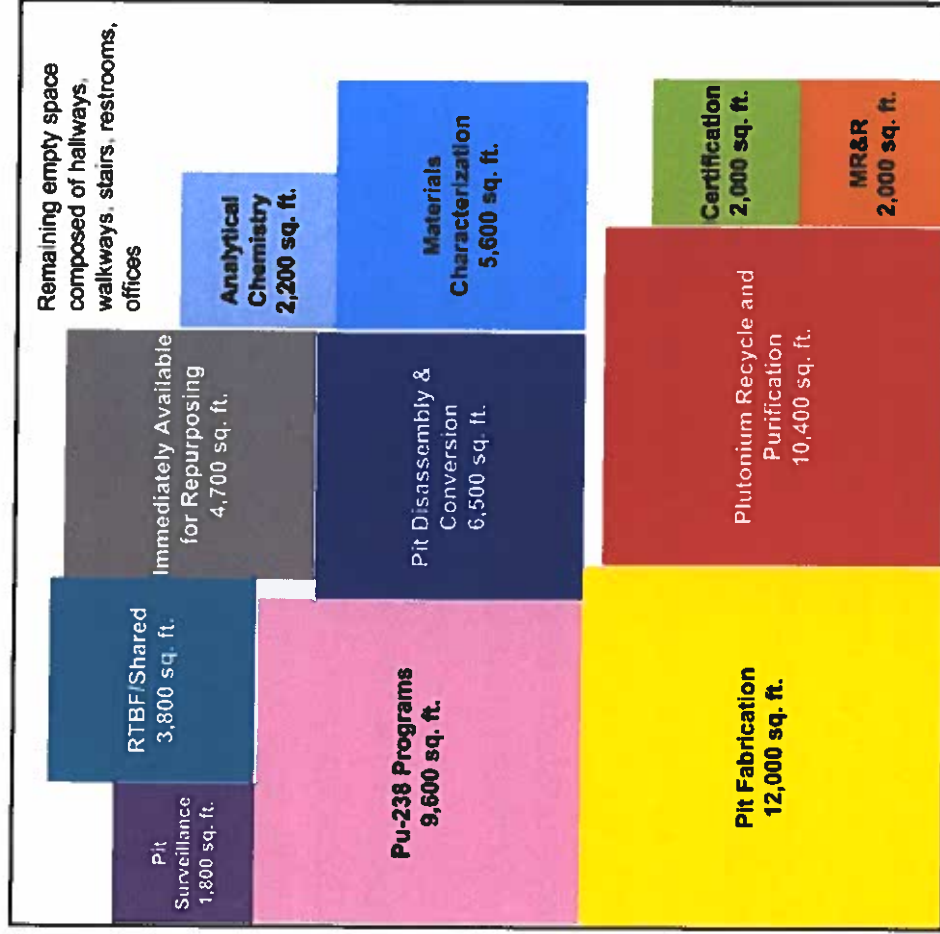


Figure 2 – LANL Oxidation Throughput Table (Ramp up to 1117 Kgs per year)

## 1. PF-4 Space Allocation as of Early 2012



Other plutonium missions in PF-4, as of 2012

(from Congressional Research Service)

Source: Los Alamos National Laboratory. The blocks in this diagram represent space allocations to scale, but do not show the physical location of each activity within PF-4.

## Observations about LANL industrial nuclear materials missions (1 of 2)

- Short gaps in basic plutonium operations may be tolerated but longer gaps (>1 year) may be self-perpetuating and could have longer-term impacts (e.g. loss of key personnel).
- In stark contrast, new pits need not be supplied until 3 or even 4 decades from now with no effect on the stockpile until >2060.
- Preparation for industrial missions (pit production, PuO<sub>2</sub> production) must not jeopardize with basic stockpile missions, the true foundation of stockpile confidence. The AoA is careful about this. The EA is not.
- Continuity in basic missions requires an enduring, capable, well-maintained and -operated plutonium facility, with appropriate safety systems. At LANL this is at best a “work in progress” – at worst, a process of gradual collapse and “run-to-failure” (the view of a former NNSA LANL Area Manager; his phrase).
- NNSA’s basic pit plutonium missions are largely housed in PF-4, which was completed in 1978 to then-current codes. The adequacy of PF-4’s safety systems is contested. PF-4’s ability to withstand a design-basis earthquake is ambiguous. Neither ventilation nor fire protection are safety-class.
- Despite continual investment, NNSA has stated PF-4 will “age out” by 2039. Others in NNSA believe PF-4 will last as long as 2060, but apparently agree that replacement will be required during the productive lifetime of planned pit production facilities. *Ceteris paribus*, outages are likely to increase a) over time and b) with increases in overall mission burden, if undertaken.

## Observations about LANL industrial nuclear materials missions (2 of 2)

- Replacement of PF-4 would be a deeply-fraught prospect at best; at worst – impossible.
- PF-4 replacement will require most or all of the remaining real estate within TA-55 for building footprint, access, and laydown. No planning for this is visible. Current proposals for expansion of pit capacity use up the real estate in which this could be done.
- Removal and replacement of PF-4 gloveboxes is a slow, disruptive, dangerous, and expensive process. Much internal re-tooling is likely to halt some, most, or even all work at PF-4.
- Construction of the LANL industrial pit production options under consideration in the EA will make it difficult (for options 2a, 2b) if not impossible (option 2c) to maintain continuity of operations in PF-4, and would prevent PF-4 replacement at TA-55.
- Thus at LANL there is a high risk of mission interference of two kinds: attempted expansion of the pit mission will cause a gap in basic plutonium missions, or else may cut short their future. With the proposed expansion in PuO<sub>2</sub> mission there would be a second body-blow to the integrity and operation of PF-4.
- We also believe the nature of the LANL contracts, its overall culture, and the environment of LANL will make it impossible to reliably conduct industrial missions at all, as we will discuss.



## **2. NNSA'S 2017 and 2018 pit production AoA and EA: general observations**

- Guidance, assumptions, and conclusions of these two analyses differ radically. All the alternatives examined in the EA are based on a “split production” model that was rejected in the AoA because of its redundancy and high cost.
- Three of the four EA alternatives use a “split manufacturing” flowsheet, which likewise was rejected in the AoA for reasons of feasibility, longevity, and risk.
- One alternative in the EA is included (underground “modules” at LANL) even though it does not meet many of the EA's own feasibility and safety criteria.
- What other alternatives might merit analysis?
- “Lessons learned” are conspicuously absent on this topic in official discourse, markedly so in the EA.
- The FY19 NDAA requires the Pentagon (not NNSA) to re-analyze the AoA and EA, including the four EA alternatives, by April 1, 2019, among other requirements. We contest the a) validity, b) legitimacy, and c) executability of both the recent former “50-80” and the current “at least 80” ppy “by 2030” pit production requirements. Current requirements translate into 103 ppy on average for a single shift, for difficult pits.
- DoD and DOE have stated all current pits will last for at least 85-100 years from manufacture, which was 1978-1989. There is no need for any pit production at all for some decades. The US has ~12,000 usable pits of modern types, half in warheads and bombs. A smaller stockpile would decrease “need” even further.

## The 2017 Pit Production AoA: key results & comments

- Please see handout for lightly annotated congressional briefing slides and Executive Summary. The AoA is at [http://www.lasg.org/MPF2/documents/NNSA\\_PuPitAoA\\_Oct2017\\_redacted.pdf](http://www.lasg.org/MPF2/documents/NNSA_PuPitAoA_Oct2017_redacted.pdf).
- All alternatives have high schedule risk. The achievement of 80 ppy is unlikely before 2033 for any alternative.
- The difference in equipment and space for 80 vs. 50 ppy is smaller than space and cost estimation errors. The AoA therefore says it makes little sense to have a pit production facility smaller than 80 ppy. The AoA rejects “split production” as grossly inefficient. **Us: split production is the basis of all EA options.**
- Renovation of PF-4 to increase production capacity beyond 30 ppy will make 30 ppy unachievable in the 2020s and interfere with basic plutonium missions. **Us: EA alternatives 2b and 2c do this.**
- The 80 ppy equipment would require seven 5,000 sq. ft. “modules,” if “modules” are to be the basis of expansion at LANL. These wouldn’t fit in TA-55. **(It has been asserted to us by a senior Pentagon official that “10 or 12” such modules would fit in TA-55. Could they be functional, and would they be safe? No.)**
- The AoA rejects all production based or dependent on PF-4, including “split flowsheet” production. **Us: three EA alternatives (2a, 2b, and 2c) are dependent to varying degrees on PF-4. The AoA would have PF-4 “return to the [R&D] mission for which it was built.” Us: it will last longer that way. It may be irreplaceable.**

## AoA results and comments, continued

- Moving PuO<sub>2</sub> and Pu-238 missions out of PF-4 would not generate enough space to matter. Also, the Pu-238 mission “cannot be gapped.” Moving Pu metal preparation out of PF-4 does not provide enough space to matter, would take too long to establish elsewhere, and would disrupt the 30 ppy operation in PF-4.
- PF-4 was built in 1978 with a planned useful lifetime of 50 years. Relying on PF-4 for pit production would jeopardize the program of record, present unacceptably high risks, and PF-4 would still be 22,000 sq. ft. too small. **Us: a new PF-4 would cost >\$10 B, if feasible at LANL at all.**
- Building a new Security Category I facility outside TA-55 would cost \$1 B just in security infrastructure (p. A-7). This is not included in cost estimates. Unless a large enough new version of PF-4 is planned now for TA-55, a second Pu site may be required at LANL.
- All higher-capacity LANL pit production plans involve converting the Radiological Laboratory, Utility, and Office Building (RLUOB) into a Nuclear Laboratory (etc.) (NLUOB) – that is, acquiring nuclear facility space by fiat, without having constructed it to nuclear facility standards. This may present difficulties. **Please see [http://www.lasg.org/MPF2/LASG\\_RLUOB-DEA\\_comments\\_25Apr2018.pdf](http://www.lasg.org/MPF2/LASG_RLUOB-DEA_comments_25Apr2018.pdf).**
- NLUOB may very well not be adequate for 80 ppy. (AoA pp. A-3,4). The same marginality applies to material characterization (MC) resources.

## AoA results and comments, continued

- Us: cost estimates, while comparable across alternatives, may be low-balled, especially at LANL. CMRR-NF HazCat 2 space costs were staggering (equipment plus working space: \$150,000/sq. ft.) due to site-specific seismic, geotechnical, congestion, and haulage requirements.
- The ~\$2 B advantage for an existing facility looks too small, especially if uncontaminated.
- Transportation of pits is not expected to be a discriminator (p. 73).
- Refurbishment alternatives save about 4 years in schedule over new construction.
- The Mox Fuel Fabrication Facility (MFFF) has about three times the processing space required. Additional space in MFFF, should it be needed, is thus inexpensive. The MFFF is the “most favorable” choice for pit production (p. 81). This choice is however dependent on congressional and judicial concurrence in terminating the MOX program.
- The AoA did not suggest a location for a proposed new facility at LANL. Tellingly, the AoA found “little cost or schedule distinction” between new facilities at LANL, SRS, and INL.
- A number of potential problems with LANL support facilities were mentioned (waste handling, instrument calibration, non-nuclear parts). There may be electric power supply issues.
- **There is significant local opposition to industrial pit production at LANL.**



## The 2018 Pit Production EA: key results and comments

- The EA is a “quick and dirty” analysis. The broadest disclaimers are used e.g.: “costs and schedules are “rough-order-of-magnitude estimates.” Many unpleasant conclusions are soft-pedaled or hidden. The EA is largely a *de novo* analysis that does not depend on, use – or rebut – the AoA’s analysis.
- As noted, all EA alternatives all involve split production. The much greater capital and operating costs are not mentioned. They are “baked in.” Split production of plutonium pit parts ended in 1965.
- All EA alternatives explicitly depend on an enduring, reliable 50 years by 2028 + 50 years after that = 100 year PF-4 lifetime for 30 or more ppy with “high confidence.”
- All LANL alternatives use up the real estate necessary for TA-55 PF-4 replacement.
- All EA alternatives depend on NLUOB for 30 or for 80 ppy AC.
- All three LANL alternatives (2a, 2b, and 2c) depend on PF-4 to varying degrees, at a minimum for aqueous Pu recovery, i.e. they have split flowsheet production, which the AoA condemned. Alternative 2a: “partial reliance.” Alt 2b: “complete interdependency.” Alt 2c, even more dependence, requiring 2 shifts in PF-4 to meet the 80 ppy requirement.
- No alternative in the EA comes even close to meeting the 2030 requirement. All alternatives “could” meet requirements using (uncosted) multiple shift work, etc.

## The 2018 EA: key results and comments, continued

- The sizes of process areas said to be required for 50 ppy in the four alternatives are grossly discrepant from each other. This is neither adequately explained nor, on its face, credible. Furthermore, the process space requirements of the EA are not comparable to those used in the AoA. The latter says 50-100% more space is needed than does the EA.
- It strongly appears that the LANL-preferred module option (2c) was retained for political reasons despite not meeting requirements and presenting various operational, schedule, and safety challenges, some severe. The design was provided by LANL. Us: it was apparently not driven by architectural standards, nuclear codes, or operational needs.
- The AoA rates the LANL module plan as providing less than half the required space and capacity. The details of corners cut, some of which are provided by the EA, are shocking. Without stating the obvious, the EA itself invites readers to come to their own conclusions. The EA briefing slides are more explicit (provided in the handout).
- Germane: “Delusion and Deception in Large Infrastructure Projects: Two models for explaining and Preventing Executive Disaster,” Bent Flyvbjerg, Massimo Garbuio, Dan Lovallo, California Management Review Vol. 51, No. 2 Winter 2009, <https://arxiv.org/ftp/arxiv/papers/1303/1303.7403.pdf>.)

## Is 30 ppy at LANL worth it? Is it worth the risk to PF-4?

- Assuming LANL succeeds in meeting the 30 ppy by 2026 requirement -- a big question -- and can keep it up at 30 ppy through 2030, LANL's total production would add up to 181 WR pits by the end of 2030.
- If an 80 ppy production facility is brought on line in the early 2030s, LANL production quickly fades to insignificance.
- LANL production eventually shuts down as PF-4 comes near end-of-life and the long transition to a new LANL facility begins.
- NNSA (in the AoA briefing slides) says acquiring a 30 ppy capacity (on average, not "high confidence") at LANL will be a \$3 B investment (\$2 B capital, \$1 B operating). Thus  $\$3 \text{ B} / 181 = \$16.6 \text{ M/pit}$ , or ~ 100 times the weight of a plutonium pit shell in gold.
- But at what cost to safety? To the region? To LANL?

### 3. Realities of the LANL site: why LANL in particular can't do industrial plutonium

It will be very difficult or impossible for LANL to establish industrial plutonium missions, especially industrial pit production at any scale, for a multitude of reasons, all of which are largely independent of senior management. These factors are negatively synergistic in ways proven to be difficult to predict or prevent.

- The site's industrial, cultural, and educational isolation, which increases costs and creates program risks;
- LANL's dissected topography, which dramatically increases costs and places firm limits on construction;
- LANL's R&D culture and identity, necessary to protect in order to attract young scientists and engineers, especially given LANL's isolated location; LANL's identity is not one of a high-hazard industrial facility;
- LANL's culture of grandiosity, arrogance, and entitlement, a product of LANL's nuclear weapons mission and its lack of accountability, its secrecy, its isolation, its relatively high formal educational attainment, its large salaries and generous benefits, and locally, its relatively low taxes, splendid local government finance and therefore excellent schools and much else of genuine community accomplishment and value relative to its New Mexico surround; the point is that LANL's culture is one where "delusional optimism" (Flyvbjerg, op. cit.) and "normal accidents" have thrived, for fundamental reasons;
- The unconsolidated sediments that underlie TA-55 and other LANL sites, which together with the site's considerable seismicity (next bullet) increase costs and limit construction options;



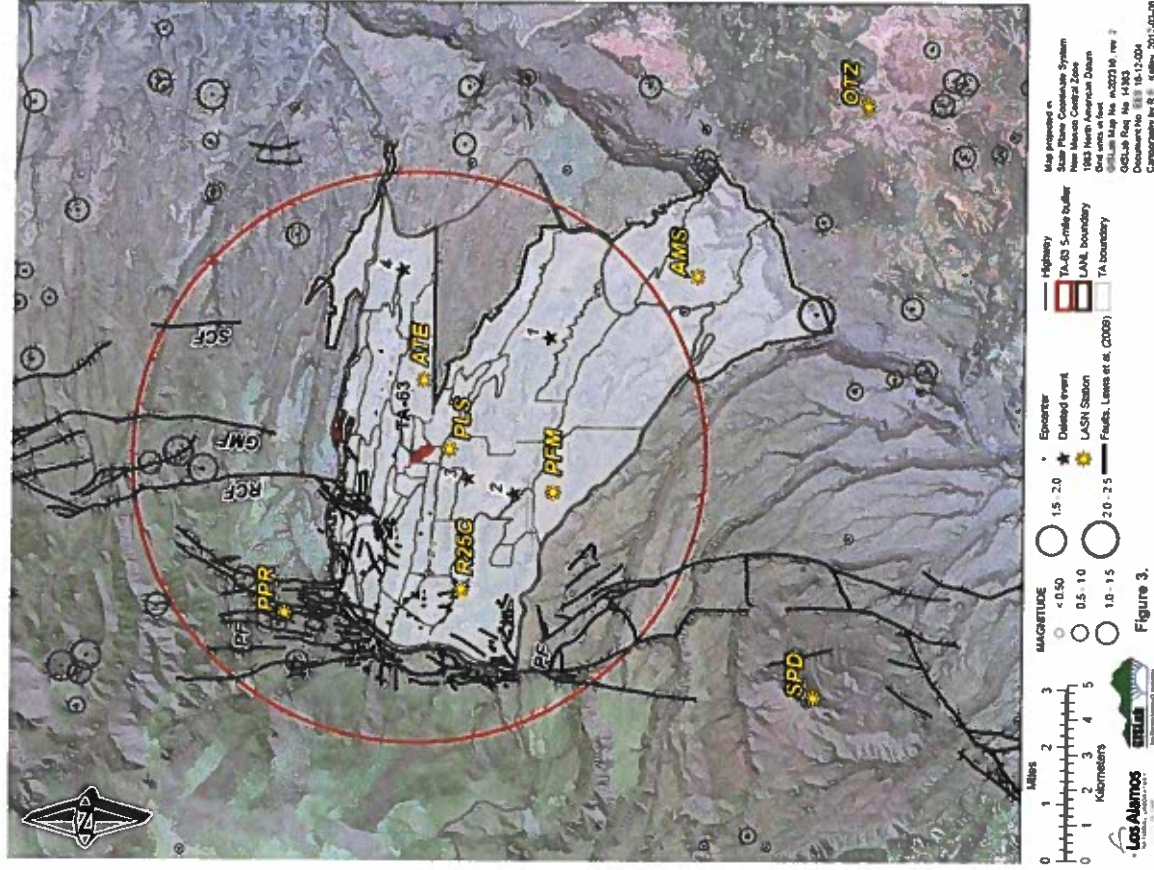
## **Why LANL in particular can't do industrial pits or plutonium, continued**

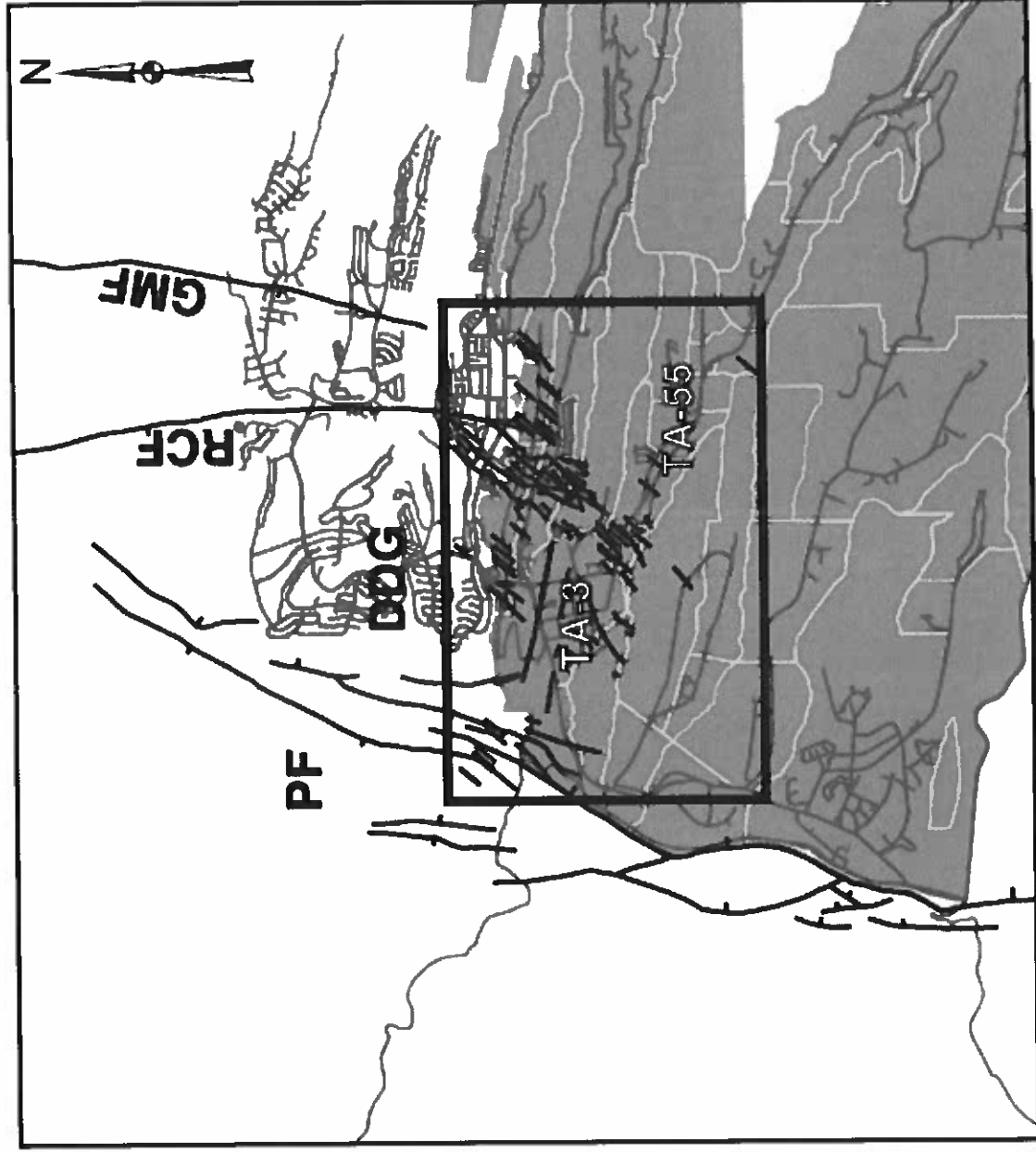
- LANL's high seismicity, a problem that is amplified by known active on-site faults and hence possible ground rupture, the shallow location and high acceleration of earthquakes from them, seismic amplification from unconsolidated sediments, and the structural incompetence of all the rock at LANL;
- LANL's legacy nuclear facilities, which were built for R&D and of limited size; most of these will soon (relative to this long mission) be at, or are already past, their reliable, safe, and useful lives; these include PF-4, the Main Shops, and Sigma, all of which are to have greater or lesser roles in pit production; tearing these facilities down will also be disruptive to a greater or lesser extent.
- The concatenation of difficulties and strain on various LANL support systems posed by multiple industrial plutonium missions at PF-4 (pit production, PuO<sub>2</sub>, Pu-238); the challenge of the RLUOB-NLUOB conversion;
- A political environment conducive to corruption, partly of LANL's own making as we see in the case of the Regional Coalition of LANL Communities (RCLC), again contributing to a lack of accountability;
- A very high incidence of drug use and associated crime linked to systemic poverty and inequality ("the aura of apartheid") in the region;
- The relative lack of a qualified regional workforce and the relative lack of post-secondary educational and vocational institutions in the region;
- The reality of prior, living Pueblo traditions and religious claims to "LANL" lands and waters; and
- The incompatibility of industrial plutonium operations with powerful local cultural aspirations and values.

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.

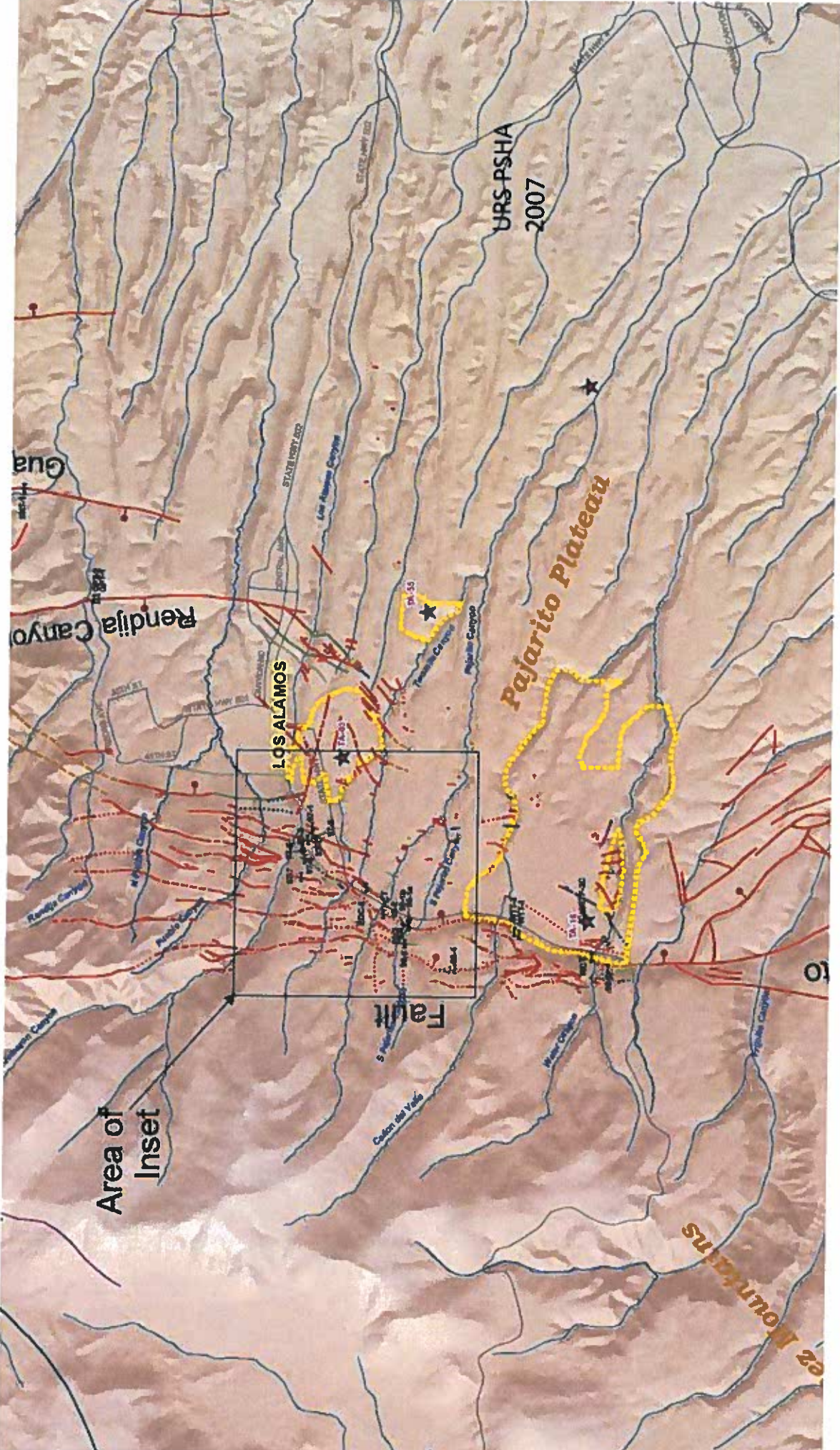
Faults also run through the LANL site and town. I do not believe that the relatively high density of faults mapped N and S of the lab magically becomes much lower beneath the lab itself. Other LANL publications do show faults (Guaje, Rendija) crossing the entire laboratory from N to S.

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 (pumice) 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.











#### **4. LANL worker safety: on a collision course with powerful other agendas**

- Historically LANL, like the rest of the nuclear warhead complex, has not been a safe place for workers. Thousands of workers died and hundreds of thousands – yes – were made ill.
  - Nationwide, 84,000 claims have been approved so far, out of 120,500 unique worker claims filed, by the Department of Labor under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA).
  - Records are widely missing for exposures, for the Manhattan Project and early Cold War years, practically everything. So these figures grossly underestimate the number of workers made ill or killed. Roughly doubling them would be more accurate, not counting “minor” impairments like hearing loss, which was widespread.
  - At LANL, 10,336 unique worker claims have been filed; 4,406 have been paid, including 1,599 unique worker death claims (as of 6/17/18) (Alliance of Nuclear Workers Advocacy Groups, ANWAG, personal communication). Discounting early years, this is about one committed occupational fatality every two weeks. \$845 million has been paid to former and current LANL workers under EEOICPA, out of more than \$15 billion nationwide.
  - These deaths and morbidity result from what University of Chicago sociologist Joe Masco has called “the heroic mode of production.” Right up to the present day, the “efficiency” of nuclear weapons production during the Cold War is a model and a standard in many influential governmental and

advisory minds.  
8/15/2018

## **LANL worker safety (continued)**

- There is no external regulation of worker safety at DOE facilities, nor is any contemplated; imposing “ordinary” regulation of worker safety in the nuclear weapons industry has always been and still is widely seen as threatening national security.
- Nuclear-complex-wide, current trends in nuclear safety are not positive. This is also true at LANL, the recent history of which has been one of periodic shocking disregard to the most elementary safety procedures and rules.
- LANL is subject to “normal accidents” (cf. Charles Perrow) – it is the kind of institution where such accidents occur.
- LANL does not and cannot fully identify as a high-hazard nuclear or industrial facility.
- Changing LANL’s basic identity and culture will neither be successful nor enough despite the best will in the world – too many determinants – geographic, political, geotechnical, social – lie outside LANL’s institutional control.
- The Defense Nuclear Facilities Safety Board (DNFSB) is not a regulator, does not have an explicit worker safety mandate (neither nuclear nor otherwise), has been under attack from without and within for a decade, is too small to even visit most LANL facilities, has a large number of vacant positions on the staff and a board with only one non-expired position; DOE is currently attempting to shut down direct, unmediated communications with the contractors that run DOE’s nuclear facilities under the new DOE Order 140.1.

## LANL worker safety (continued)

- It is normal at LANL to operate major facilities like PF-4, the Chemistry and Metallurgy Research (CMR) building, the Main Shops, and many others under variances from normal DOE regulations and standards, or in objectively dangerous conditions (structural unsoundness, beryllium contamination) which would not be tolerated in US civilian commercial buildings.
- LANL, so far with the passive acceptance of NNSA, is proposing nuclear facilities which do not meet current nuclear or safety standards, and which so far appear to my eye to violate common building standards to the point of future inoperability. LANL is doing so because it cannot acquire the mission it corporately desires, given the limitations of the site, while also meeting nuclear facility and safety standards.
- The safety strategy for LANL's proposed underground pit production modules would "rely solely on the passive confinement capability for accident mitigation and assumes that no active safety systems would be required" (EA, p 2-43).
- Emergency fire water supply and electrical power for the modules "will not be designed, procured, or installed to nuclear code and standards" (op. cit., p. 2-47).
- Production shifts of 235 people each would be shuttled in and out of cramped underground foundries and processing rooms through locker rooms totaling just 1,306 sq. ft. There would be no "office areas, lunch/break room, restrooms, or operations and security control areas" (Ibid).
- LANL and NNSA seek to acquire Hazard Category 3 nuclear facility space in the former RLUOB despite not having built the facility to nuclear standards. Another corner cut.

Additional slides will be provided as soon as possible.



