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

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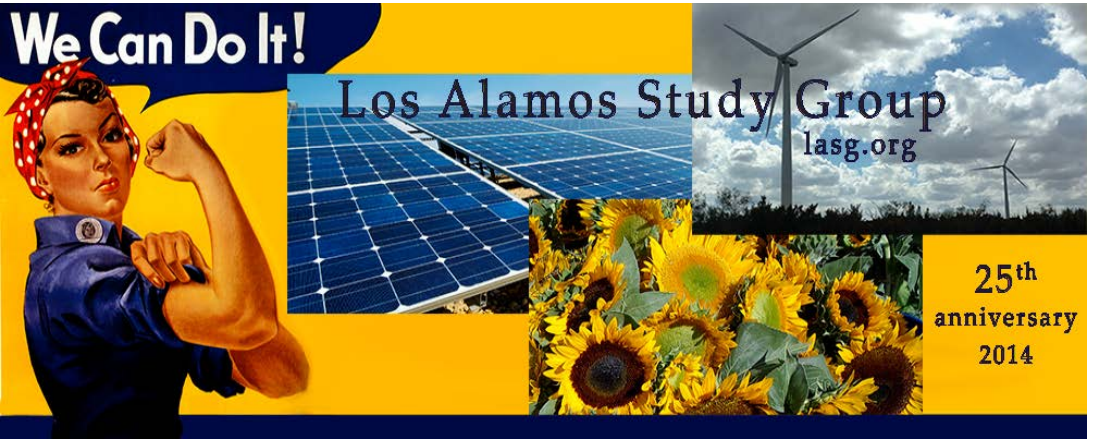
August 15, 2018



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This presentation

1. LANL production mandates, current and proposed
    a. Pits (please see 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 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?

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

LANL TA-55:

1. PF-4, 60K ft^2 labs, HC2
2. RLUOB, 20K ft^2 labs, HC3 proposed
3. Two proposed underground modules and tunnels, each 5K ft^2 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 proposed plutonium modules

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
Total	30*	21*	2*	7

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

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

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.

DOE/NNSA Office of Cost Estimating and Program Evaluation (CEPE), Surplus Plutonium Disposition Dilute and Dispose Option, Independent Cost Estimate (ICE) Report, April 2018, page 5

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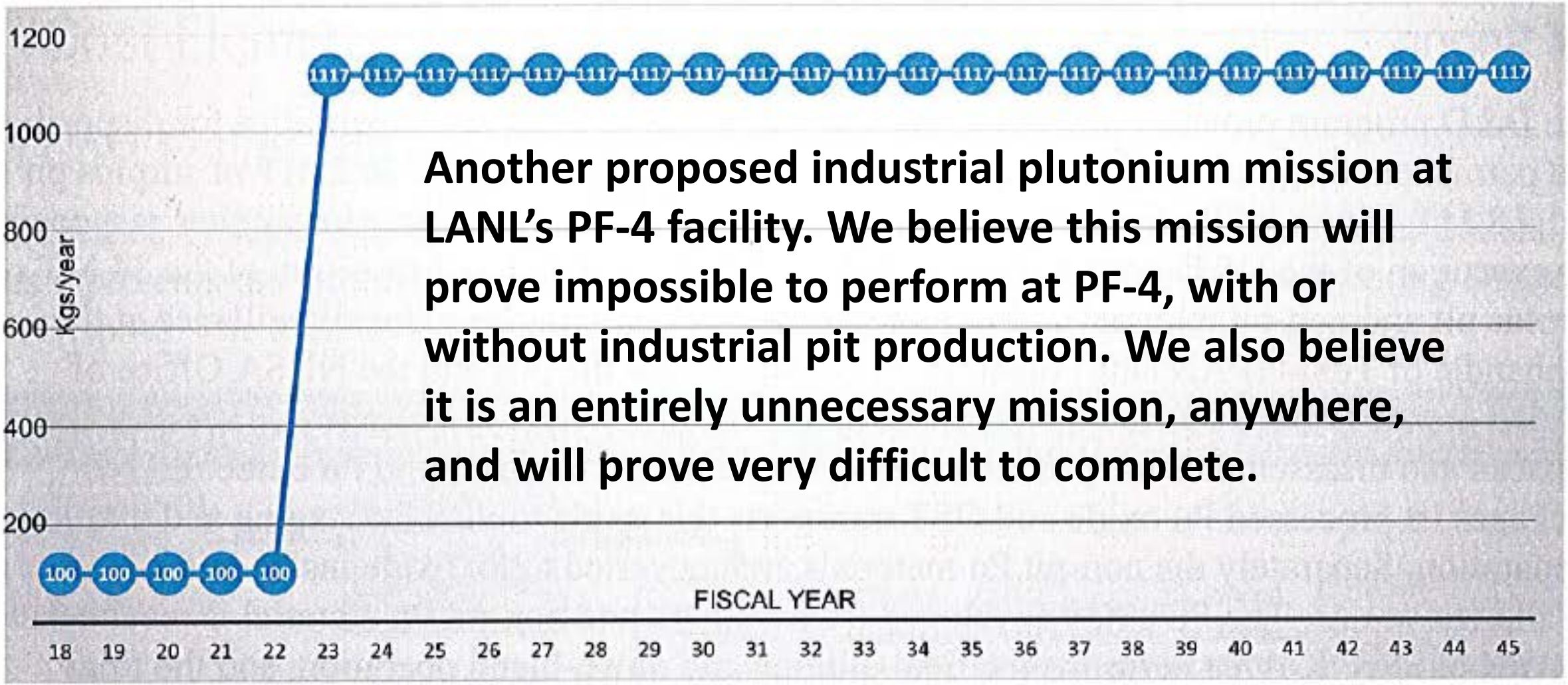
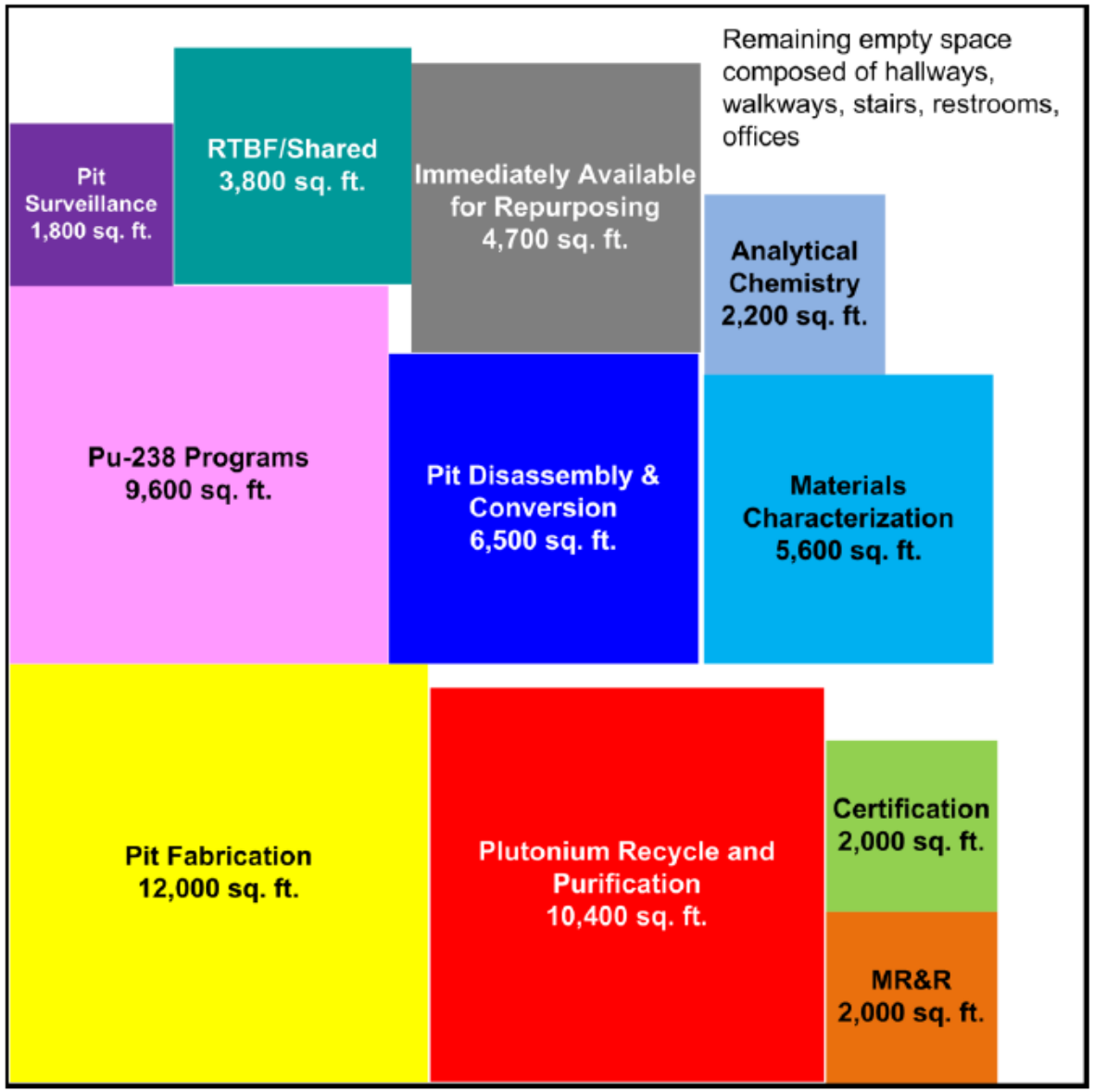


Another proposed industrial plutonium mission at LANL's PF-4 facility. We believe this mission will prove impossible to perform at PF-4, with or without industrial pit production. We also believe it is an entirely unnecessary mission, anywhere, and will prove very difficult to complete.

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

1. PF-4 Space Allocation as of Early 2012



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.

Other plutonium missions in PF-4, as of 2012

(from Congressional Research Service)

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_2 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_2 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.
- 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_2 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.
- 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 downs 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 B/181 = $16.6 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_2, 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.

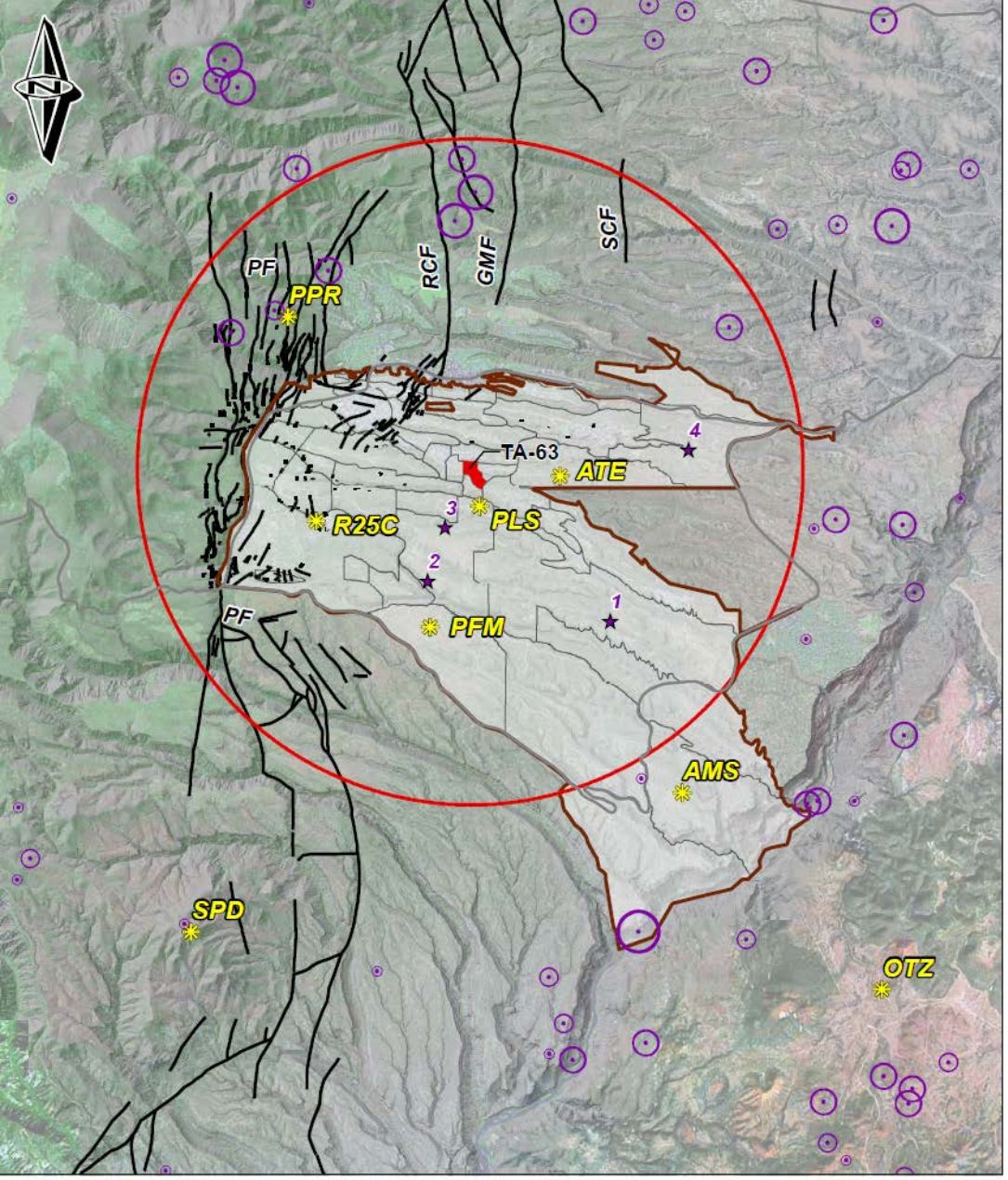
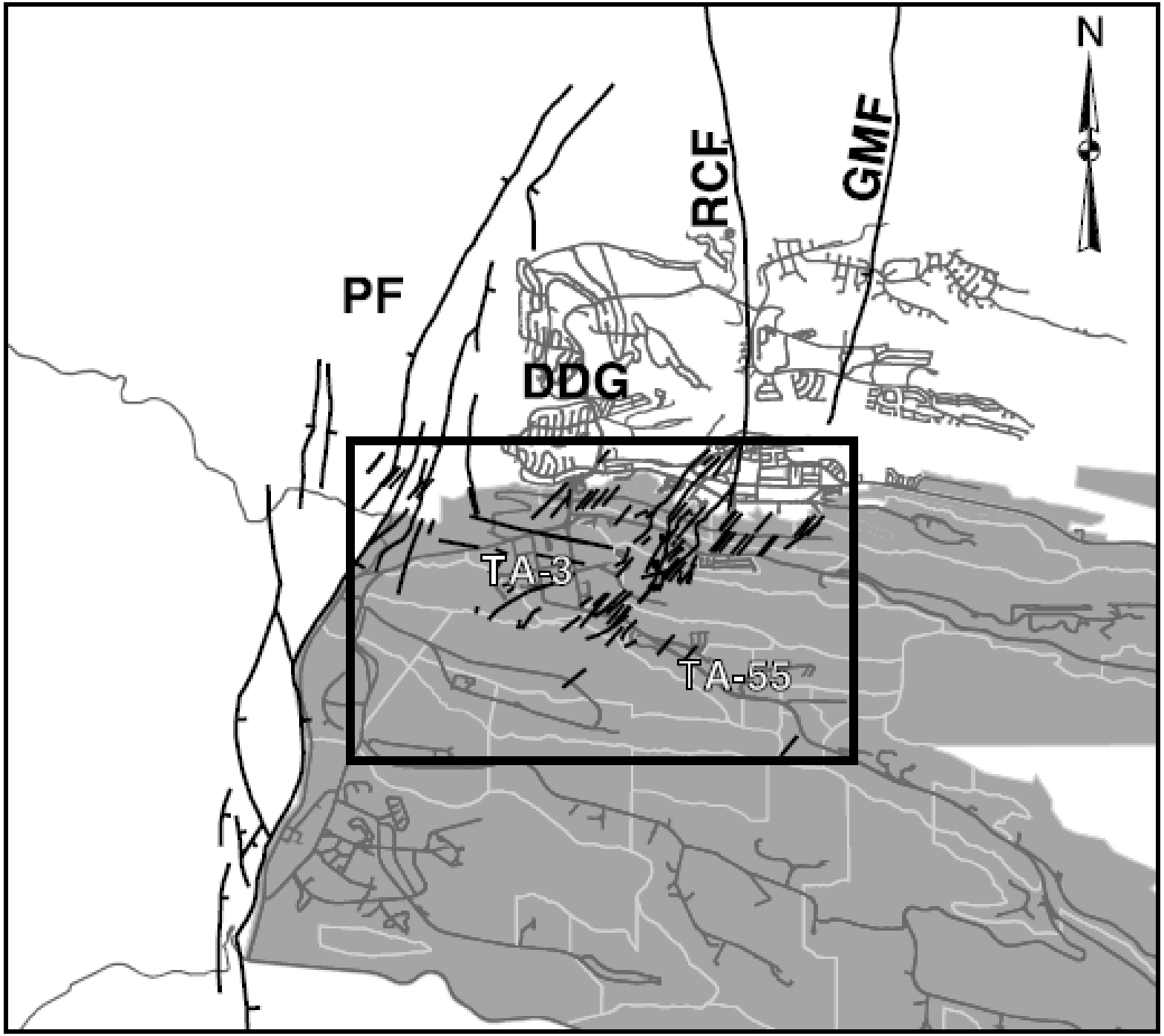


Figure 3.

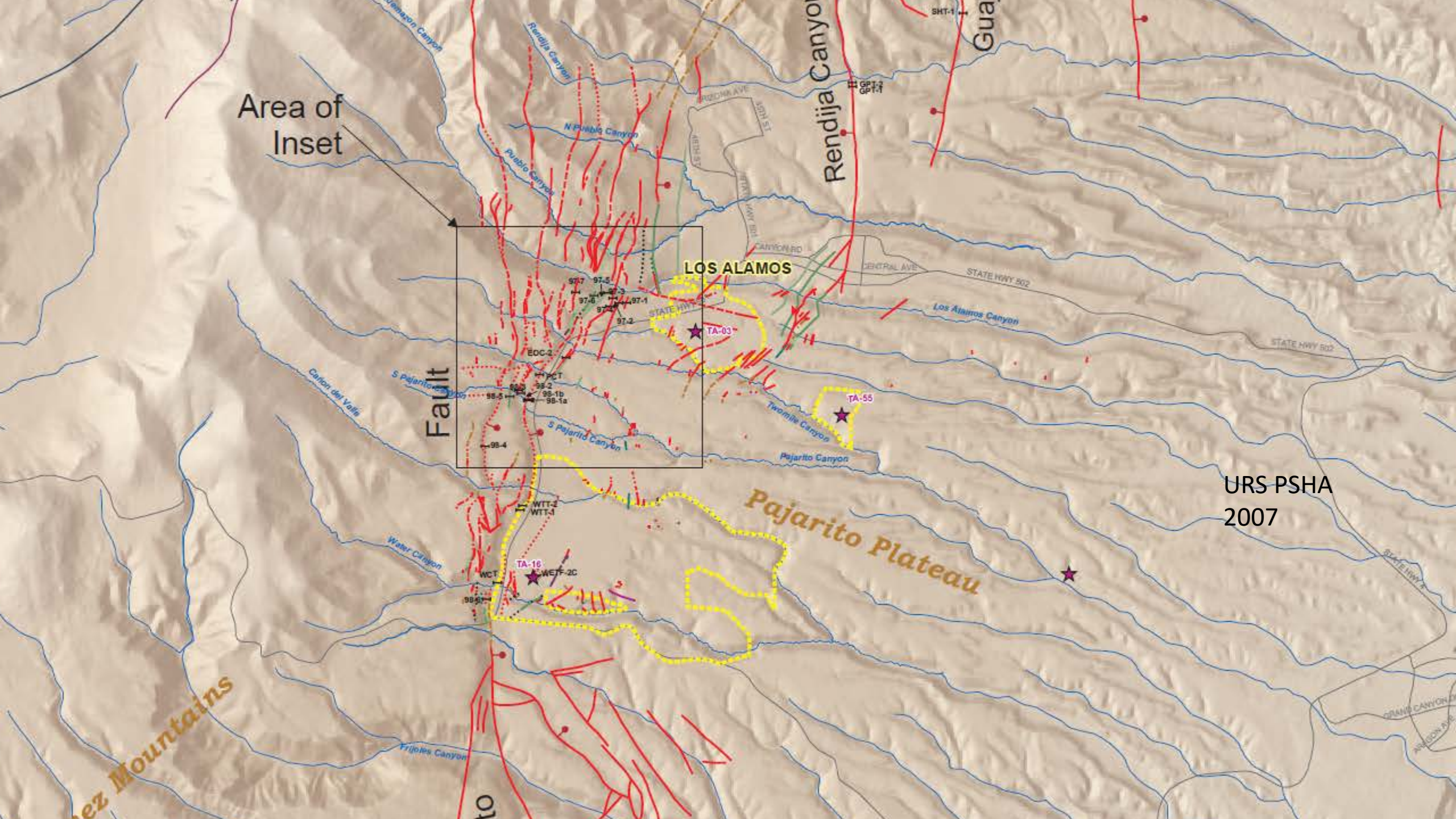
LANL sits on the western edge of the Rio Grande Rift, a graben bounded by more or less vertical faults. The Pajarito Fault System runs N-S along the western edge of LANL.

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



URS PSHA 2007

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.

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.