



Los Alamos Study Group

Nuclear Disarmament • Environmental Protection • Social Justice • Economic Sustainability

NNSA pit production update 10/20/23

Stumbling through the early 2020s with no schedule, cost estimate, or plan • early-to-need • self-competing/defeating • maximizing fiscal waste • jeopardizing other programs • little confidence in results

Five full years after NNSA's 2018 plutonium pit production [volte-face](#) (from its [2017 alternatives](#), fully presented [here](#)), neither NNSA nor Congress can predict how many war reserve (WR) pits NNSA will produce, by when, or where, or at what cost, or with what realistic program risks, or with what endurance. Impacts on other programs at the crowded LANL facilities and site are still accumulating.

NNSA has a statutory [requirement](#) to produce at least one high-quality ("war reserve," WR) pit this year, then at least 30 WR pits by 2026, and then at least 80 WR pits by 2030 with at least 80 WR pits per year (ppy) thereafter. These deadlines were set somewhat arbitrarily by Congress, on the basis of representations from NNSA as to what was possible. ("[NNSA, Pentagon 'sorting out' pit needs; new pits are 'a hedge,' NNSA administrator says](#)," *Exchange Monitor*, Apr 29, 2022; "[NNSA: early pit production a 'hedge,' not strictly necessary; is there a 'pit gap'?](#)" LASG, May 3, 2022). None of these deadlines will be met, but this will not affect the current nuclear stockpile.

Fiscal year 2023 has now passed without a single WR pit from LANL.

In February of this year, NNSA anticipated finally making its first WR pit in the second half of FY24 (remarks by Marvin Adams, Feb. 14, 2023, [audio](#) at 16:20ff).

LANL now expects to complete its first "proof of concept" pit by the end of FY24, LANL's deputy director for weapons Robert Webster [said](#) this summer, pushing the estimated delivery date of the first actual WR pit to some time in FY25.

As of February of this year, public remarks by NNSA Administrator Jill Hruby (Feb. 14, 2023, audio [54:28 to 56:19](#)), and NNSA's [FY24 congressional budget request](#) (FY24 CBR, pp. 211-212), suggested that LANL may be able to make 30 ppy by FY31, after the Los Alamos Plutonium Pit Production Project (LAP4) "30 Base" equipment installation project is completed, then projected to occur by August 2030. As Dr. Hruby said then, these pits are not expected to be all certifiable, i.e. all WR pits. As she said, to reliably produce 30 WR ppy, completion of the LAP4 "30 Reliable" subproject is required.

As of March 2023, when the FY24 CBR was released, the 30 Reliable subproject was slated to be completed by the end of FY2031. In the half-year since then, that date has slipped 6 months to March 2032, as GAO has noted ("[NNSA: Assessment of Major Projects](#)," [GAO-23-104402](#), Aug. 2023, p. 40). The second half of FY2032 is now the preliminary (and as experience suggests also the *earliest*) expected date for the reliable production of 30 WR ppy. The exact meaning of NNSA's enigmatic statements about schedule and costs may remain obscure until baseline estimates become available, currently scheduled for the April-June 2025 timeframe ("[CD-3](#)", [p. 211](#)).

As GAO's assessment shows, most if not all of the major projects supporting LANL pit production are delayed, over-budget, and lack confident completion dates, as is the case for most major NNSA projects.

The policy importance of LANL's lengthening pit production schedule lies not just in the added costs and risks, but in the fact that the main *raison d'etre* of the LANL production effort -- as opposed to pit production technology preservation, demonstration, and training -- lies in the speed with which initiation of production at LANL was once thought capable. The at-best late, limited, and non-enduring production at LANL will, assuming it is successful at all, consume over half of NNSA's projected pit production budget ("[Pit Production Startup Costs By Site and Year](#)," May 11, 2023), while incurring competition for scarce resources and consequently delaying the larger, enduring, safer, SRS facility ("[NNSA's effort to restart plutonium warhead 'pit' production will cost more than the Manhattan Project. Why is NNSA trying to build two pit factories at once -- one that is adequate, and one that is not?](#)," May 27, 2023).

The other main significance of the LANL delays lies in the difficulties they objectively signal. A long list of key issues at LANL remain unresolved, from staffing, to transportation of workers, to safety, to competition for scarce floor space, and on to the perennial issue of nuclear waste, among others. What are the risks attached to these issues, does NNSA have adequate contingency plans, and does Congress know what these plans are? The public, which is bankrolling all this and in whose name it is being done, definitely does not know.

Using NNSA's [preliminary cost estimates](#) and schedules it is possible to estimate per-pit costs at both production sites under different sets of assumptions, using a) total costs, b) current- and subsequent-year costs only (i.e. omitting sunk costs), and c) using post-startup operational costs only (marginal costs). Without presenting an entire table of scenarios and sites here (which we will publish next week), the bottom line is that LANL pits can be expected to cost about \$100 million each (i.e. from \$85 to \$150 million or so depending on assumptions), and a little less if only current and forward costs are included. SRS pits can be expected to cost about 1/3 to 1/4 as much. The discrepancy between sites, which carries over into marginal pit costs, is largely due to the much higher program costs at LANL, which will involve some 4,100 LANL full-time equivalents (necessary for two production shifts) plus a continual stream of facility construction and deferred maintenance. At one production shift SRPPF will be cheaper to operate. It is brand-new, unlike PF-4 largely self-sufficient, and it is adequately sized.

Recapitalization of major LANL facilities is not included in these costs, beyond those few NNSA has estimated, all of which are current line items. We may see more major recapitalization costs appearing in next year's CBR. Others, such as PF-4 replacement (should that be contemplated), will appear later. If PF-4 is to be replaced by 2045 as NNSA implicitly suggests (see below; see also endnote 260 in [America's Strategic Posture](#), Congressional Commission on the Strategic Posture of the U.S.), investment will need to begin in the early 2030s at the latest.

Replacement and/or augmentation of PF-4 in more than 20 years but less than 30 years is also a feature of LANL's Campus Master Plan ([p. 54](#)). This, if feasible at all, will be very expensive. Available real estate is limited.

Of note, according to one knowledgeable congressional staff member, pit production at LANL is not expected to continue after PF-4 loses its utility for that purpose.

There are as yet no firm safety performance standards for LANL plutonium operations. PF-4 continues to operate outside DOE safety parameters in several respects (e.g. fire safety, ventilation systems). Multiple LANL buildings, some of which are necessary for pit production (e.g. Sigma, in TA-03) do not meet seismic standards. For legacy hazards like beryllium, it [appears](#) the ball has been dropped. Regarding PF-4, the DNFSB continues to review NNSA's submittals but has not definitely expressed itself on the adequacy of LANL's planned approach. In engineered safety as well as in other ways, the situation at the Savannah River Plutonium Processing Facility (SRPPF) is still in "early days," and is more fluid.

Contrary to DOE regulation 413.3B which governs major projects, there is no applicable Analysis of Alternatives (AoA) supporting the present pit production strategy, let alone one which meets [GAO standards](#). The 2017 AoA and associated Program Secretarial Officer (PSO) decisions:

- Rejected splitting pit production between two sites (now the policy);
- Rejected using PF-4 for enduring pit production (now the policy);
- Endorsed, among five workable alternatives, one of two alternatives: a single-site production facility in what is now SRPPF, or else a brand-new stand-alone pit production facility at LANL, with the SRPPF being the cheaper, faster, and more adequate alternative of the two, with less risk.

NNSA's subsequent 2018 Engineering Assessment further examined the SRPPF option as well as three other options since rejected by NNSA or never considered, using very different assumptions. Again the SRPPF option carried the least risk.

The Sentinel land-based ballistic missile fleet can be entirely deployed with modern, accurate, W87-0 warheads, which use insensitive high explosives (IHE). W87-0 warheads are slated to be fitted with a new, even more accurate, fuze that increases the likelihood of "hard-target kill" for ballistic missiles. This system has already been deployed on all submarine-launched missiles. It is now slated to [enter full-rate production](#) for application on Minuteman III Mk-21 RVs in FY24. Some [693 fuze units are to be built](#) (p. 9). W87-0s with the new fuze will also be used on at least some Sentinel missiles. The warhead, RV, and fuze are evidently Sentinel-compatible.

Small-quantity early pit production is not a hedge against pit aging, which is not a current concern for the stockpile. Pit production will eventually be needed but isn't needed right now, even for the Sentinel system, if the W87-0 is retained. MIRV-capable W78 warheads could even be kept at first on the diminishing stock of Minuteman III missiles, if a MIRV option is desired.

(For the record, we recommend against land-based missiles, and bomber-based gravity bombs and cruise missiles altogether. These systems, especially land-based missiles, could be negotiated away when the time comes, which hopefully it will prior to nuclear war.)

As NNSA's FY24 CBR and GAO's first "Assessment of Major Projects" make clear, the LANL and Savannah River Site (SRS) pit programs compete with one another for scarce design talent and specialized equipment. Could faster progress be achieved without this internal competition? If so, how much?

GAO's reports on pit production are indispensable. However:

- Little concrete policy advice can be gleaned from them. Asking NNSA to prepare better planning documents, e.g. a resourced Integrated Master Schedule (IMS) is fine but it does not illuminate the policy choices available to NNSA and Congress.
- GAO reports take a long time to write, risking obsolescence in our rapidly deteriorating situation. Only those facts to which NNSA stipulates can be included, limiting the application of GAO's own expert judgment. Case in point: GAO's January 2023 review of pit production ("[GAO: NNSA's Huge Program to Build New Warhead Cores \("Pits"\) Lacks Detailed Schedule, Budget, and Scope of Work](#)," press release, Jan 12, 2023) took a year to write. GAO must "freeze" the data it uses months before publication, which can result in reports which are somewhat out of date when published. Just one week after GAO's year-long study of pit production was published, NNSA revealed that a key element in its pit production strategy at LANL would be delayed four years ("[Installation of "Base" Capability to Produce 30 Plutonium Warhead Cores \("Pits"\) at Los Alamos To Be Delayed 4 Years, to 2030](#)," press release, Feb 3, 2023; "[Approval of Critical Decision-2/3 for Los Alamos Plutonium Pit Production Project 30 Base Equipment Installation Subproject and Approval of Project Execution Plan](#)," DOE memo, Jan 19, 2023), making GAO's cost estimates of the week before obsolete.
- It is up to Congress to a) provide penalties for NNSA's failures to properly plan, e.g. withholding some funds until plans are made; and b) to really *use* the reports GAO writes, to question NNSA's plans more deeply and help improve them.
- At present, Congress does almost everything NNSA and DoD ask. These agencies, especially the former, are responding to contractors. The changes in proposed budgets offered by Congress are typically quite small. There is not really much oversight.

On pit production in particular, Congress is kicking the can down the road. NNSA explicitly says ([p. 3](#)), and Congress seems to agree, that spending is effectively unconstrained. It does not appear to us that either NNSA or Congress are really serious about pit production, given the wasteful investment at LANL, which consumes a lot of resources with high risk for very little potential output.

Even if we assume funds are unlimited,

- What is the net value of LANL pit production, its value vs. its a) cost and b) competition for scarce material and human resources.
- What is the net value of LANL pit production given its impact on other programs, e.g. surplus plutonium disposition, and risks to other programs in PF-4, both in the short and the long run?
- What additional "deterrence" is obtained by starting WR pit production in FY32 at the earliest, vs. say FY36 (or earlier, if NNSA could concentrate on building a single pit facility, as it does for uranium, lithium, and tritium)?
- What additional "resilience" is obtained from producing at two sites when one of the two is a high-risk, small producer in a sunseting facility and the other capable of handling the entire mission at half the total cost?

We need a new pit AoA with a single-site option at SRPPF.

We also need an AoA on W78 replacement that includes *not* replacing that warhead as it retires, or if it must be replaced doing so with W87-0s in a non-MIRV configuration, or doing so on a more dilated schedule, e.g. beginning in the late 2030s instead of the early 2030s (MMIII/W78 retirement need not take place until the latter part of the Sentinel deployment schedule).

We have proposed what we believe to be [a better plan](#). (For reference, here is [Part One](#).) In our plan,

- The Los Alamos Plutonium Pit Production Project (LAP4) would be canceled immediately.
- There would be only one operational shift at LANL's plutonium facilities; 24/7 work would not be necessary.
- Net hiring at LANL for pit missions would cease, as there are already enough staff for a single operational shift.
- SRPPF design and construction would proceed as currently planned, with strong efforts to capture scarce design and construction talent and scarce resources such as gloveboxes.
- A number of capital projects and capital equipment purchases at LANL could be canceled or curtailed given single-shift work with no LAP4 and about 2,000 fewer workers in "the pipeline."

Key questions which would help better quantify the benefits of this plan include:

- What LANL capital projects and capital equipment purchases could be avoided, at what cost savings?
- What personnel and other operational costs could be avoided?
- Overall, how much money would this plan save relative to the current plan?
- What benefits would there be in plutonium facility space needed, in material at risk (MAR), in waste production, and in conflicts with other programs, already somewhat severe?
- How would transportation and housing needs be affected?
- How much faster could SRPPF be completed in the absence of competition with LANL for designer time, gloveboxes, and other resources? In this regard, NNSA should be required to produce a plan to essentially eliminate -- not just reduce -- program risk at SRPPF. Absent such a plan, NNSA is not really serious about pit production.
- How many pits would be produced at SRS given the resulting schedule and by when?

In its latest plan to solve its interrelated transportation, infrastructure, and housing problems, LANL now proposes to open one or more research "mini-campuses" and labs in Santa Fe and/or Bernalillo (see presentation and video in "[Los Alamos to metastasize as weapons mission outgrows site Lab management to present before local government Tuesday 7/18/23, 6 pm MDT](#)," Jul 17, 2023). Opposition is [growing](#).

Prior plans included a new high bridge over the Rio Grande and associated highways through a Native American heritage area of notable scenic value, and when that failed, trailer parks and "man camps" on Indian Pueblos. The latest plan is to use several dozen intercity buses to transport workers from large regional parking lots, transferring them to smaller on-site buses, is still active ([LANL Transportation Plan FY23, LA-UR-22-31888](#), Nov 9, 2022.) We believe this hair-brained plan will never work.

Other related news reports, analyses, [press releases](#), and articles of interest can be found [here](#). Of recent note, see

- "[Risks for Sustainment of PF-4 at LANL, Report to Congress](#)," Nov 2020, obtained by FOIA, redacted. With the investments outlined in the report, NNSA thinks PF-4 can be nursed to 2045. We think this grossly optimistic. Again -- why is this facility being turned inside out for early-to-need, short-term pit production?
- "NNSA kicks can on facility crucial to disposing of old warhead cores," Oct. 20, 2023, Dan Leone, *Exchange Monitor*. This is not going to look that good to other countries.

Final remarks, from [here](#):

"The new pits LANL would make are not needed for any current stockpile weapon system, nor will they ever be needed for that purpose. The entire LANL pit production program is superfluous. Every dollar spent at LANL on this program is wasted. Every drum of waste produced in the process need not have been produced. Every career spent making these pits, or supporting the work, is a career that could have been spent building a sustainable, moral, responsible future. The LANL pit production program is a symptom of pure arrogance, greed, and management failure at the highest levels of government."