Plutonium Pit Factory at LANL: Dead End for New Mexico and the U.S.

Greg Mello, Los Alamos Study Group, September 27, 2023

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

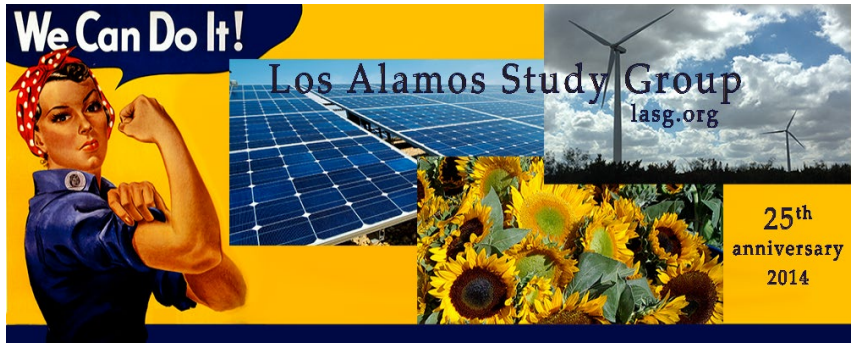
Simone Weil

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

Herman Agoyo, Ohkay Owingeh

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

E.L. Doctorow



Los Alamos Study Group, 2901 Summit Place NE, Albuquerque, NM 87106
www.lasg.org, 505-265-1200

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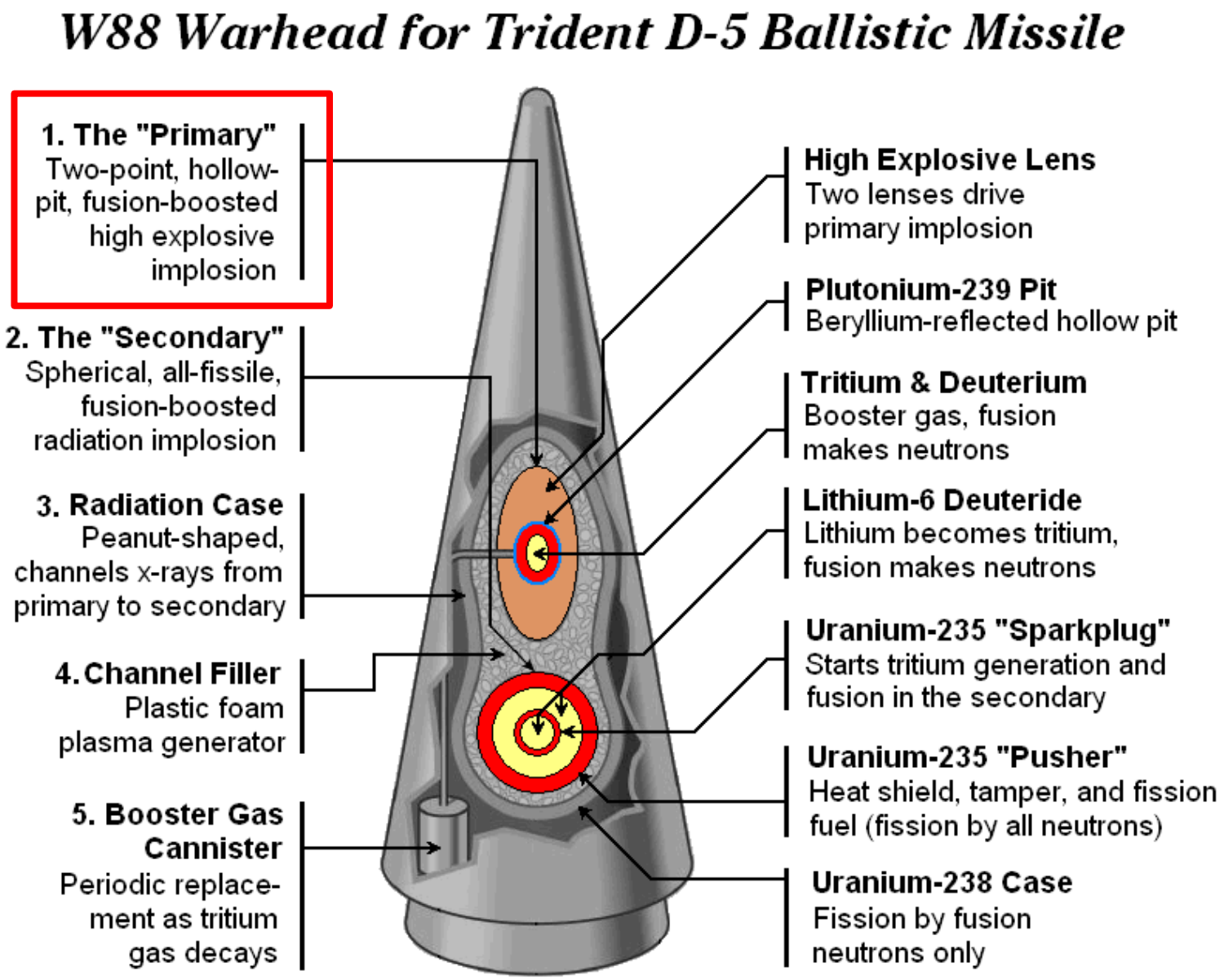
Modern U.S. ballistic missile warhead, late 1980s



Sources for illustrations: Wikipedia

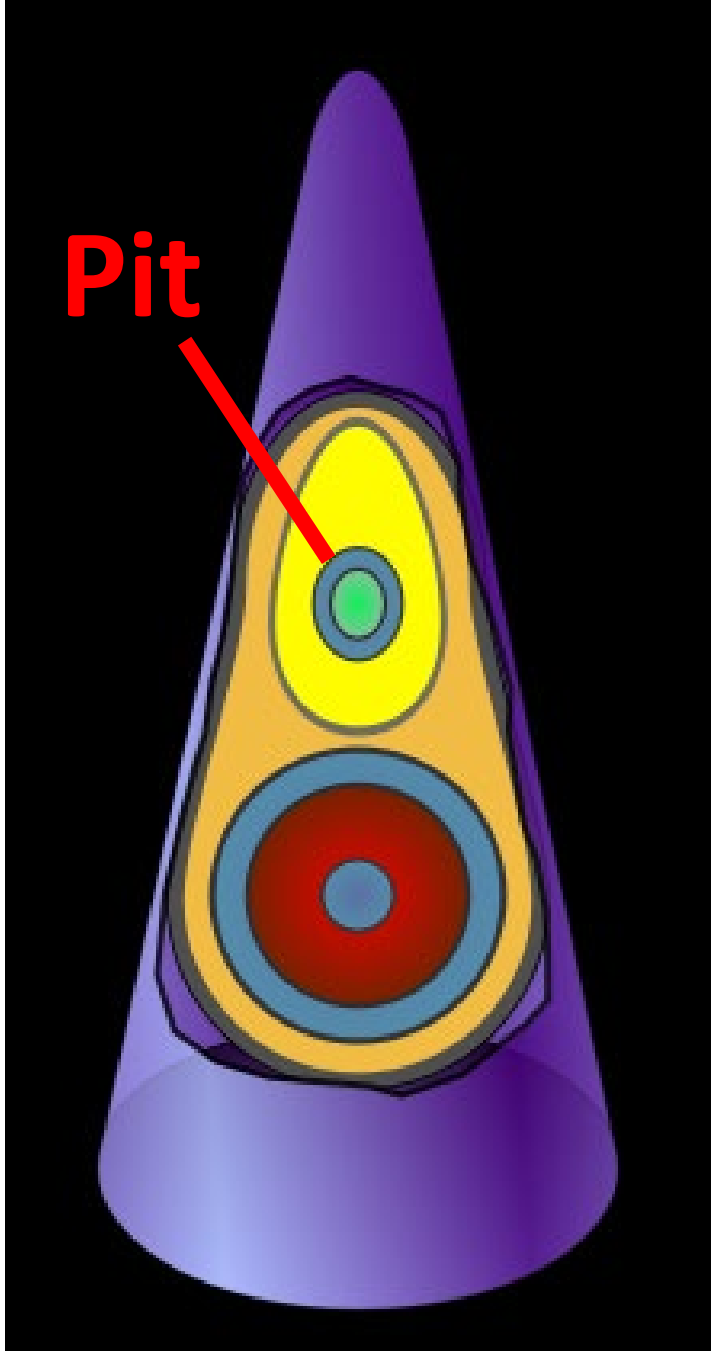


Table 1. US nuclear forces, 2021.

Type/Designation	No.	Year deployed	Warheads x yield (kilotons)	Warheads (total available)[1]
ICBMs				
LGM-30 G Minuteman III				
Mk-12A	200	1979	1–3 W78 x 335 (MIRV)	600[2]
Mk-21/SERV	200	2006[3]	1 W87 x 300	200[4]
Total	400[5]			800[6]
SLBMs				
UGM-133A Trident II D5/LE 240[7]				
Mk-4A		2008[8]	1–8 W76-1 x 90 (MIRV)	1,511[9]
Mk-4A		2019	1–2 W76-2 x 8 (MIRV)[11]	25[10]
Mk-5		1990	1–8 W88 x 455 (MIRV)	384
Total	240			1,920[12]
Bombers				
B-52H Stratofortress	87/44[13]	1961	ALCM/W80-1 x 5–150	528
B-2A Spirit	20/16	1994	B61-7 x 10–360/-11 x 400 B83-1 x low-1,200	322
Total	107/60[14]			850[15]
Total strategic forces				3,570
Nonstrategic forces				
F-15E, F-16 DCA	n/a	1979	1–5 B61-3/-4 bombs x 0.3–170[16]	230
Total				230[17]
Total stockpile				3,800
Deployed				1,800[18]
Reserve (hedge and spares)				2,000
Retired, awaiting dismantlement				1,750
Total Inventory				5,550

Hans Kristensen & Matt Korda (2021), United States nuclear weapons, 2021, *Bull. Atom. Sci.* 26 Jan 2021.

Ground Based Strategic Deterrent (GBSD) "Sentinel" system. Deployment 2030-2037. A $85-140+ billion program plus warheads, according to DoD's Cost Analysis and Program Evaluation (CAPE). 400 deployed, MIRV-capable (3 per missile for some fraction of 400, perhaps 200 as at present). To be armed with new W87-1 warheads (W87-0s initially). Some 250-1,500 new-pit W87-1s are desired, starting in 2030.

This is the origin of the 80+ pit per year by 2030 requirement.

Mark 21/W87 on single RV MM III bus, the present deployment configuration.

This RV is too wide and heavy for MIRVing MM III.

MM III in operation.

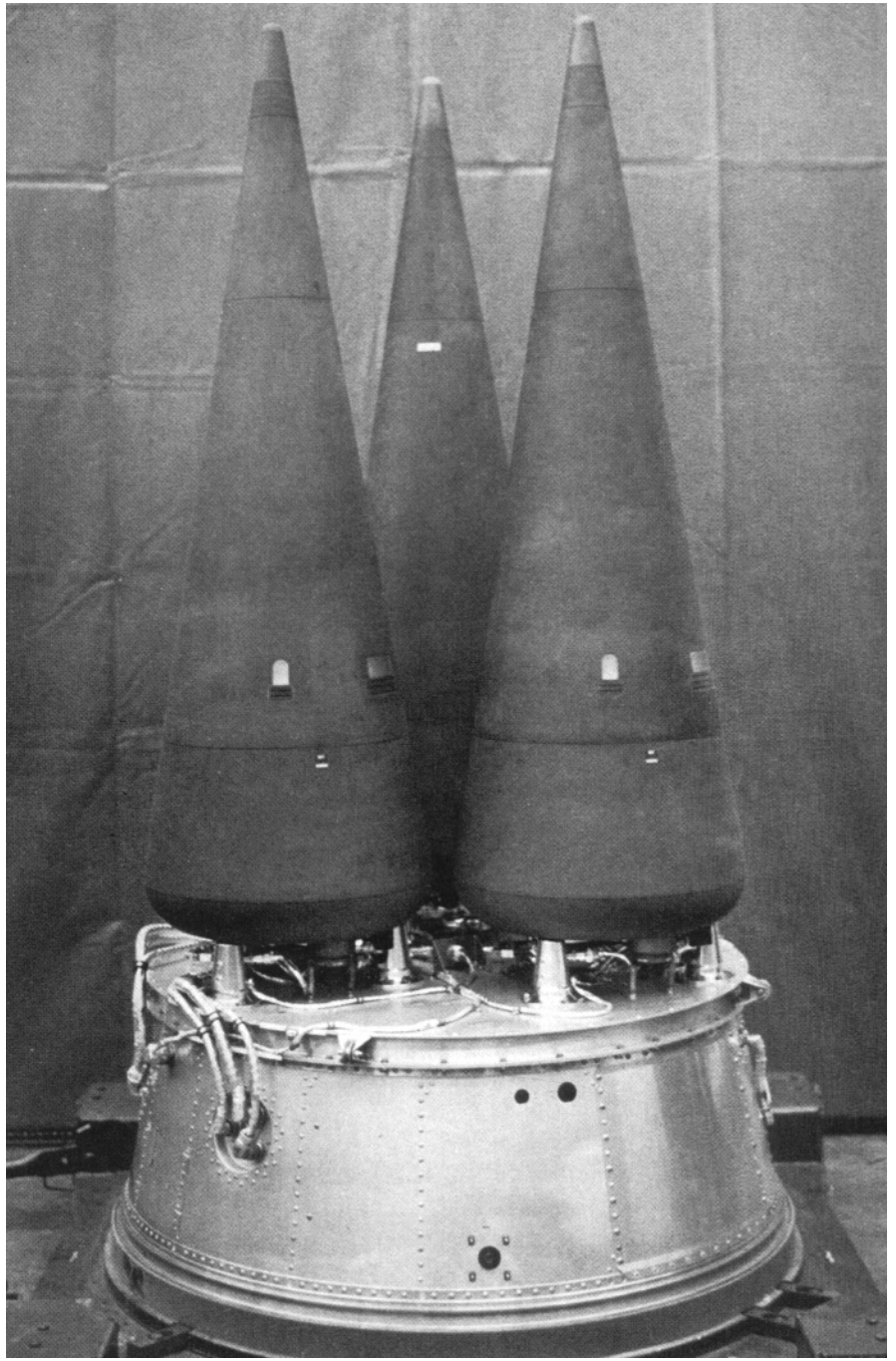
Result.

New silo-based missiles are to be the destination for new plutonium pits.

W87-0 in Mark 21 reentry vehicles (RVs), shown here in (retired) MX missile configuration. Circular error probable (CEP) is classified but say ~100 m, with "smart" fuzing. Yield is 300 kilotons (kt), with a 475 kt variant optional. It is pits of this type which LANL is tasked to make.

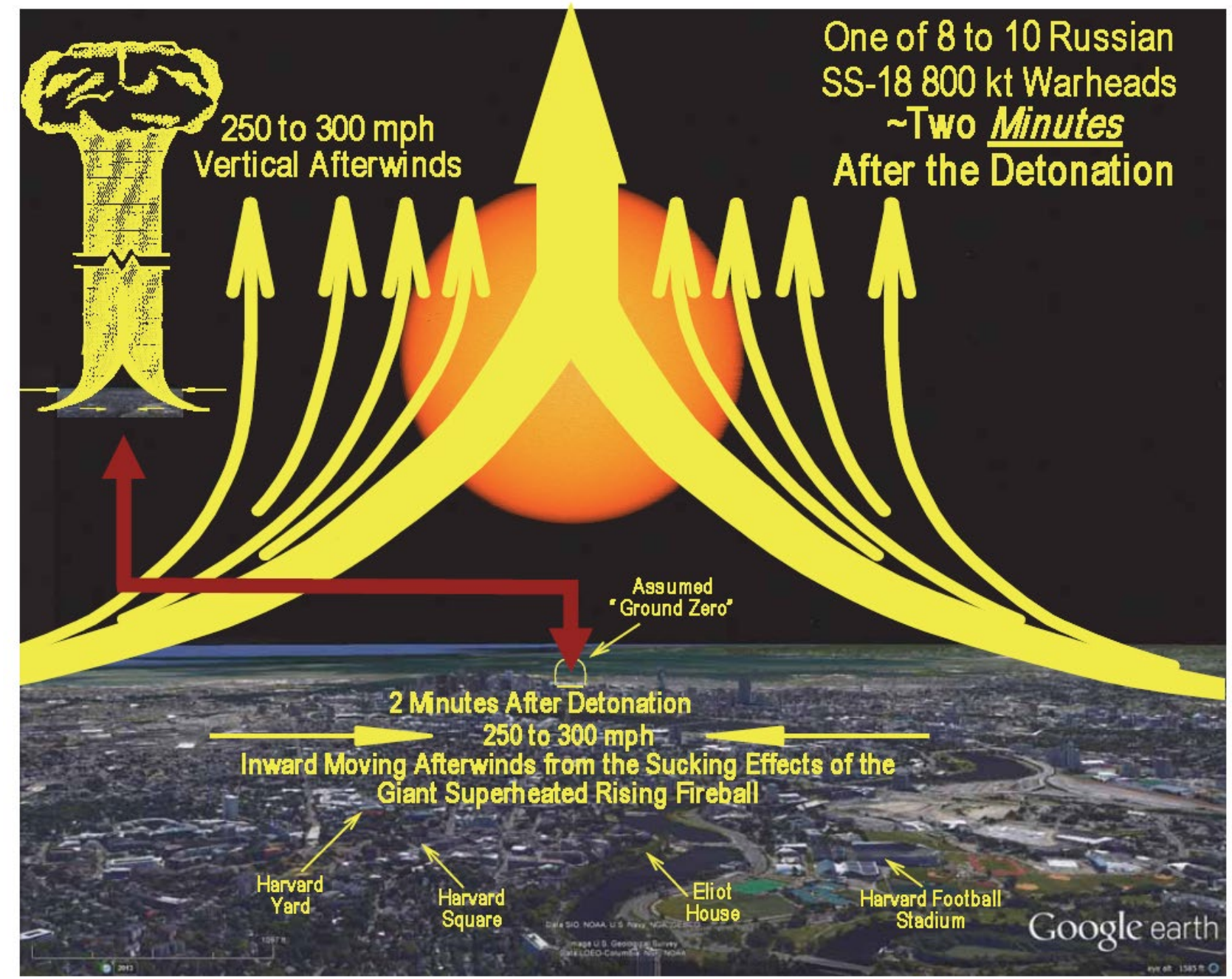
The US possesses ~ 540 (490?) W87s, in addition to ~780 W78s in Mark 12A RVs (CEP ~720 ft) for the same 450 Minuteman III missiles (400 deployed). At present, ~200 MM IIIs could be returned to multiple independent RV (MIRV) status with 3 W78 warheads each.

Skinnier, lighter, less accurate RV for the W78. Both the RV and the warhead are to be retired.



Minuteman III Mk-12 MIRV Warheads (W78s), tested in this configuration in the last administration.

Slide from [Ted Postol, Harvard Peace Action talk, Feb. 25, 2016]



What LANL and SNL design and build: effects

Modern thermonuclear warheads have far larger energy yields than the primitive nuclear explosives used at Hiroshima and Nagasaki.

One large nuclear explosion would utterly destroy all of Albuquerque, or Santa Fe.

The purpose: terror (de-terr-ence).

Analysis and graphic from Steven Starr, nuclearfamine.org

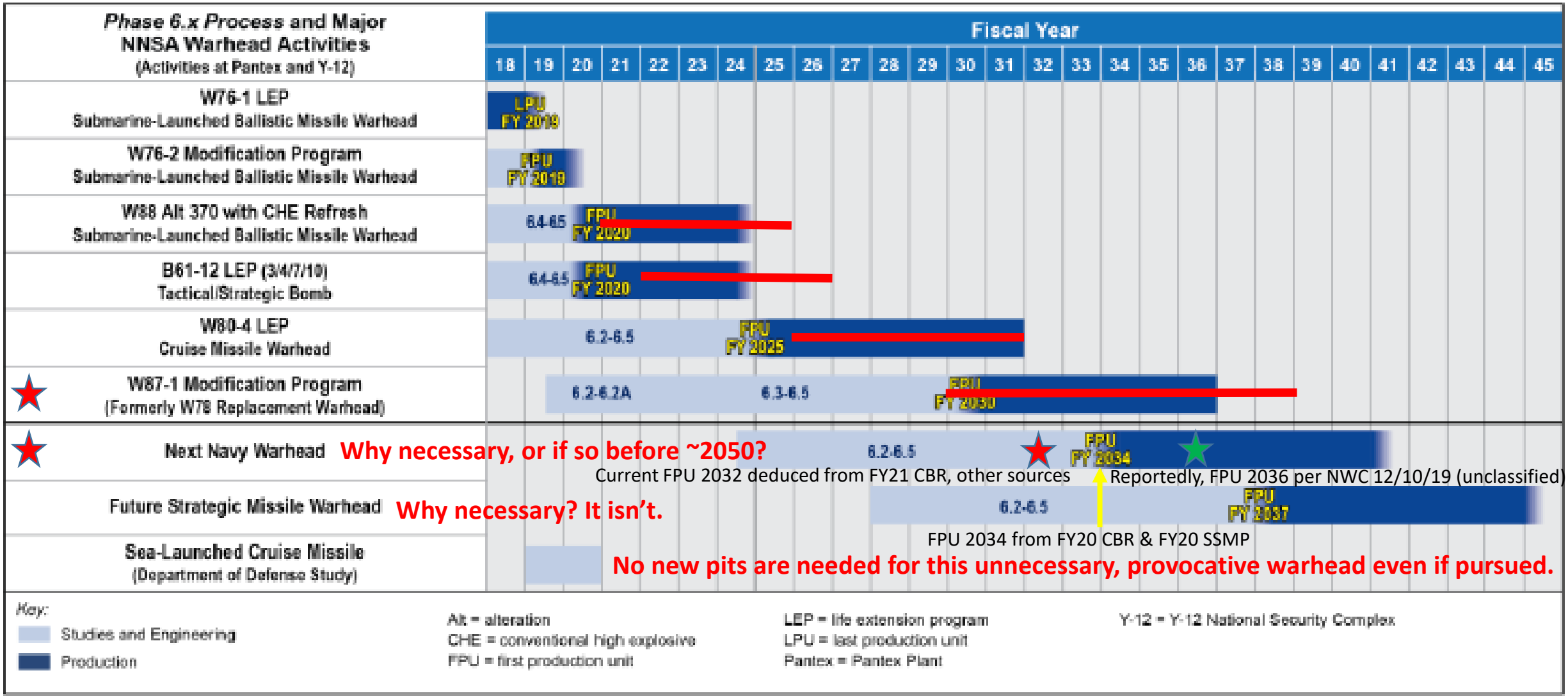


Figure 2–2. NNSA warhead activities[2]

From NNSA FY2020 SSMP, July 2019. Red bars are production schedule as of May 2020, from LASG sources and GAO-20-573R (p. 16). FPU dates in the 2030s are now classified and/or uncertain.

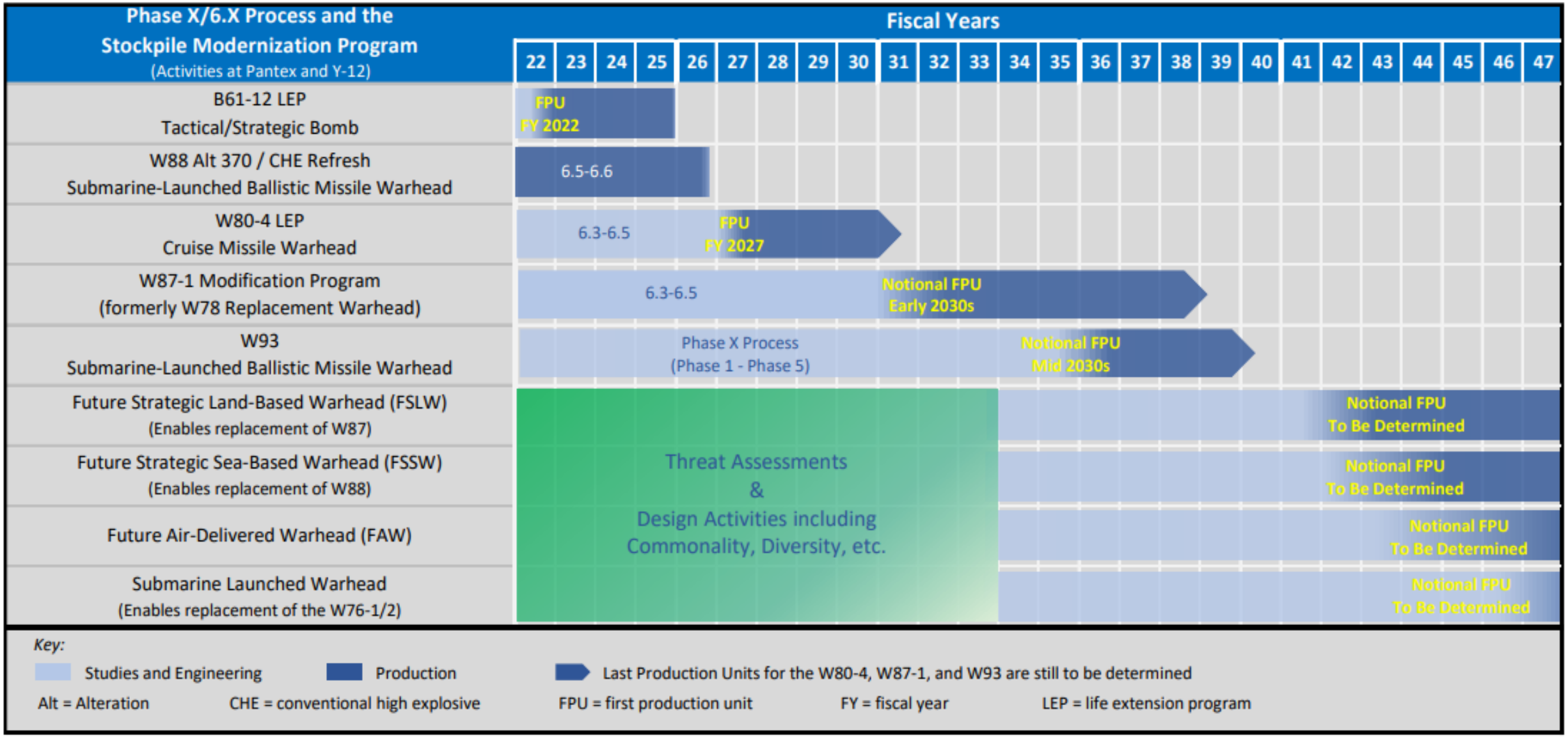


Figure 2–2. DOE/NNSA Warhead Activities

Some Key Takeaways

- LANL's new production mission is a key enabling program for a hybrid war against now-combined Russia and China. The U.S. has already lost.
- LANL's new mission is absurd, based on poor engineering and management, and is vulnerable to "off-ramps." With help, LANL has failed at this mission four times before and is in the process of failing again, with increasing visibility.
- It will be impossible to meet climate, environmental, or social goals under conditions of empire and a nuclear arms race, for political, fiscal, and social reasons.
- Santa Fe and Northern New Mexico are uniquely placed to make an enormous, material contribution to peace and social development.

More Key Takeaways

- LANL pit production in the 2020s and early 2030s artificially increases nuclear weapons (NW) spending & hiring across the NNSA complex.
- Postponing pit production until circa 2036, when it might begin at the Savannah River Site makes sense from every perspective except a) empire, b) runaway nuclearism, and c) contractor budgets.
- There are, or recently were, senior staff in Congress and the military who want to stop LANL pit production in lieu of just R&D and training.
- If the war-state is not stopped now, and a broad political awakening not achieved in the 2020s, prospects for a habitable earth are dim.
- Pit production proponents, in arms control groups and elsewhere, implicitly deny the U.S. faces immediate, converging existential crises. We are certain otherwise. Pit production in the mid- to late-2030s is a mirage, given these. Assertion of humane values (always) matters most here and now.

(This and following 2 slides from NM Legislature presentation 8/21/23)

Madam Chair, Ranking Member, and Committee: Key Takeaways (I)

- This is the fifth time, over a five year period, that I have come before this Committee to share some of what I and my colleagues at the Study Group and in government have learned about NNSA's proposal to create industrial plutonium capabilities at LANL, primarily to manufacture pits. This will not be another data-rich presentation, but rather present conclusions and one proposed action.
- The Study Group is a non-partisan, non-ideological, policy research, consulting, and educational organization. We also educate, lobby, and learn from, Congress and executive branch officials.
- **The Committee had the opportunity to demand a full environmental analysis *prior to* the NNSA decisions in September 2020 that have since created an increasing, multi-dimensional hazardous and radioactive materials crisis for the state. The environmental and social impacts, some of which are being discussed today, will continue to build and accrue until this mission is terminated.**
- **Pit production is an inherently "dirty" mission that has been assigned to LANL despite the site's many drawbacks due to political "pork-barrel" pressure and, as a senior LANL official once explained to us, in anticipation of political compliance and lack of regulatory rigor. This is called "pollution shopping." Politically, it is a form of "Stockholm Syndrome."**
- **This committee has not placed a high value on NNSA and LANL transparency or oversight, as today's executive session with NNSA and LANL officials demonstrates.**

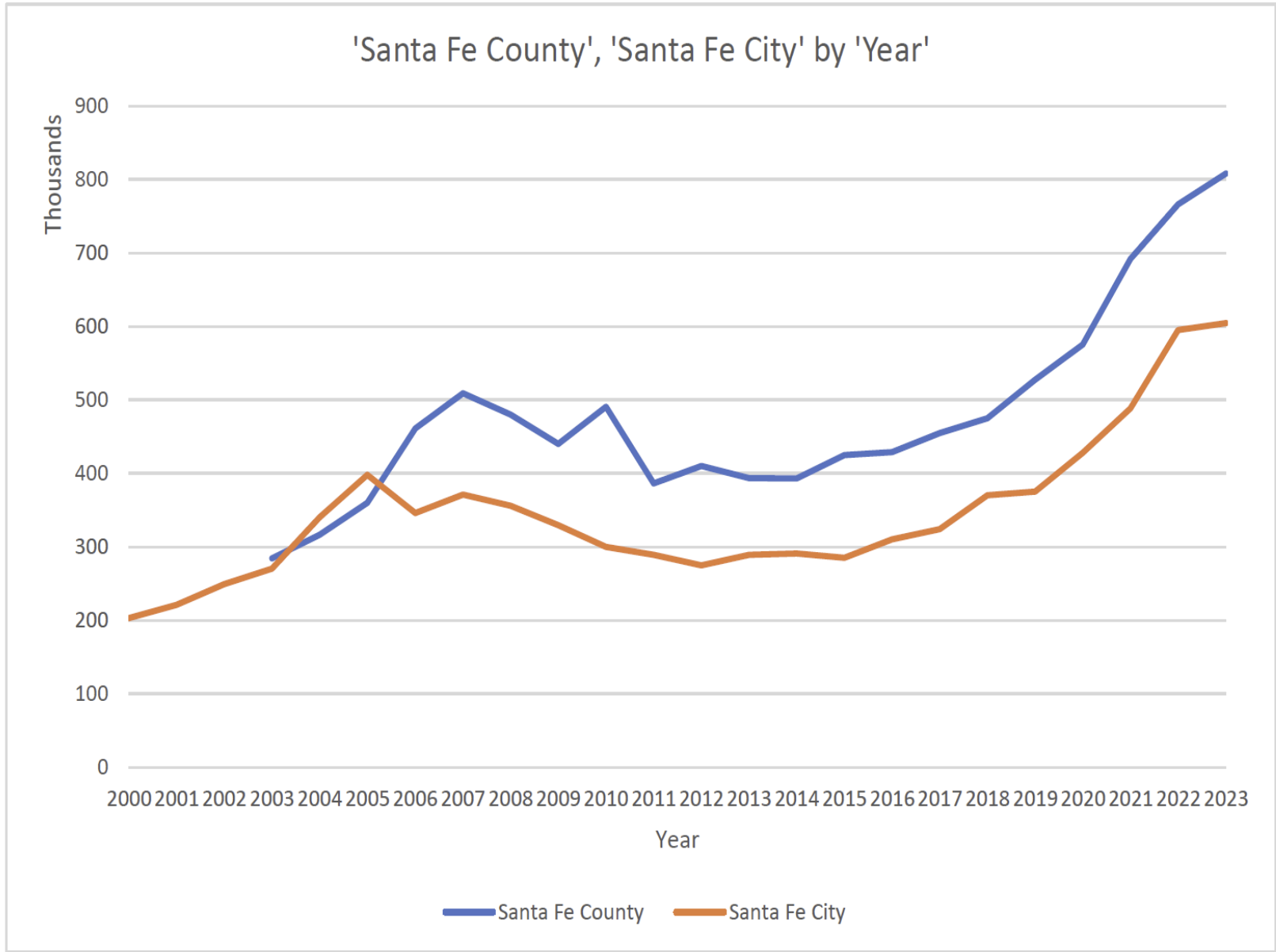
More Takeaways (from NM Legislature testimony this August)

- Meanwhile the Committee can observe that there has been no true economic development in the region as a result of enormous LANL spending, historically totaling in excess of $140 billion in today's dollars and rising rapidly over the past 5 years. "Those who think LANL create economic development are people for whom 78 years of data are not enough."
- Spending money does not in itself create economic or social development. It can create growth, but growth has costs, which can be damaging on a net basis. LANL spending can and has distorted labor and housing markets and has incurred transportation, resource use, and waste handling externalities, exacerbated regional inequality, and stifled the imaginations of New Mexico political leaders. As rural development and public health advocate Carol Miller has rightly said, "LANL is our political heroin."
- The result has been a flagrant "failure to thrive," with New Mexico falling to last place among all U.S. states in terms of overall child well-being, a good measure of social development overall. Areas in LANL's "labor-shed" which ought to be benefitting, are among the worst in the state in terms of poverty, drug abuse, and social ills.
- Overcoming this social failure will require more creative, committed, bipartisan, urban-rural state government responses than we have yet seen. "Help" from LANL comes with implicit costs the region cannot afford to pay and is no substitute for the cooperative social contract we need.

NM Leg testimony (more)

- The reasons for LANL's failure to create economic development are many and include:
  - LANL's salaries are far too high relative to other local businesses and government institutions. LANL is a "black hole" for talent.
  - LANL does not produce useful goods or services. "Tech transfer" has been and will remain largely a mirage, an economic and social development strategy that "underachieves."
  - LANL-induced growth comes with high fiscal and "congestion" costs as well as market distortions, leaving non-LANL workers with less-affordable housing, longer commutes, and lower quality of life.
  - The nature of LANL's mission – improving nuclear "deterrence," i.e. threatened genocide or omnicide, using dangerous materials that also require an extensive militarized and intrusive security apparatus – violates treaties the U.S. has signed and is a form of "reputational pollution" for the state and region. It also damages the moral tenor of the region, essential for a social contract, which in turn is required to overcome the erosive effects of predatory capitalism in a peripheral region.
  - LANL's national security missions require extensive secrecy, and lying, in its public statements. This lying usually takes the form of omitting the most important information or quietly re-defining the terms of discussion to mean something quite different from ordinary language. This secrecy creates, in Herman Agoyo's words, *a lack of public story and meaning*, around which meaning, traditions, productive vocations, and identity could otherwise constellate. LANL makes enormous efforts to fill the resulting "black hole" with empty corporate slogans.

Year	Santa Fe County	Santa Fe City
2000		$203,000.00
2001		$221,000.00
2002		$249,450.00
2003	$284,313.00	$270,475.00
2004	$316,661.00	$340,000.00
2005	$360,000.00	$398,000.00
2006	$461,313.00	$346,125.00
2007	$508,900.00	$371,000.00
2008	$480,000.00	$355,688.00
2009	$440,000.00	$329,500.00
2010	$490,500.00	$300,000.00
2011	$386,250.00	$289,000.00
2012	$410,000.00	$274,855.00
2013	$393,500.00	$289,000.00
2014	$393,000.00	$291,000.00
2015	$425,000.00	$285,000.00
2016	$428,875.00	$310,000.00
2017	$454,816.00	$324,000.00
2018	$475,000.00	$370,000.00
2019	$527,500.00	$375,000.00
2020	$575,153.00	$428,000.00
2021	$691,803.00	$488,500.00
2022	$765,950.00	$595,000.00
2023	$808,050.00	$604,500.00



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 [1]	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 dominates all investment in NM.

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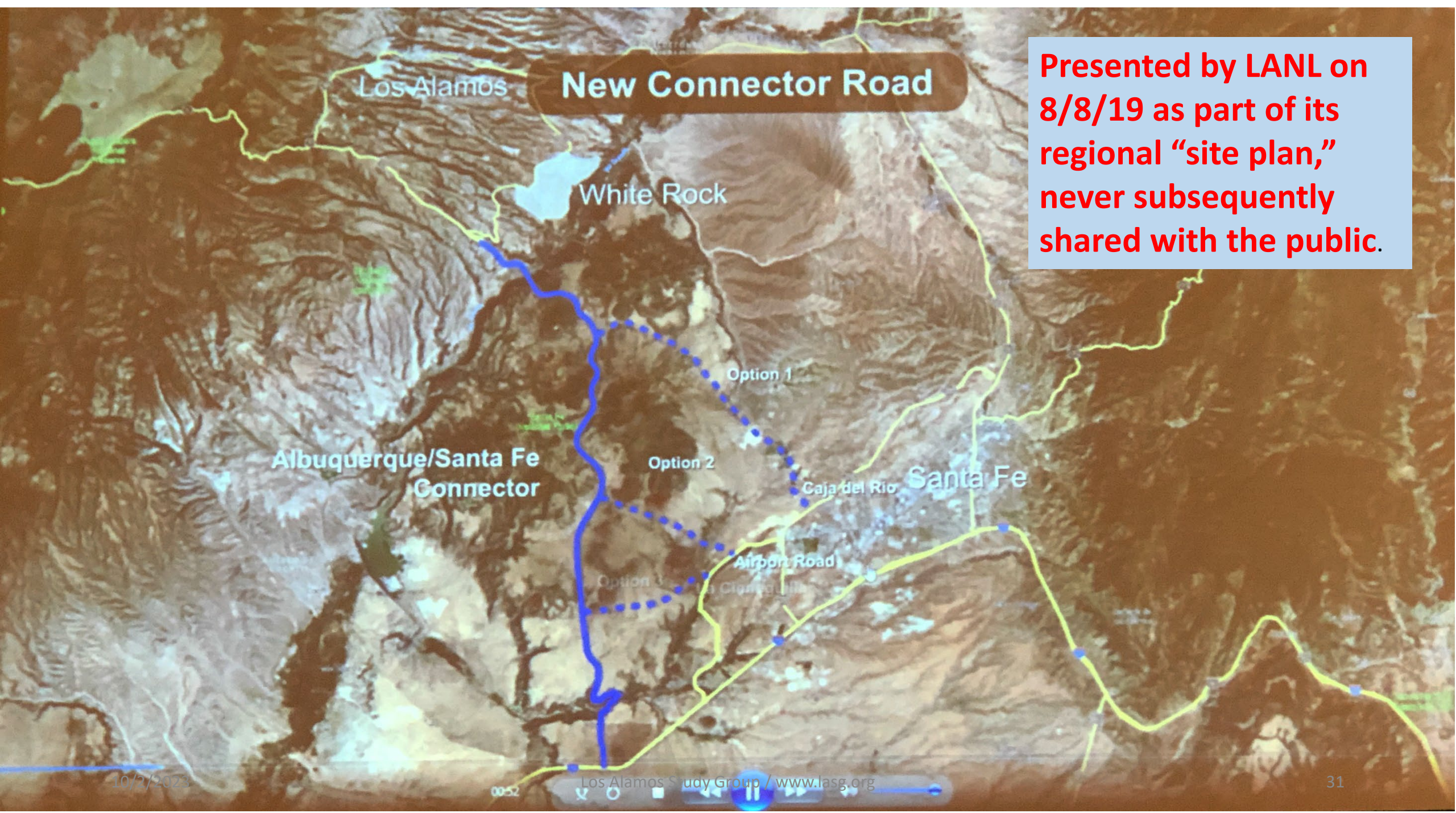
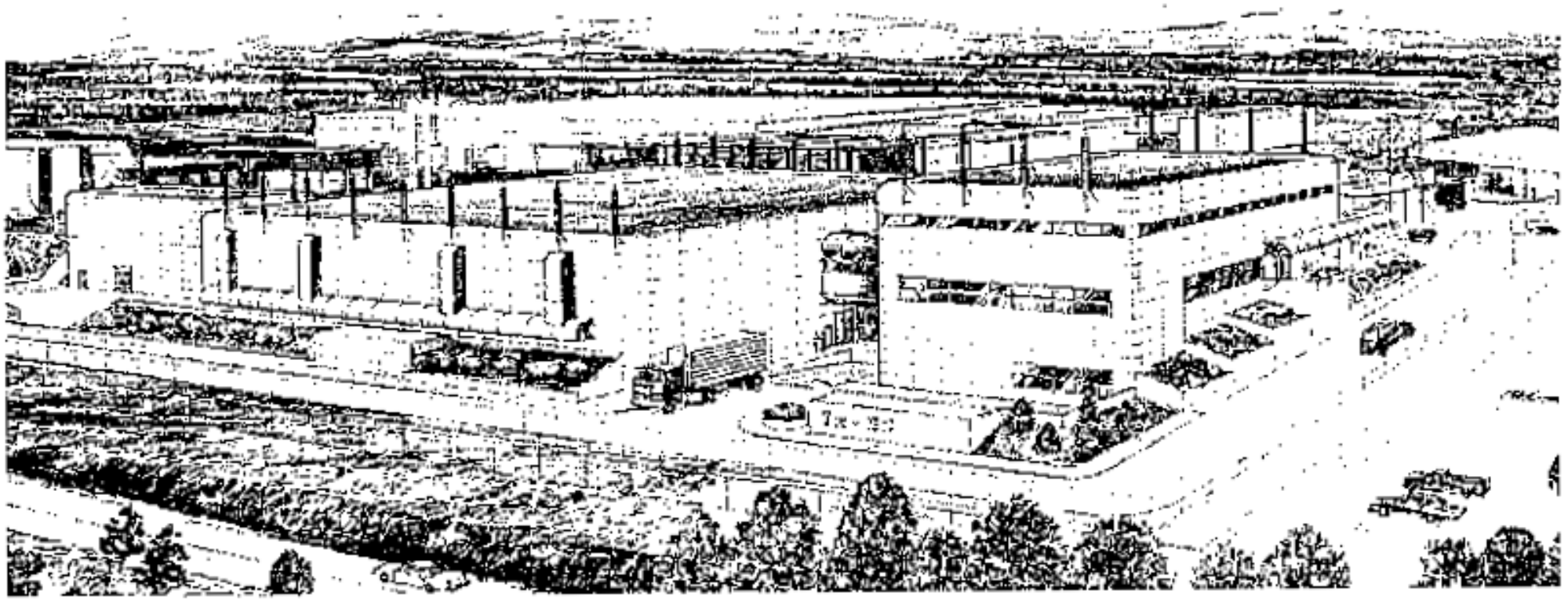


Presented by LANL on 8/8/19 as part of its regional "site plan," never subsequently shared with the public.

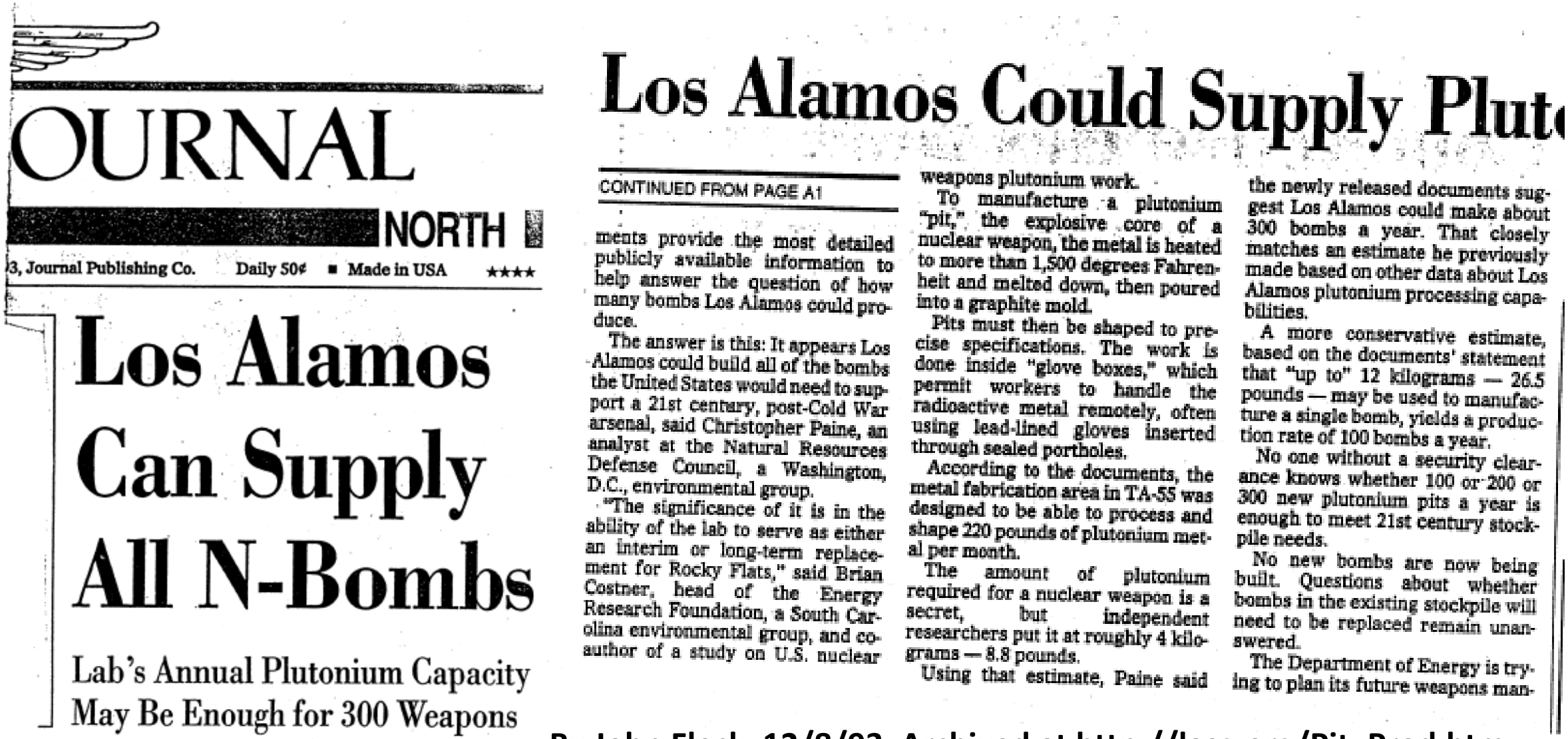
Special Nuclear Materials Research and Development Laboratory Replacement Project at Los Alamos National Laboratory



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

A glance back at LANL's first proposal for a post-Rocky Flats pit facility

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



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Los Alamos Can Supply All N-Bombs

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

Los Alamos Could Supply Plut

CONTINUED FROM PAGE A1

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

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

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

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

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

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

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

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

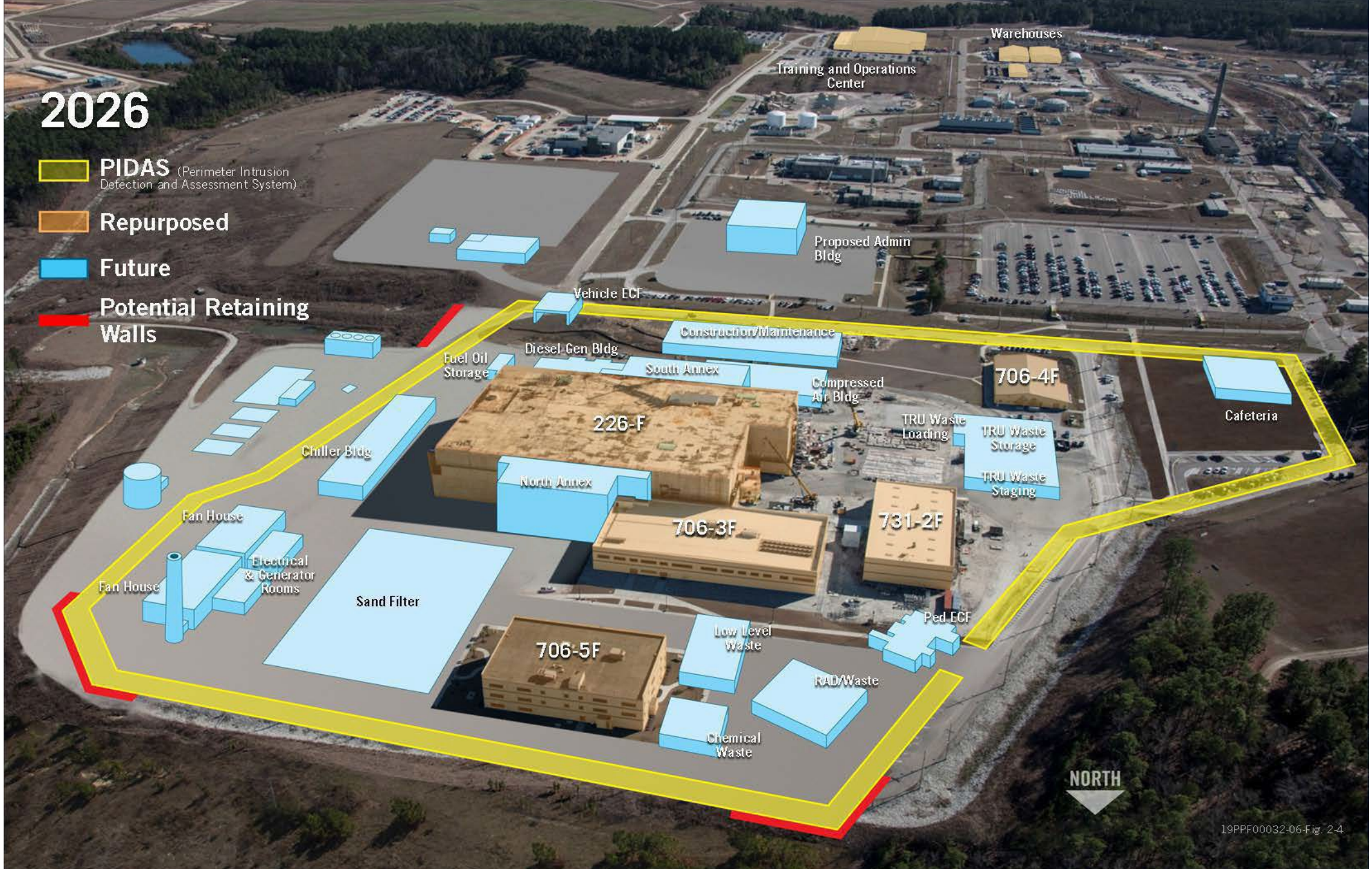
A more conservative estimate, based on the documents' statement that "up to" 12 kilograms — 26.5 pounds — may be used to manufacture a single bomb, yields a production rate of 100 bombs a year.

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

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

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

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


2026
PIDAS (Perimeter Intrusion Detection and Assessment System)
Repurposed
Future
Potential Retaining Walls
Warehouses
Training and Operations Center
Proposed Admin Bldg
Vehicle ECF
Construction/Maintenance
Diesel Gen Bldg
Fuel Oil Storage
South Annex
Compressed Air Bldg
706-4F
Cafeteria
226-F
TRU Waste Loading
TRU Waste Storage
TRU Waste Staging
Chiller Bldg
North Annex
706-3F
731-2F
Fan House
Electrical & Generator Rooms
Fan House
Sand Filter
Ped ECF
Low Level Waste
706-5F
RAD/Waste
Chemical Waste
NORTH
19PPF00032-06-Fig. 2-4

NOW, THEREFORE BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF SANTA FE that the governing body on behalf of its constituents states its opposition to all plutonium warhead core ("pit") production at Los Alamos National Laboratory.

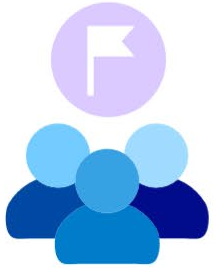
BE IT FURTHER RESOLVED that the governing body calls on the New Mexico Congressional delegation to:

1. Halt all preparations for plutonium pit production at LANL, including but not limited to the Los Alamos Plutonium Pit Production Project (LAP4).

2. Prioritize removal and disposal of legacy plutonium waste from LANL over production of additional nuclear waste from nuclear weapons activities, including manufacturing and preparations for manufacturing.

3. Decrease federal spending currently allocated for nuclear weapons activities and increase funding to support human security, community resilience, and environmental protection.

A rapidly growing workforce and LANL mission help drive the region's economy



17,244

total employees

61.2%

of FY22 new hires are from New Mexico

$4.4 billion

total Laboratory budget for fiscal year 2023

$1.76 billion

Annual salary total YTD for fiscal year 2023

Salary distribution by main counties:

Los Alamos	$751,243,751
Santa Fe	$446,376,954
Rio Arriba	$195,454,037
Bernalillo	$97,487,279
Sandoval	$72,918,192
Taos	$23,019,491
Other NM*	$30,779,651

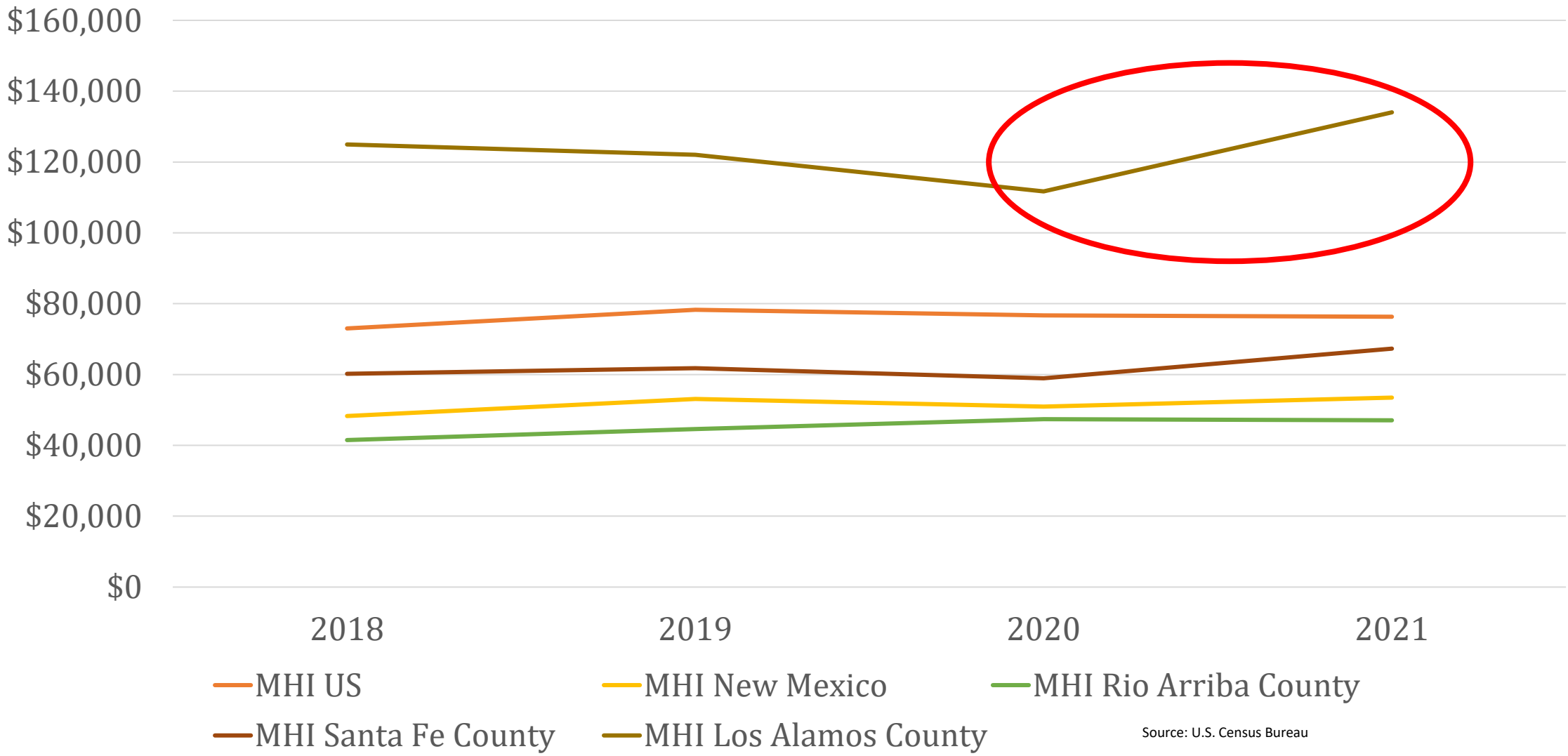
Attachment A

Median Household Income (MHI) for Three New Mexico Counties, 2018-2021

Year	US	New Mexico	Rio Arriba	Santa Fe	Los Alamos	LA/RA	LA/SF
2018	$73,030	$48,280	$41,511	$60,187	$124,947	3.01	2.08
2019	$78,250	$53,110	$44,579	$61,791	$122,001	2.74	1.97
2020	$76,660	$50,910	$47,400	$58,898	$111,724	2.36	1.90
2021	$76,330	$53,460	$47,042	$67,311	$134,050	2.85	1.99

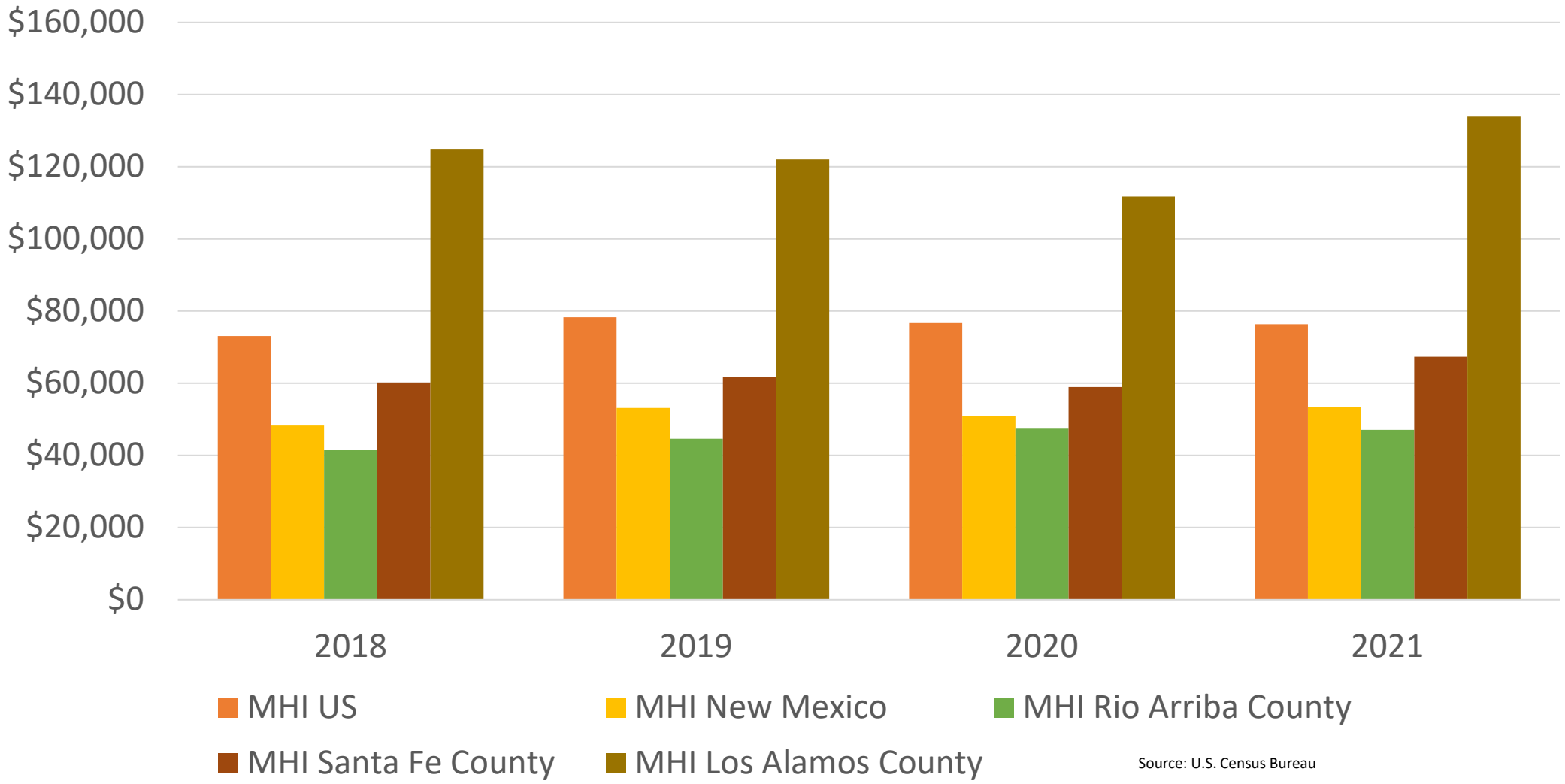
From 2020 to 2021, MHI in Los Alamos and Santa Fe counties jumped by 20% and 14%, respectively; MHI in Rio Arriba declined by 1%. Data from 2022 is not yet available.

Median Household Income 2018-2021



Source: U.S. Census Bureau

Median Household Income 2018-2021



Source: U.S. Census Bureau

Median Home Prices, Santa Fe County and City

Year	Santa Fe County	Santa Fe City
2000		$203,000.00
2001		$221,000.00
2002		$249,450.00
2003	$284,313.00	$270,475.00
2004	$316,661.00	$340,000.00
2005	$360,000.00	$398,000.00
2006	$461,313.00	$346,125.00
2007	$508,900.00	$371,000.00
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2011	$386,250.00	$289,000.00
2012	$410,000.00	$274,855.00
2013	$393,500.00	$289,000.00
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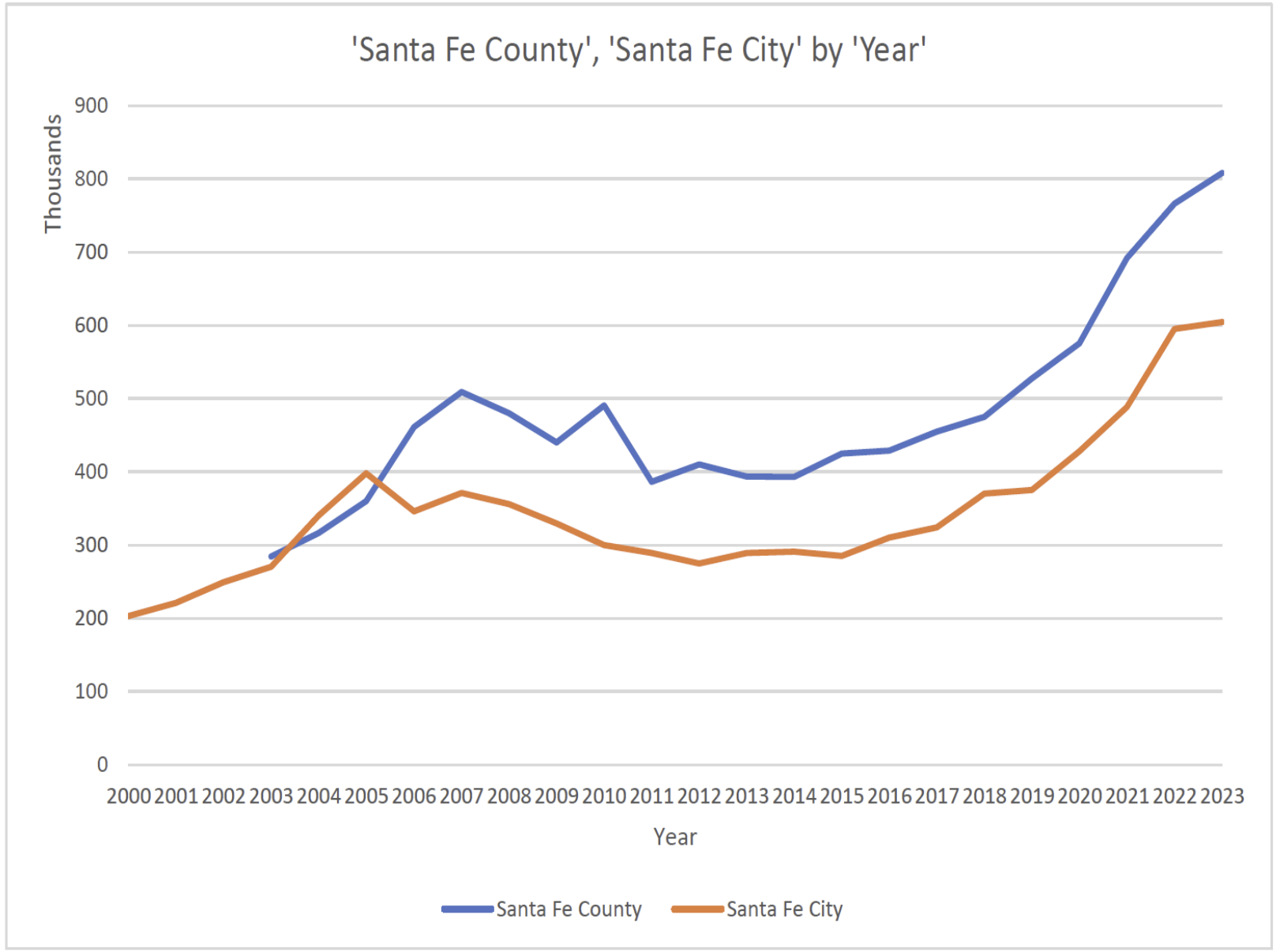
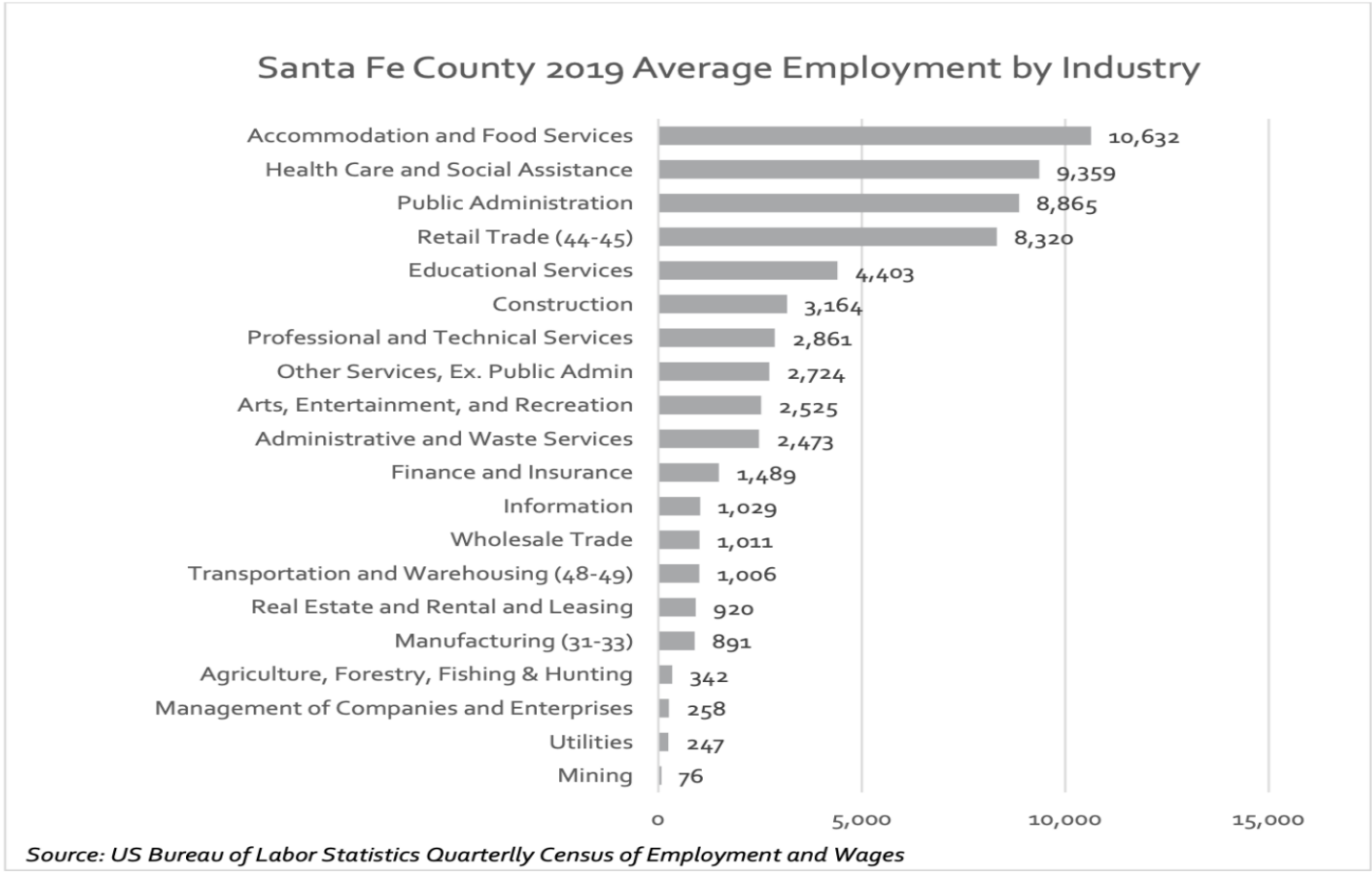


Housing Crises:

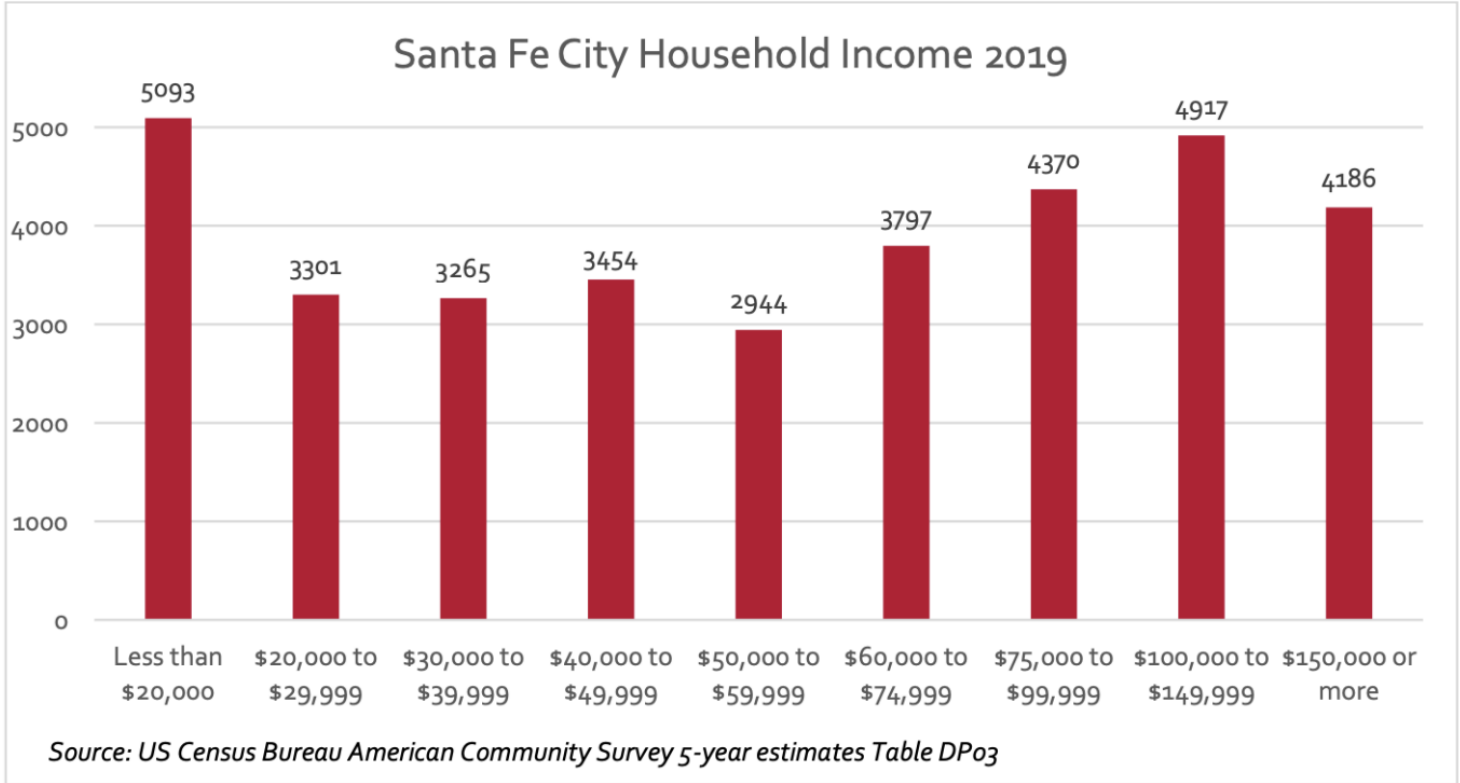
How affordable is Santa Fe for most of the population? What is the discrepancy between income and rent / housing prices?

What are the primary factors driving the housing crises?

FIGURE 17 - SANTA FE COUNTY 2019 EMPLOYMENT BY INDUSTRY



Source: US Bureau of Labor Statistics Quarterlly Census of Employment and Wages



72.4 percent of all housing structures in Santa Fe County are Single-family homes. 3.6% of housing structures have 20 or more units.[1]

In Santa Fe County, 40 percent of the population are renters and in the United States, that number is 56 percent while New Mexico statewide is about 47 percent according to 2019 ACS data.

A few final things to think about

- **LANL alone cannot handle the pit production mission.**
  - LANL production is not stable, adequate for any warhead's pits, or enduring. Any new LANL facilities would come late, at high cost, and with high risk, and none are presently planned. Eventual "all pit production at SRS" **is** the plan, per conversations on Capitol Hill. Related, the marginal cost of LANL pit production (two shifts) will always be at least twice what it is for a larger (single-shift) facility.

- Barring economic collapse, **the U.S. will continue investing each year in a pit production capacity** deemed adequate and enduring by the Nuclear Weapons Council. Providing for only 10, 20, or 30 pits per year for the foreseeable future will never be acceptable to Congress, the Executive, or the military until the U.S. utterly changes.

- Planning and construction of a new pit facility will take 15-20 years. We are 4 years into SRS design. No other facility anywhere near the capability and safety of SRS could be brought on line by 2036 (or earlier absent LANL competition).

- No site other besides LANL and SRS can produce pits in a timely fashion.

- **These four facts mean** that full investment in SRS production will continue, no matter what any of us say or do.

- **The only policy decision available in pit production during this decade is whether investments in LANL pit production, to the tune of nearly $2 billion/year, will continue, or rather *how long* they will continue.** In a decade or more from now, the decision will be how many pits SRS will produce.