

Update on nuclear weapons issues; next steps

Selected slides for briefing

July 29, 2021

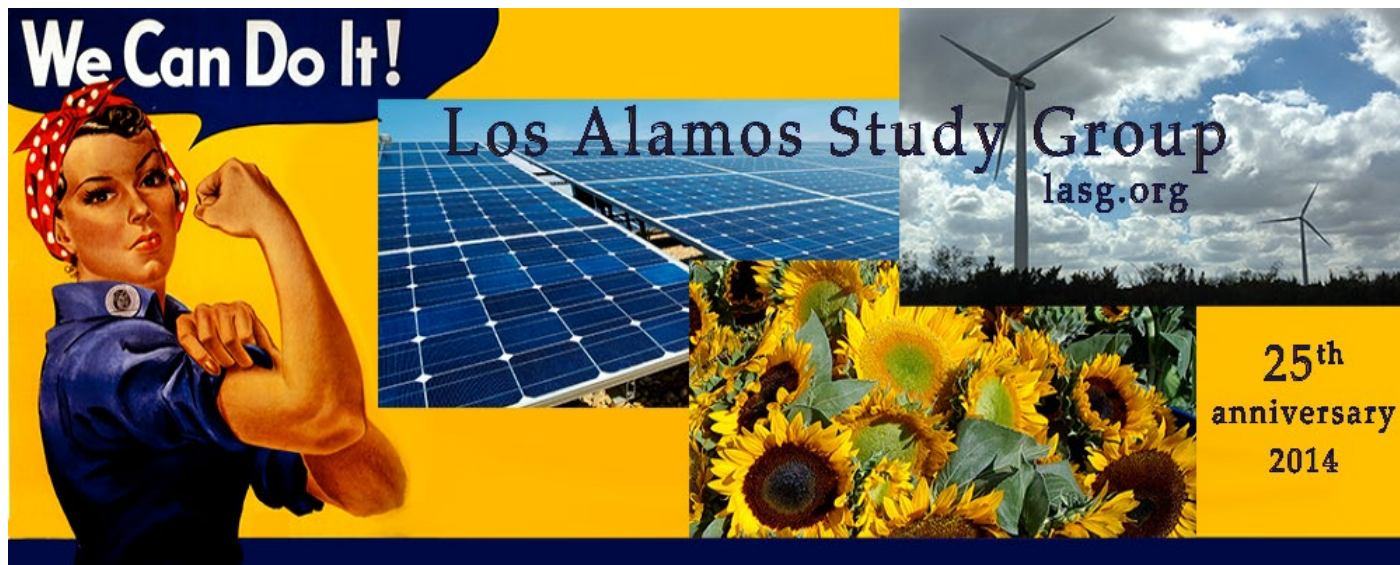
Greg Mello and Trish Williams-Mello

"If there must be trouble, let it be in my day, that my child may have peace."

Thomas Paine

"Save as many as you can." (from the movie, "The Day After Tomorrow")*

*https://www.lasg.org/videos/DayAfterTomorrow_clip_SaveAsManyAsYouCan.mp4



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To subscribe to the Study Group's main listserve send a blank email to lasg-subscribe@lists.riseup.net
Facebook: [Los Alamos Study Group](https://www.facebook.com/LosAlamosStudyGroup); Twitter: [@TrishABQ](https://twitter.com/TrishABQ); Blog: [Forget the Rest](https://www.blogger.com/blog/forgettherest)



Shown in response to a request from a younger person for a glimpse of the emotional environment of the Cold War.

This cartoon by Trever and others presented here also illustrate what was mainstream in a Republican newspaper in the 1980s, and by inference how far we moved to the political right in this state and country.



One of the persons satirized here is now treated as an authority by the Democratic-oriented *Santa Fe New Mexican*.

"IT'S THE NICE MAN FROM THE JOINT CHIEFS, HARVEY — HERE TO SEE ABOUT THE MX BASING MODE AGAIN!"

THIS REPORT SAYS DRUG ABUSE IS RAMPANT IN THE ENLISTED RANKS!

I WONDER WHAT THE GENERALS ARE ON....

SAVE THE WHALE
TRIDENT

WEAPONS PLANNING

SUPERCARRIER
U.S.S. Sitting Duck

F-18
TURKEYCAT

STAR WARS

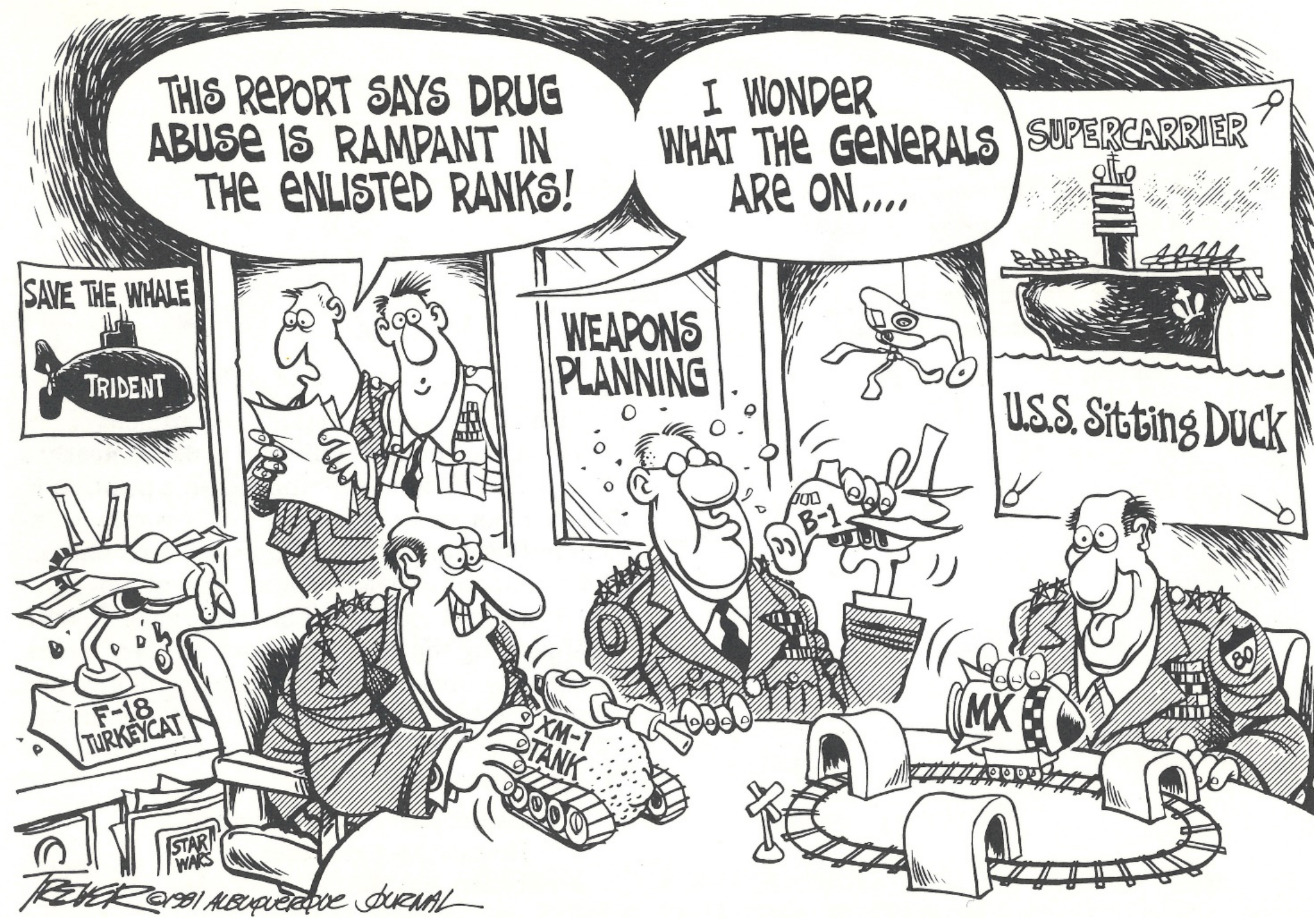
XM-1
TANK

B-1

MX

REVER @ 1981 ALBUQUERQUE JOURNAL

Much about this 1981 cartoon remains current today.





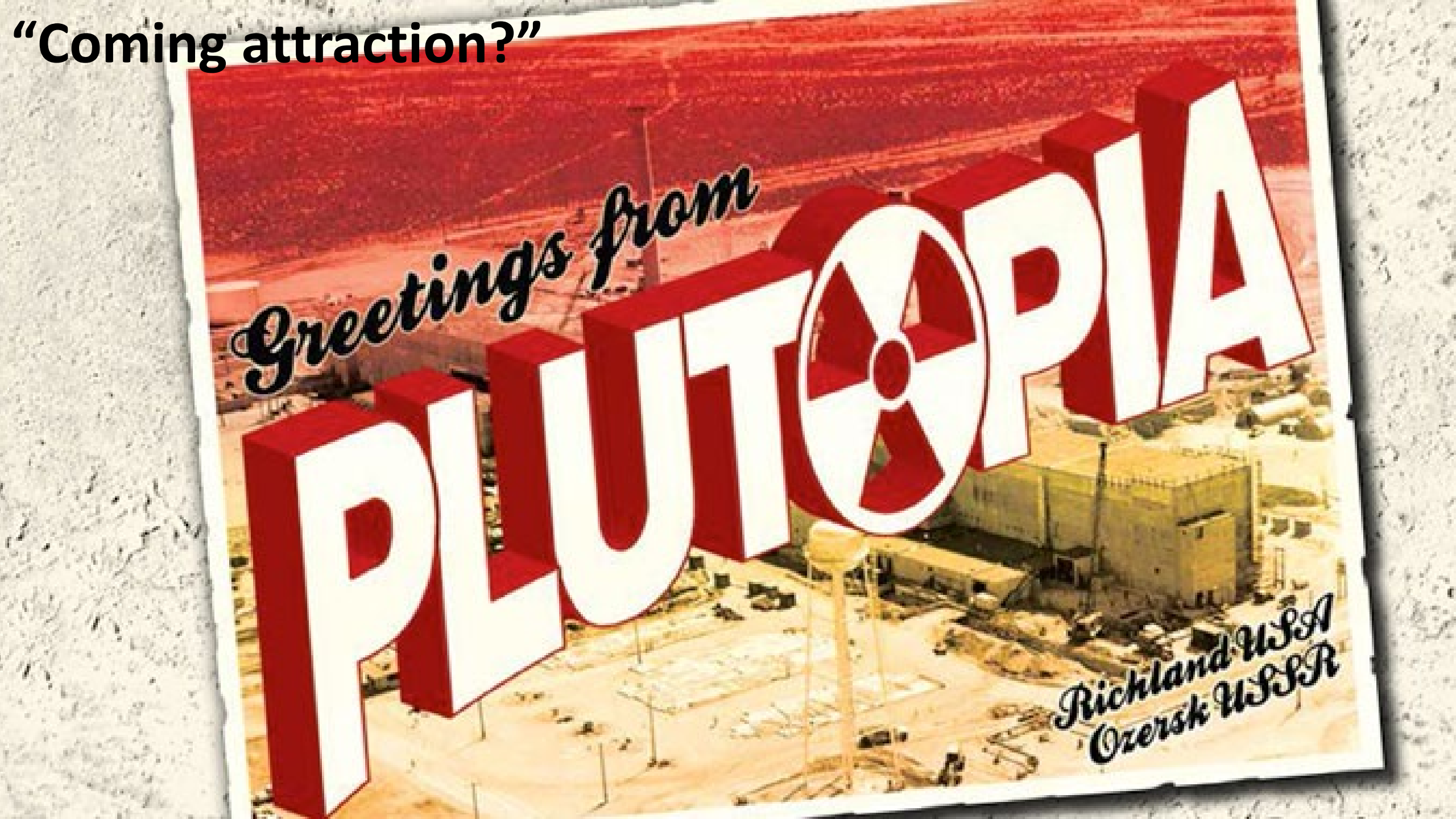
Trever, 2006. It was still possible to ridicule LANL, for cause, in a Republican newspaper. LANL has not improved since then but the news media are now cowed.

“Coming attraction?”

Greetings from

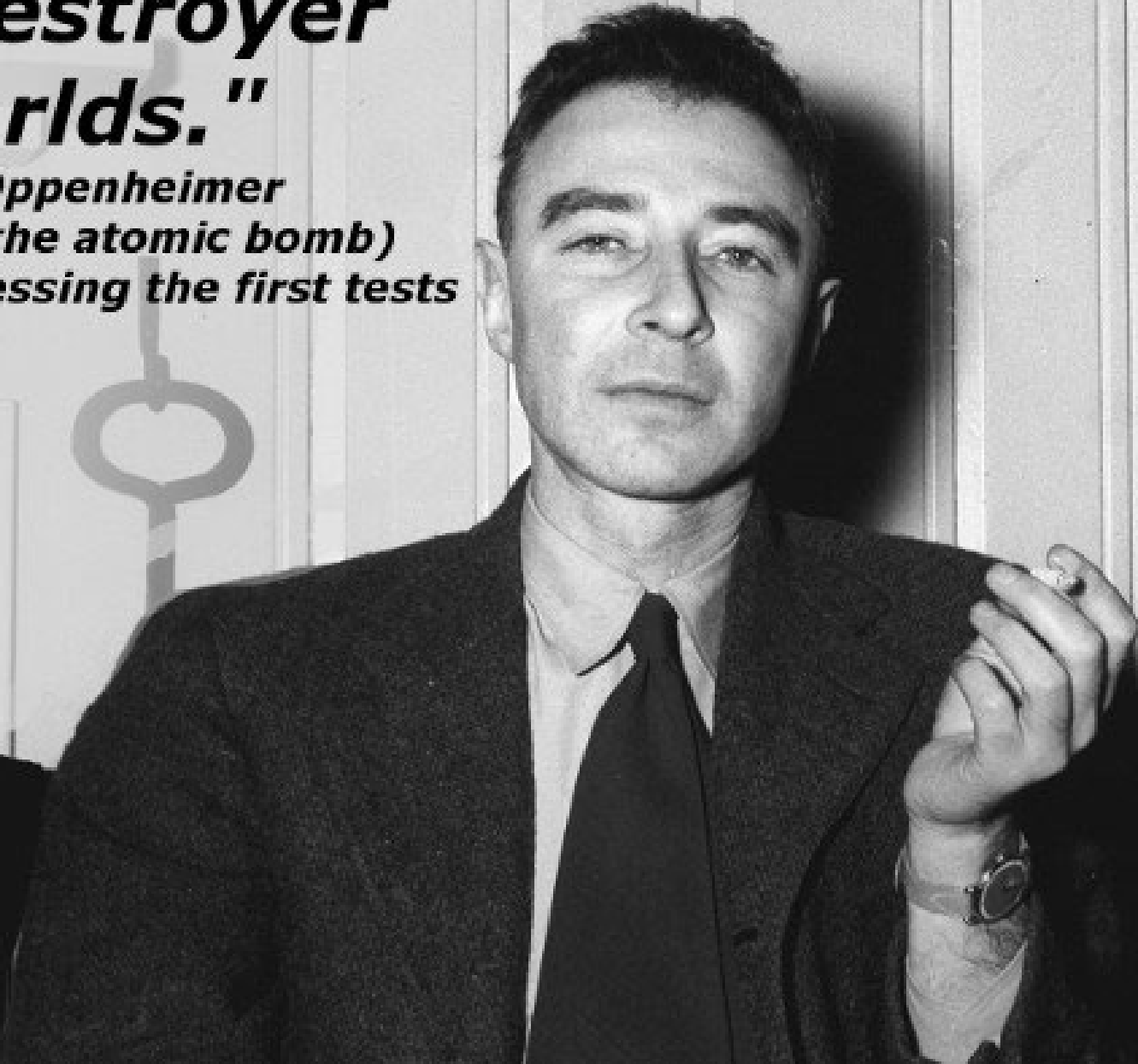
PLUTOPRIA

*Richland USA
Ozersk USSR*



***"Now I am become Death,
the destroyer
of worlds."***

***J. Robert Oppenheimer
(father of the atomic bomb)
upon witnessing the first tests***



**“Going
over to
another
order” (8
slides)**



From LANL's *National Security Science*, Summer 2021 issue: "The logo for Boese Brothers Brewery's Dr . Strangehop IPA features Major Kong (actor Slim Pickens) atop the Los Alamos–designed Fat Man bomb. Coincidentally, Boese Brothers does have a Los Alamos location."

Boese: Bad, evil, wicked

What is this and the following but “going over to another order” (Plotinus; see James Hillman, [The Thought of the Heart and the Soul of the World](#)).

“Imaginary evil is romantic and varied; real evil is gloomy, monotonous, barren, boring. Imaginary good is boring; real good is always new, marvelous, intoxicating.” -- Simone Weil

BOMB CITY BOCK

BIG TEXAN BREWERY



**BOMB CITY
BOCK**
BIG TEXAN BREWERY



GATX 64057

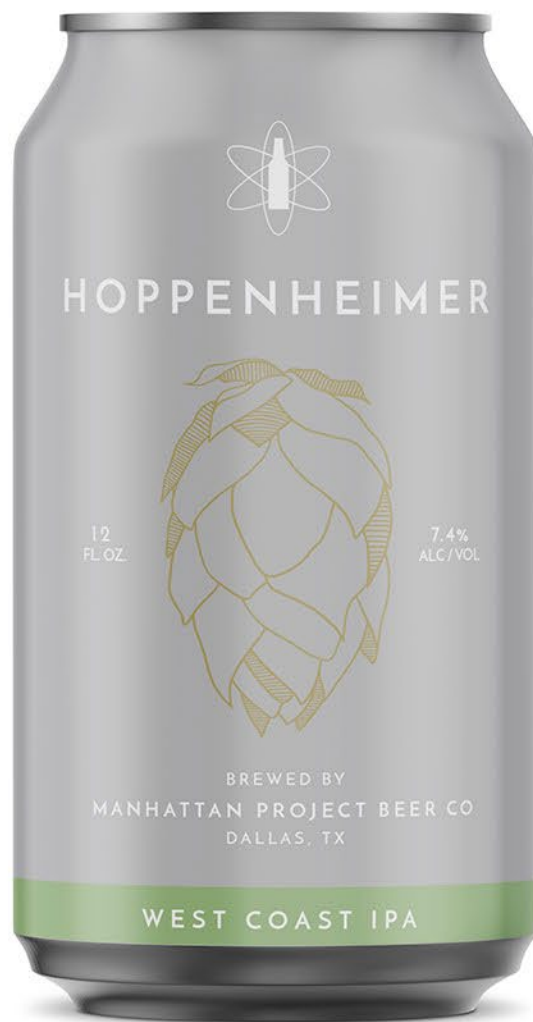
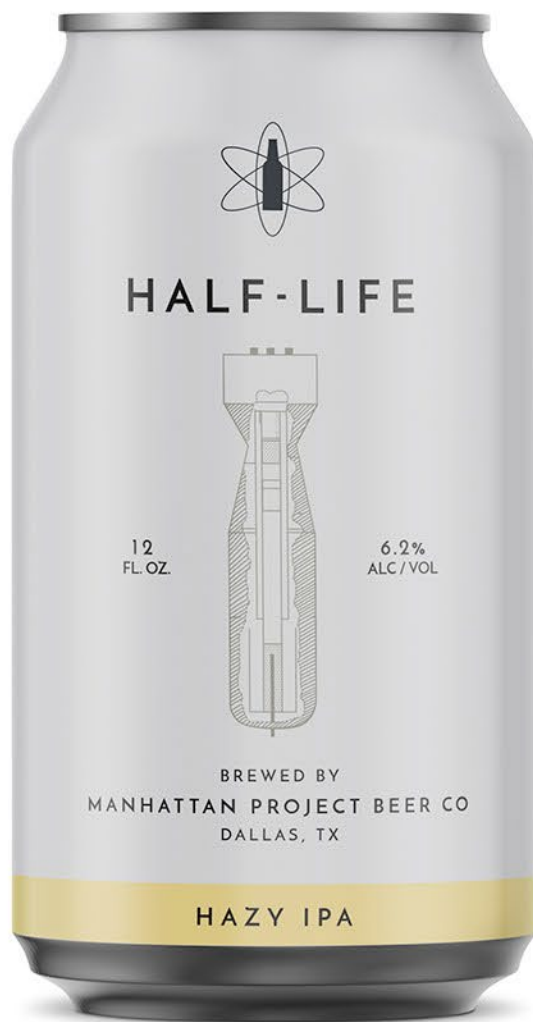
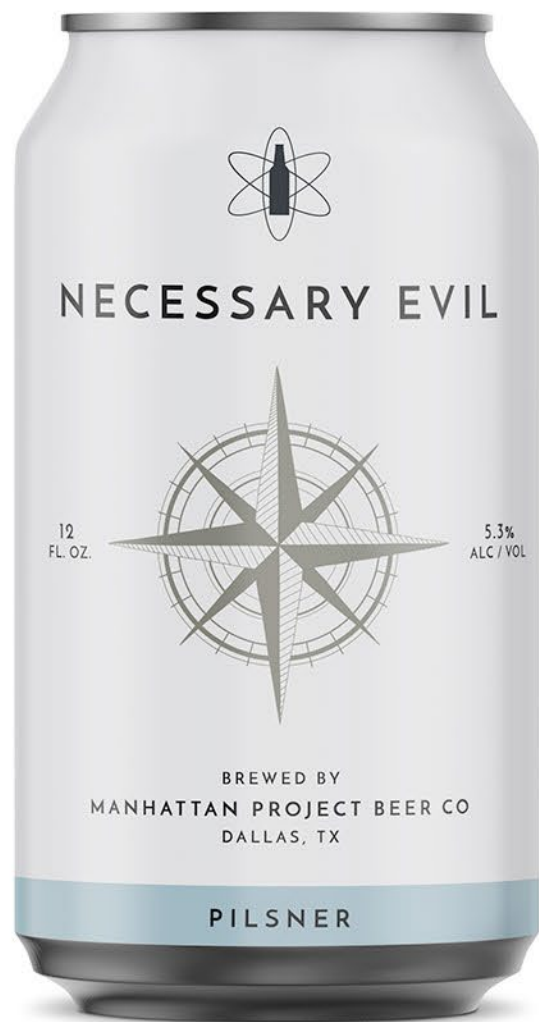


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Stockpile Stewardship: How do we sustain the nuclear deterrent



501835
B61 12
SERIAL 020970

B612
US Air Force
Strategic Bomb

B617
US Air Force
Strategic Bomb





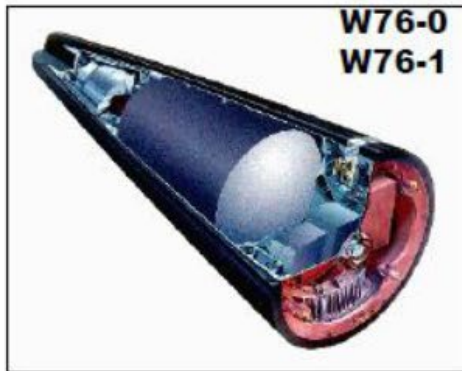
Today, the US has 11 nuclear weapon types, and Los Alamos has responsibility for 8 of the weapons

B61-3,-4,-7



LANL Weapons

W76-0
W76-1



W78



W88



B61-11



LLNL Weapons

W80-1



B83



W87



Quick overview of current U.S. nuclear warheads and bombs

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



W87, shown here in (retired) MX missile configuration, circular error probable (CEP) is classified but < 400 ft. Yield is 330/475 kilotons (kt). It is pits for this warhead or a variant which LANL is tasked to make.

The US possesses ~ 540 W87s, in addition to ~780 W78s in Mark 12A RVs (CEP ~720 ft) for the same 450 Minuteman III missiles.

At present, at least 200 MM IIIs could be returned to multiple independent RV (MIRV) status, with 3 W78 warheads each.



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](#).

That's Gen. James Cartwright, L. He does not favor retaining ICBMs.

MK 12A RE-ENTRY VEHICLE



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

Ground Based Strategic Deterrent (GBSD). 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 and presumably also with W87-0s unless the latter are kept solely as backups. Several Hundred W87-1s with new pits would be needed starting in 2030.

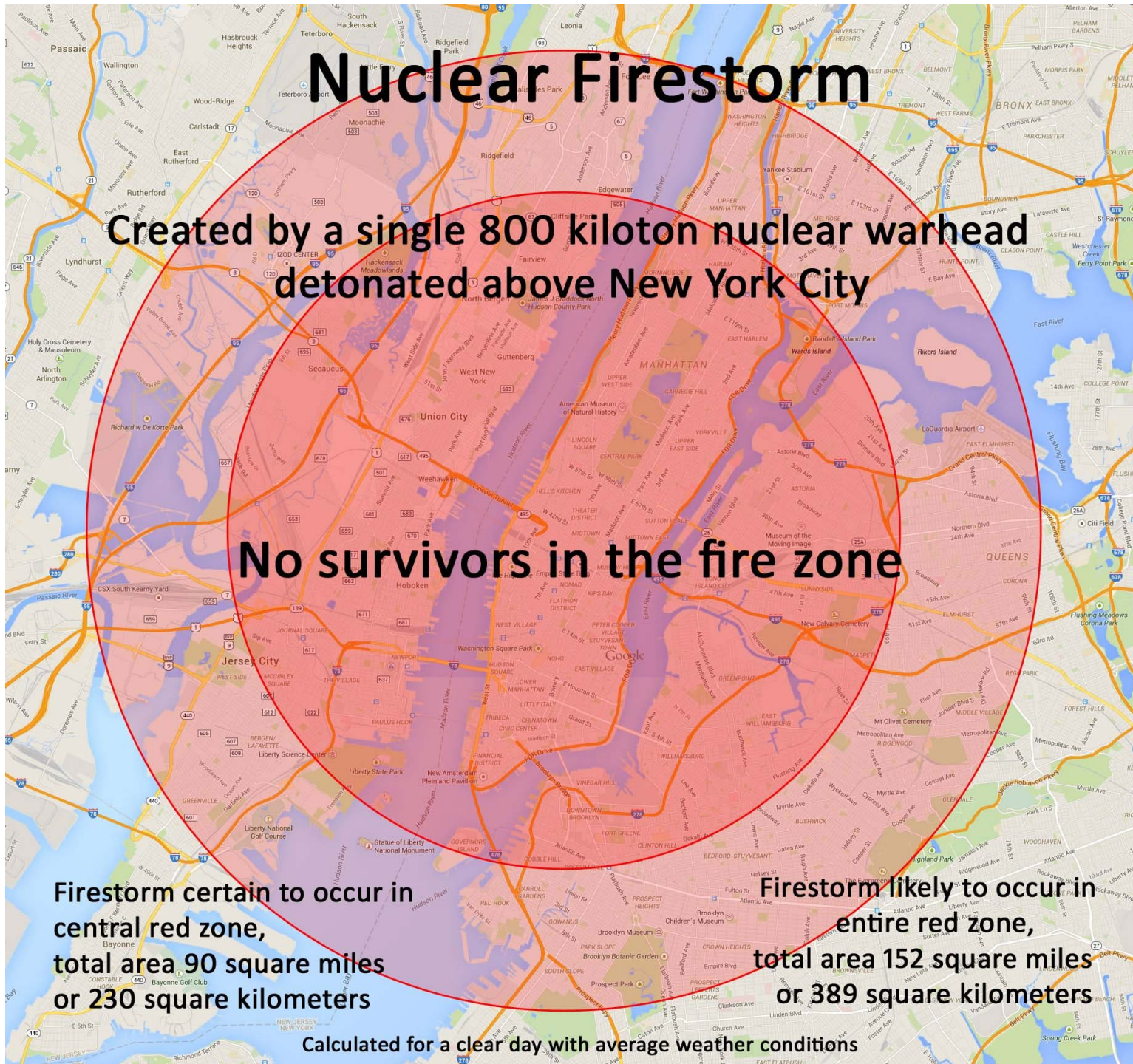


This is the origin of the 80+ pit per year by 2030 requirement.



Nuclear
weapon
effects, in brief

Analysis and graphic from Steven Starr; see <http://www.nucleardarkness.org/nuclear/nuclear-explosions-simulator>



What LANL designs and builds: effects

800 kt nuclear blast (e.g. Russian SS-18)

Fireball: 5,774 feet diameter (shown roughly at scale in plane of "Big I")

Center of fireball ~ 3,000 feet above ground zero in this picture

At 6 miles the fireball would appear more than 300 times brighter than the desert sun at noon

Blast wave travels 3 miles in about 13 seconds

Certain mass fires ($\geq 20 \text{ cal/cm}^2$) radius 5.35 miles

Probable mass fires ($\geq 10 \text{ cal/cm}^2$) radius 7.5 miles

Airblast $\geq 5 \text{ psi}$ out to 4.0 miles on the ground; $\geq 1.5 \text{ psi}$ to 9.3 miles

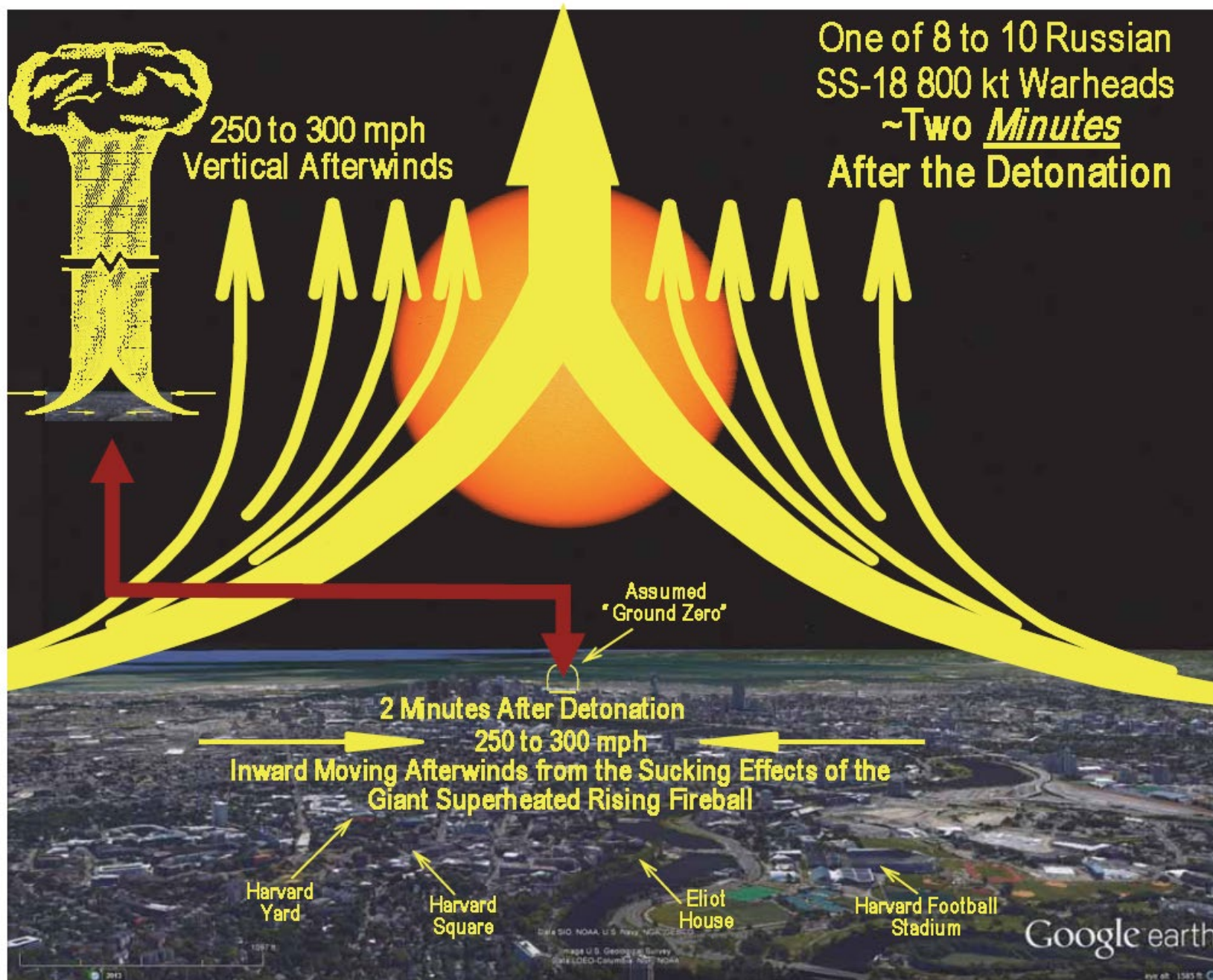
3rd degree burns (11.2 cal/cm^2) with 100% probability to 7.1 miles

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).

Boston Downtown Skyline Viewed from Nearly Above the Harvard University Campus

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



W88 Warhead for Trident D-5 Ballistic Missile

1. The "Primary"
Two-point, hollow-pit, fusion-boosted high explosive implosion

2. The "Secondary"
Spherical, all-fissile, fusion-boosted radiation implosion

3. Radiation Case
Peanut-shaped, channels x-rays from primary to secondary

4. Channel Filler
Plastic foam plasma generator

5. Booster Gas Cannister
Periodic replacement as tritium gas decays

High Explosive Lens
Two lenses drive primary implosion

Plutonium-239 Pit
Beryllium-reflected hollow pit

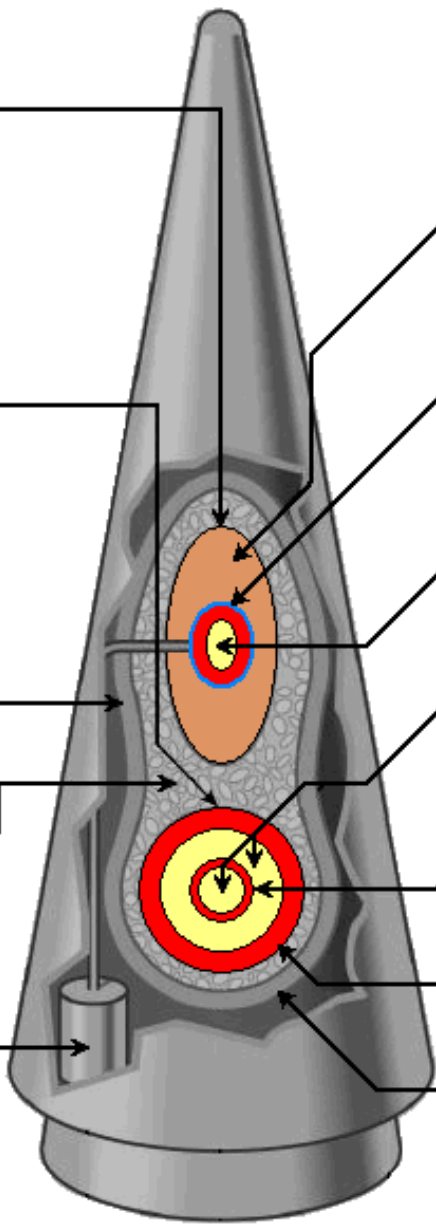
Tritium & Deuterium
Booster gas, fusion makes neutrons

Lithium-6 Deuteride
Lithium becomes tritium, fusion makes neutrons

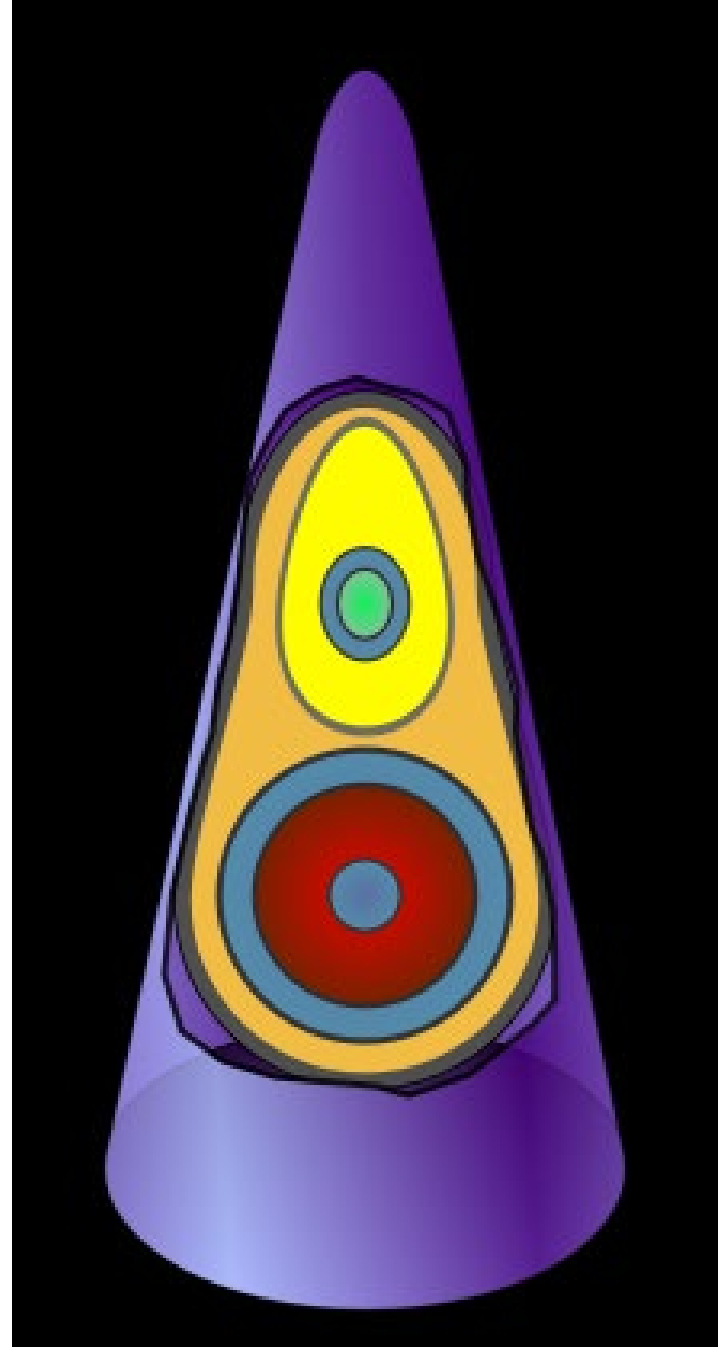
Uranium-235 "Sparkplug"
Starts tritium generation and fusion in the secondary

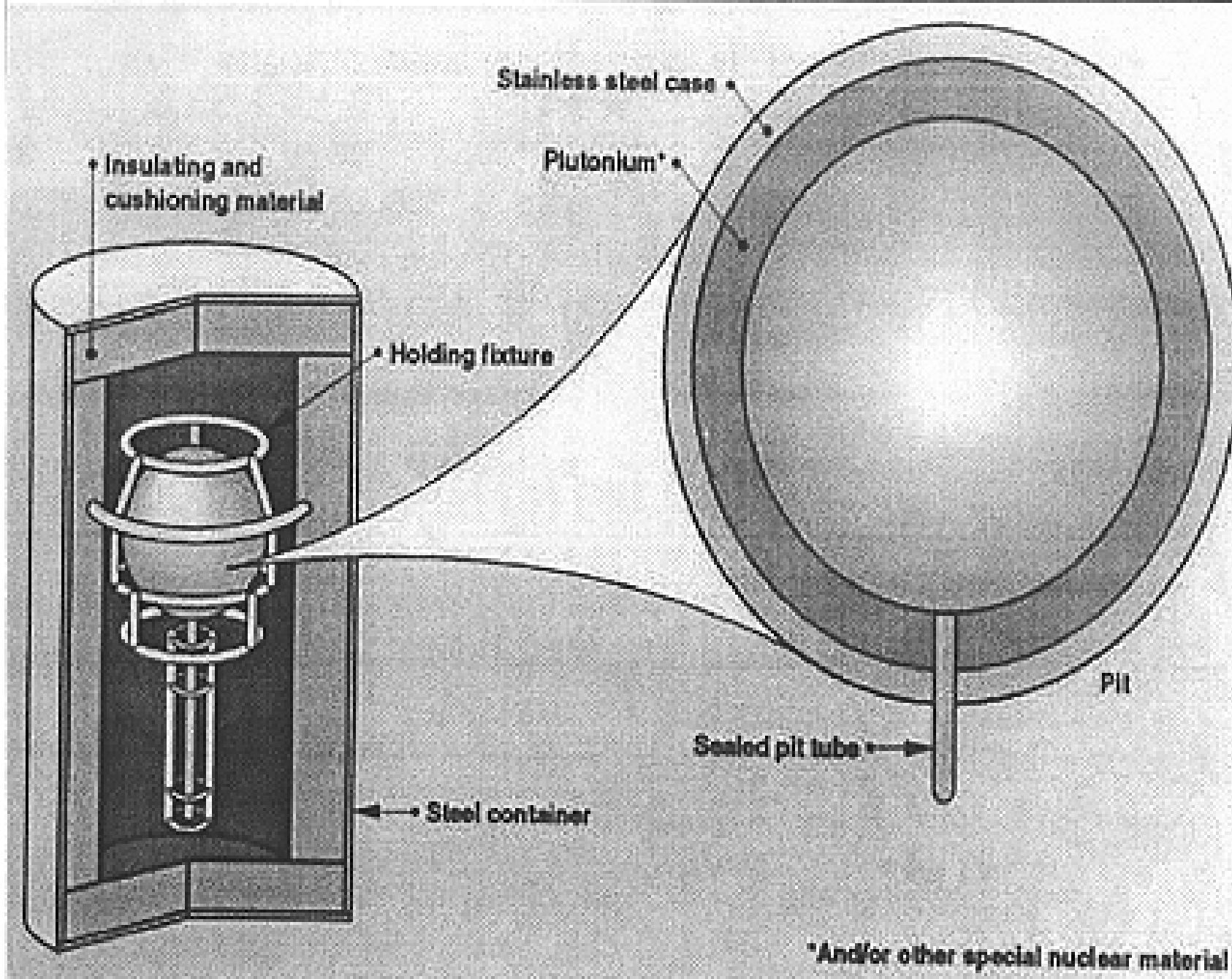
Uranium-235 "Pusher"
Heat shield, tamper, and fission fuel (fission by all neutrons)

Uranium-238 Case
Fission by fusion neutrons only

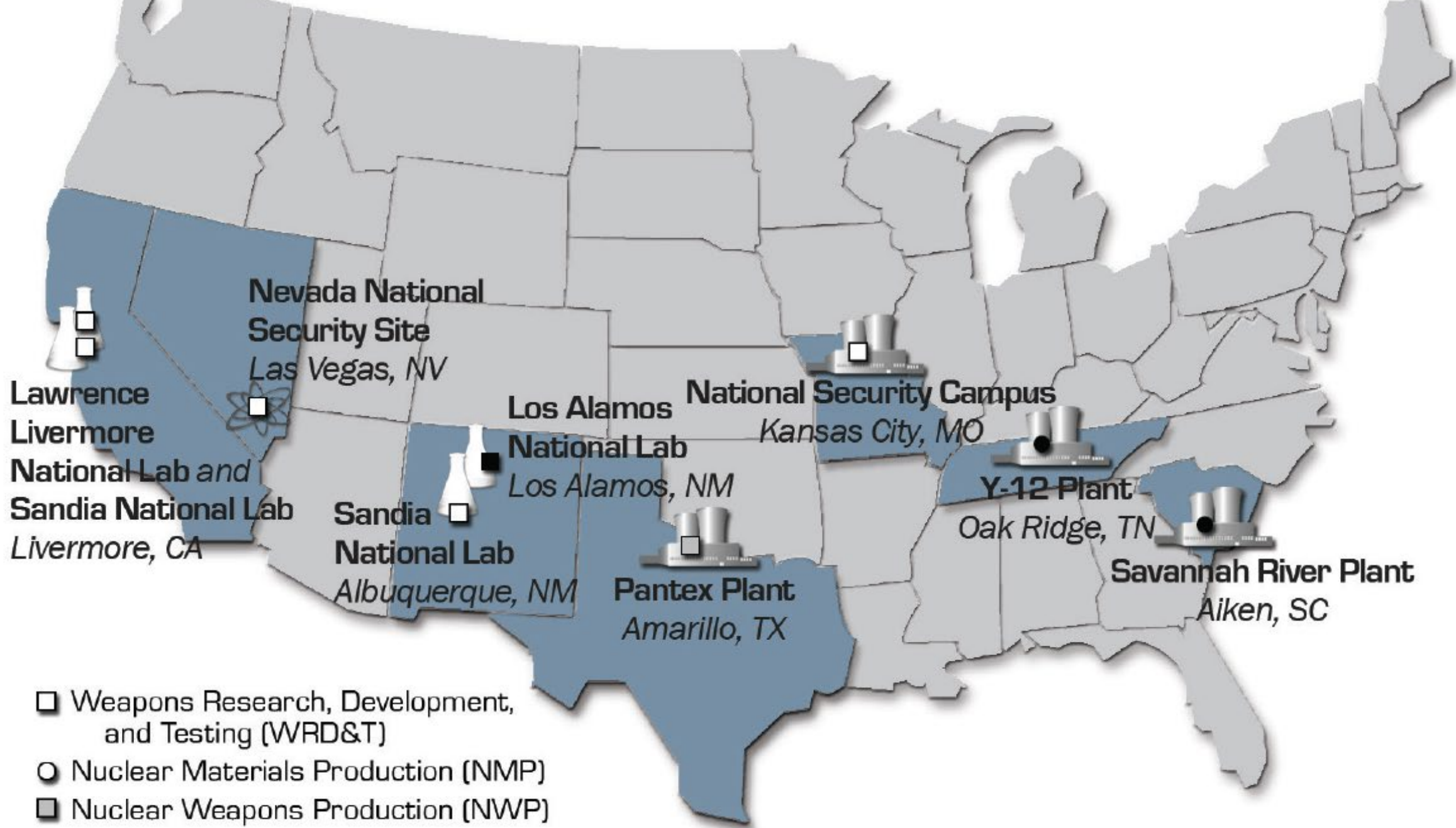


Sources for illustrations: Wikipedia





How pits are stored.



Lawrence
Livermore
National Lab and
Sandia National Lab
Livermore, CA

Nevada National
Security Site
Las Vegas, NV

Los Alamos
National Lab
Los Alamos, NM

Sandia
National Lab
Albuquerque, NM

Pantex Plant
Amarillo, TX

National Security Campus
Kansas City, MO

Y-12 Plant
Oak Ridge, TN

Savannah River Plant
Aiken, SC

- Weapons Research, Development, and Testing (WRD&T)
- Nuclear Materials Production (NMP)
- ◻ Nuclear Weapons Production (NWP)
- NMP and NWP
- NMP, NWP, and WRD&T

Pantex Zone 4 surplus pit and warhead magazines (plus more storage in Zone 12)



July 30, 2021 ~20,000 pits are here, ~5,000 still usable

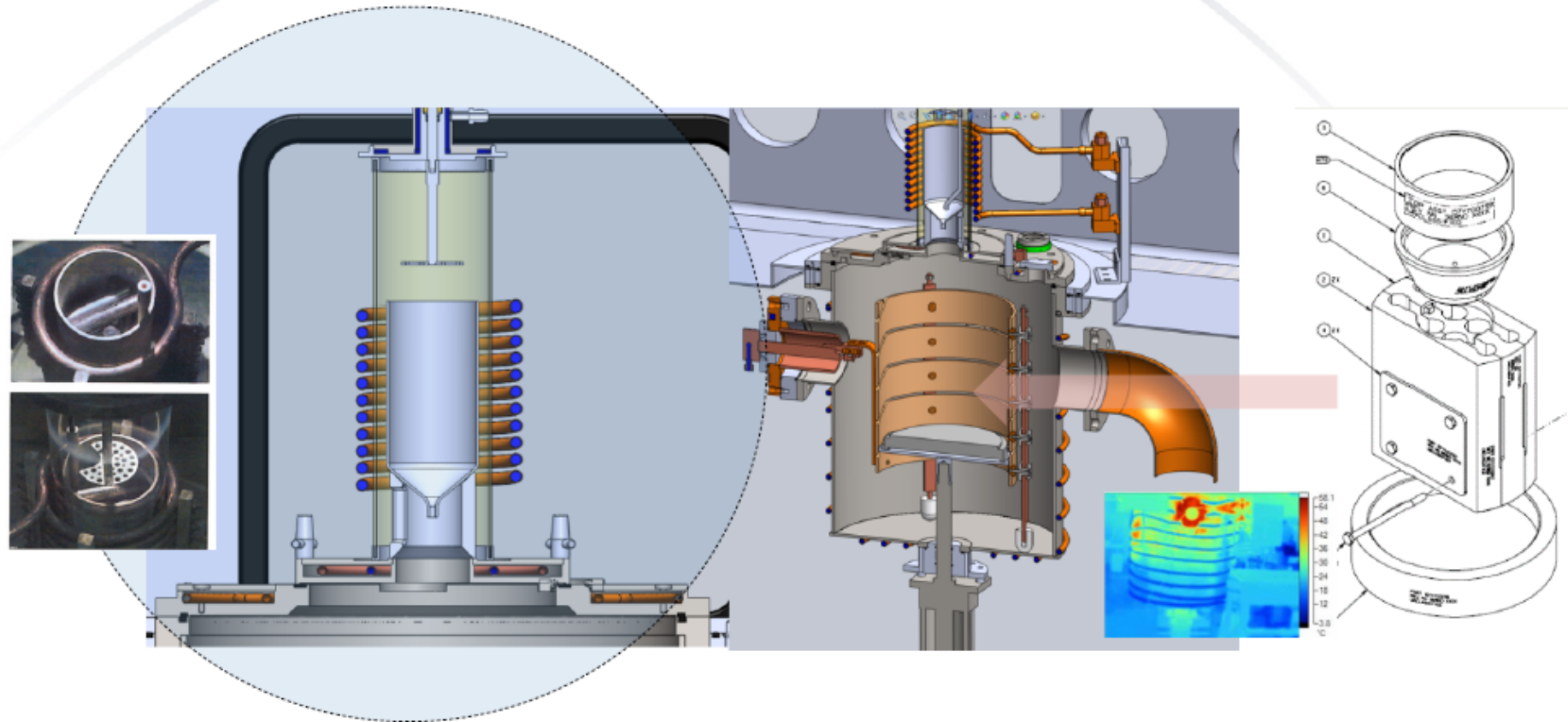
Bunkers in Zone 4, Pantex





Making pits: the environment

Pit Manufacturing (casting)



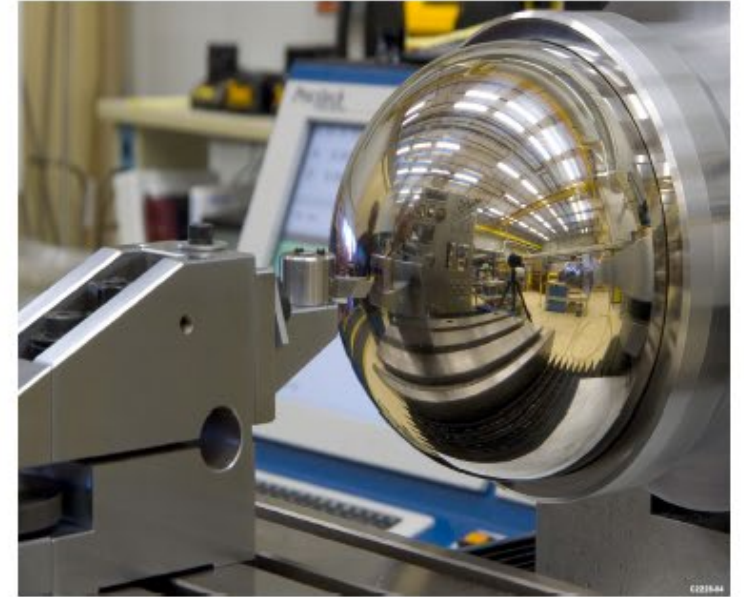
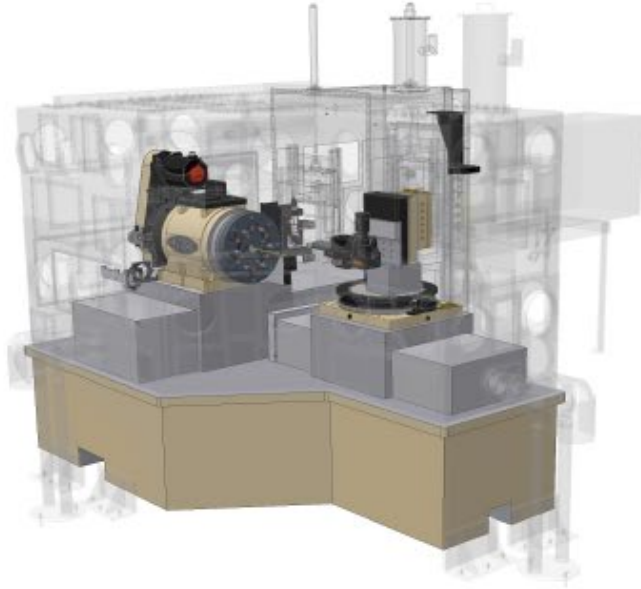
Upper Furnace

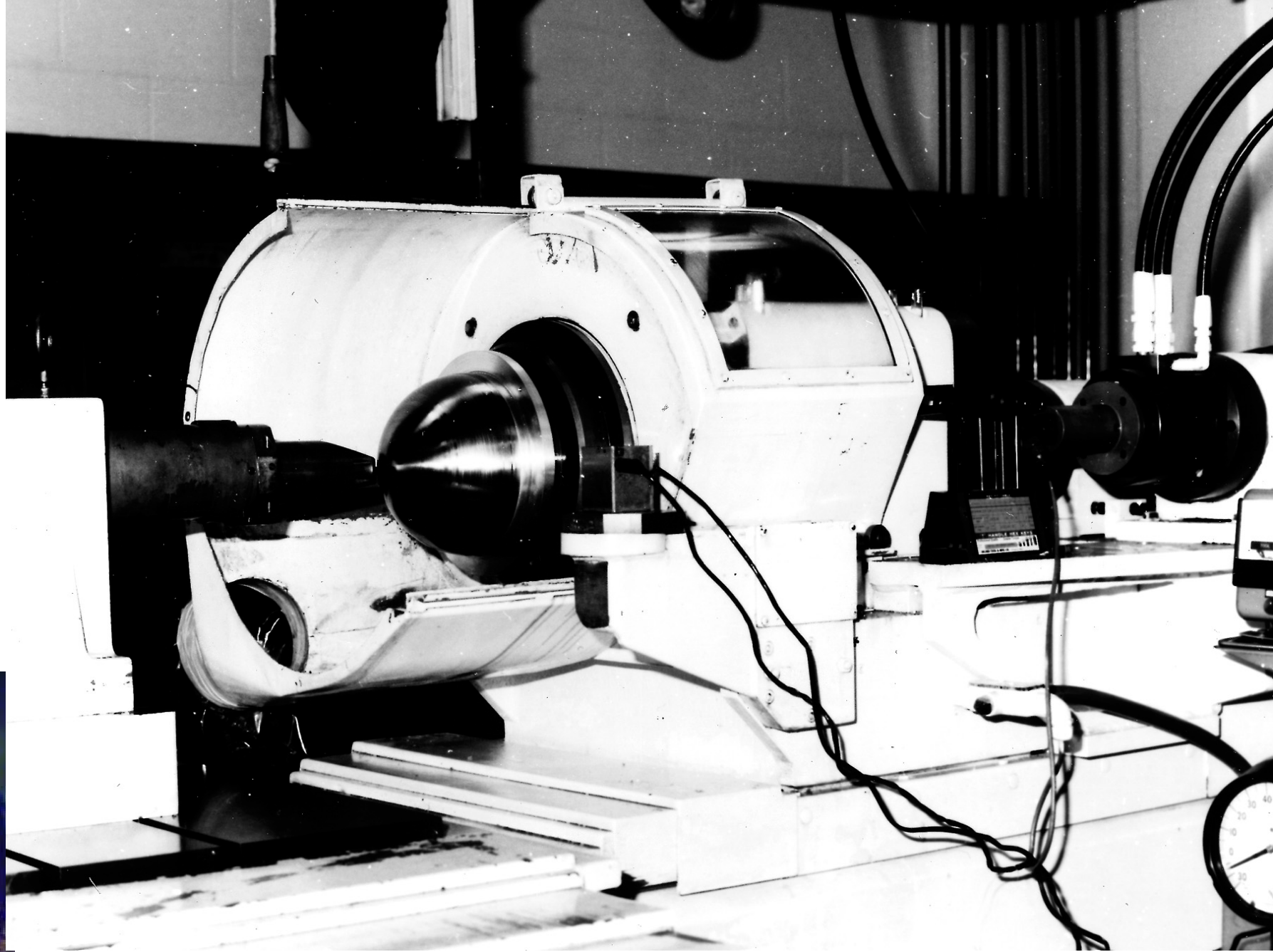
Lower Furnace

Casting Mold

UNCLASSIFIED

Pit Manufacturing (machining)







Los Alamos National Laboratory

UNCLASSIFIED



Please see <http://lasg.org/aerial-photos-2021/Apr-Jun2021.html> for detailed aerial photos of LANL's pit production facilities today.

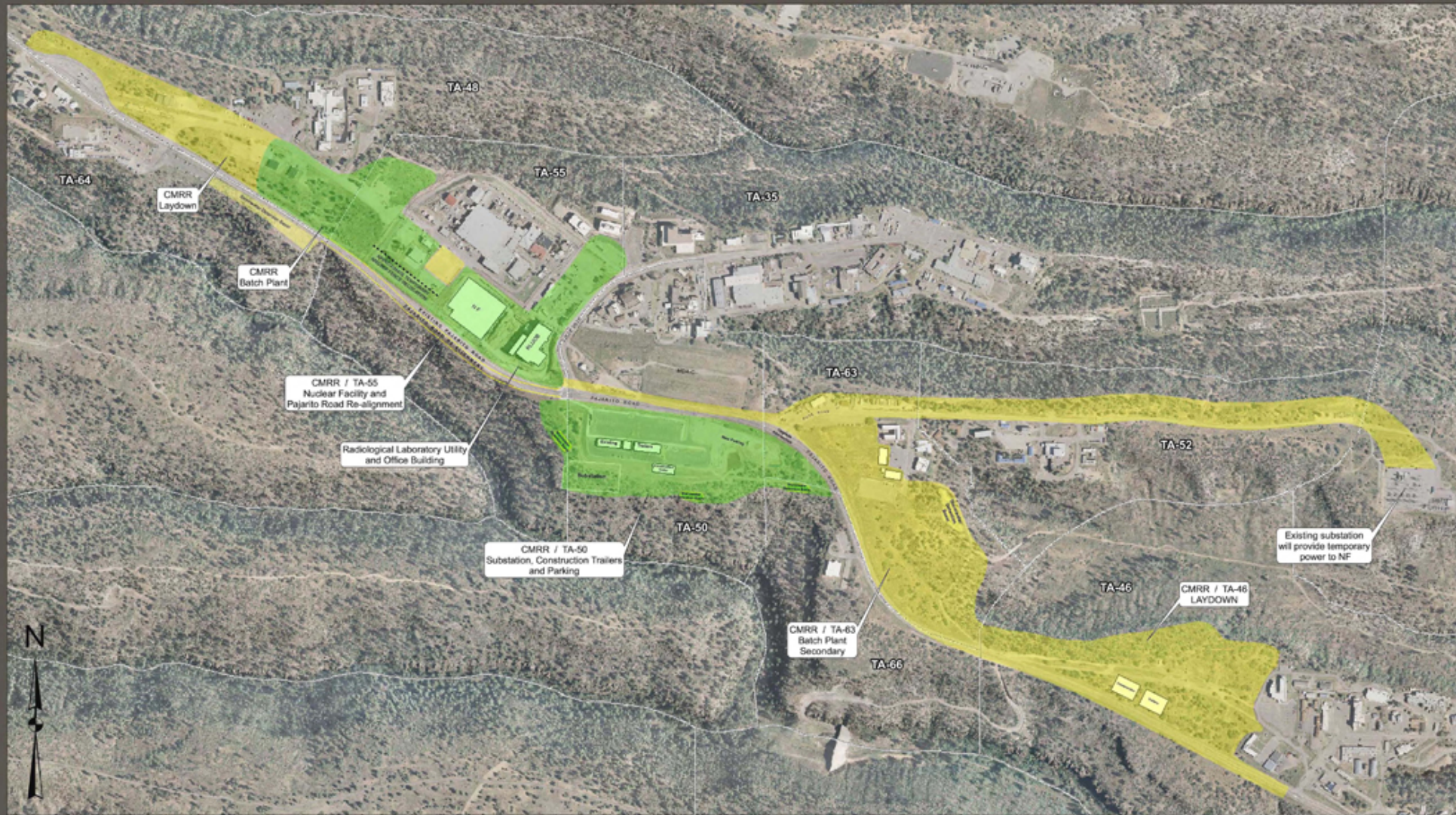
These are briefly discussed at <https://lasg.org/ActionAlerts/2021/Bulletin283.html>




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

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


Fanciful proposal for a pit factory at LANL, 2008. Half of this was a real project, most of which (CMRR-NF) was canceled due to LASG litigation and prior geologic acts of God.



This slide and next: what construction of a nuclear facility at TA-55 would entail, should it ever come back to that.




EST. 1943




LA-UR 10-07047

CMRR Nuclear Facility Project Overview

October 2010
Aerial Photography - September 2008



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Legend

- Proposed 2010/2011 SEIS Project Activities
- Previously Evaluated in 2003 EIS and 2005 SA
- Technical Area Boundary

PROJECTION: State Plane Coordinate System, New Mexico, Central Zone, U. S. Feet, DATUM NAD 83

SPECIAL DATA REFERENCES:
Aerial Photography: SPP/IR, September 2008
Roads, Facilities, EIS SE
©2008 by A. L. COAK, GIS Lab
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Site Planning & Project Initiation Group
Infrastructure Planning Office
LOS ALAMOS NATIONAL LABORATORY

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Pajarito Corridor Project Planning

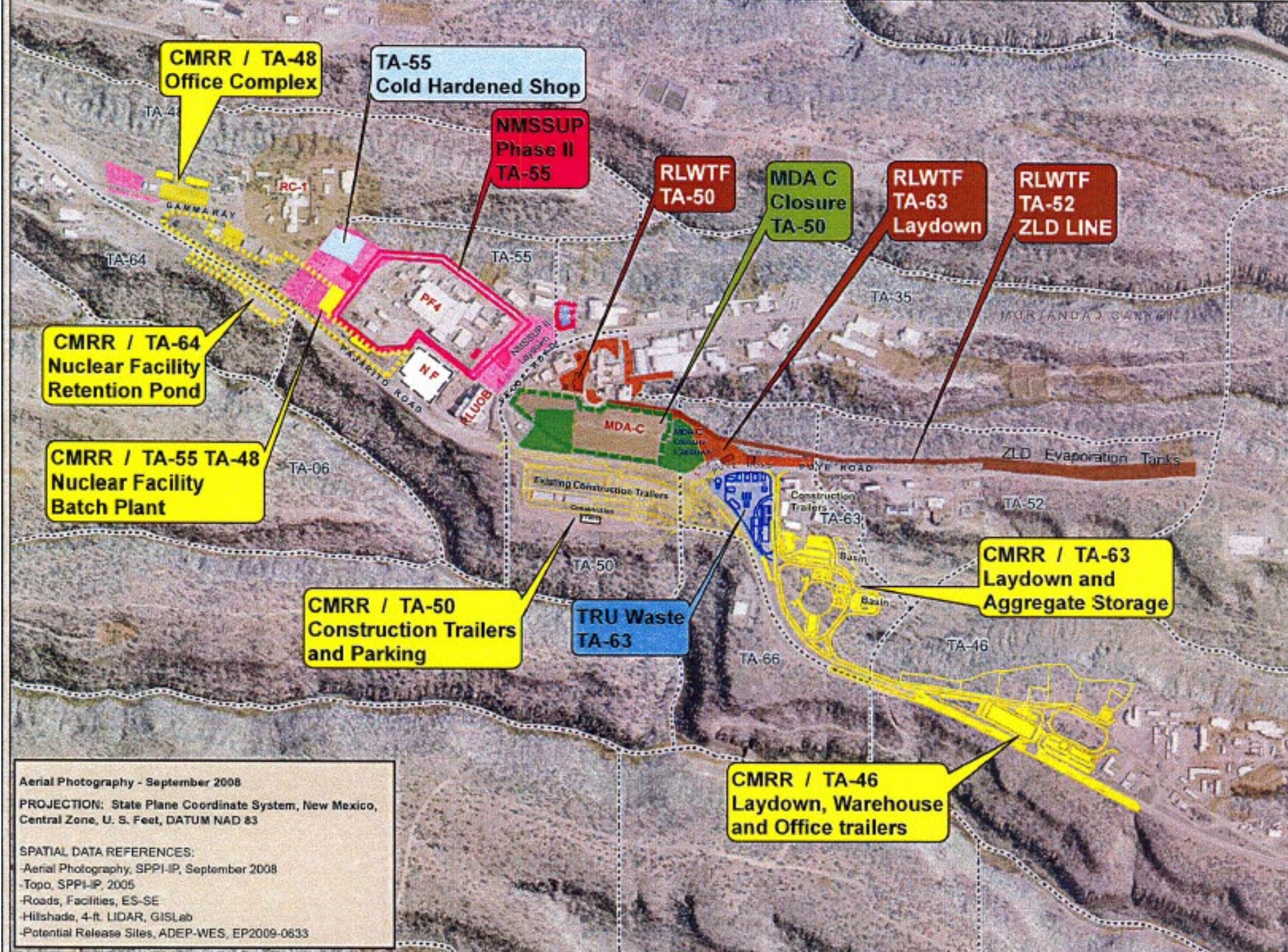
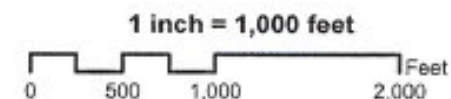
2010 - 2020

DRAFT

December 2, 2010

Legend

-  Potential Release Site
-  Technical Area Boundary



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



RLUOB: The most expensive construction project in the history of New Mexico (\$ 1.4 B, est. total cost)



Nuclear weapons manufacture with plutonium involves making transuranic and “low-level” waste. Four slides.

Photo:
LASG



**Area G pit,
November
2004, looking
west**





[2016:] Why pit production is important to us

- Would halt a major new warhead planned, end “3+2”, halt ALL new warheads not using existing pits
- Hugely symbolic, morale-crushing win
- Large environmental impacts and risks, legacy of permanent contamination
- If it proceeds, would permanently

Facts and conclusions (the most important slide in this presentation)

- ❑ **LANL alone cannot handle the pit production mission.**
 - LANL production is not stable, or adequate for any warhead's pits, or enduring. New LANL facilities would come late, at high cost, and with high risk.
 - LANL would need much larger capacity (NNSA: 140 ppy vs. 30 ppy) to compensate for this instability, and very large new investments to provide it. (LASG: LANL does not have a good location for that new facility, at any price.)

- ❑ Barring economic collapse, **the U.S. will continue investing each and every year in pit production capacity** deemed adequate and enduring by the Nuclear Weapons Council. Providing for zero or only a few new pits in the 2030s and 2040s is not just going to happen for the foreseeable future. After 2030 (or some similar date), all bets may be off.

- ❑ Planning and construction of a new pit facility will take at least 14 years. We are almost 3 years into SRS design. No other facility anywhere near the capability and safety of SRS could be brought on line in 11-14 years (NNSA: "by 2032-2035").

- ❑ Thus no site other besides LANL and SRS can produce pits in a timely fashion, except LLNL. Political considerations will prevent LLNL pit production.

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

- ❑ **The only policy decision available in pit production is whether investments in LANL pit production, to the tune of \$1 billion/year, will continue, or rather *how long they will continue.***

- ❑ In addition, the marginal cost of LANL pit production (two shifts) will always be several multiples of what it is for a much larger (single-shift) facility.

How we hope to create an “off-ramp” from proceeding with the extra pit plant at LANL:

- Primarily in DC, through research, education and lobbying
 - In the national security establishment
 - In Congress and its agencies
 - In NGOs
- In national news media
- With NM campaigns
 - Advertising
 - Direct outreach
 - Protest and resistance
 - News media
- In the courts?

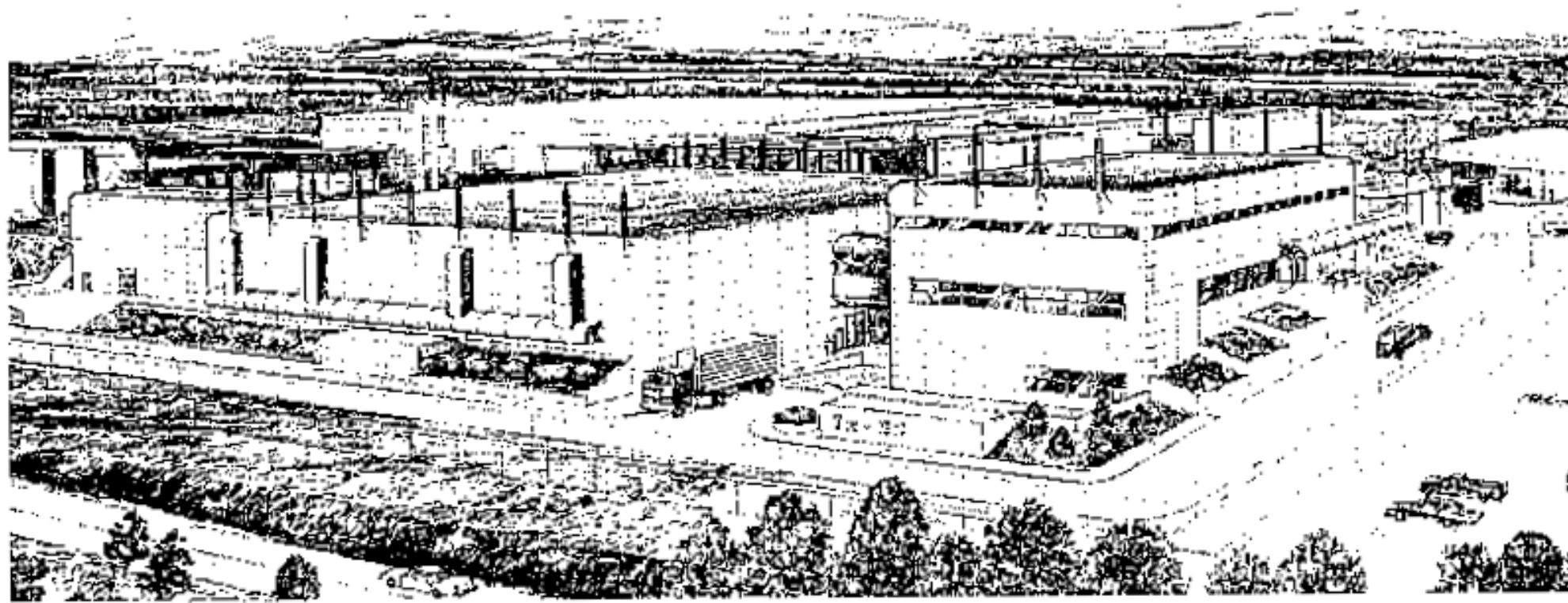
[from 2016:] CMRR Project (to finish FY2024*,
\$2.877B)

- RLUOB: finished (CD-4) FY10; \$199M spent
- CMRR Nuclear Facility: canceled FY14; \$495M spent
- RLUOB Equip. Install. (REI): finished FY13; \$197M spent
- REI Phase 2 (REI2); began (CD-1) FY14, ends FY20; \$675M
- PF-4 Equip. Install. Ph. 1 (PEI1): began FY14, ends FY20; \$315M
- PF-4 E.I. Ph. 2 (PEI2): began FY14, ends FY2024; \$685M
- RLUOB Re-categorization to Hazard Category 3 (RC3): to begin FY2017, ends FY2024; \$365M
- RLUOB to cost \$199+197+675+365 M = \$1.436 B

*[5 years later CMRR is slated to finish...5 years later. \$300M original cost,



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



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

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

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