The Status of US National Laboratories

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The view from within the nuclear weapons complex

"Our nuclear deterrent is nearing a crossroads. To date, we have preserved this deterrent by extending the lifespan of legacy nuclear forces and infrastructure—in many cases for decades beyond what was originally intended. But these systems will not remain viable indefinitely. In fact, we are now at a point where we must concurrently modernize the entire nuclear triad and the infrastructure that enables its effectiveness."
- General Paul Selva, USAF (Ret.), Former Vice Chairman of the Joint Chiefs of Staff, 2017

The US belief that modernization is required is driven by perceived competition with nuclear peers and domestic pressures

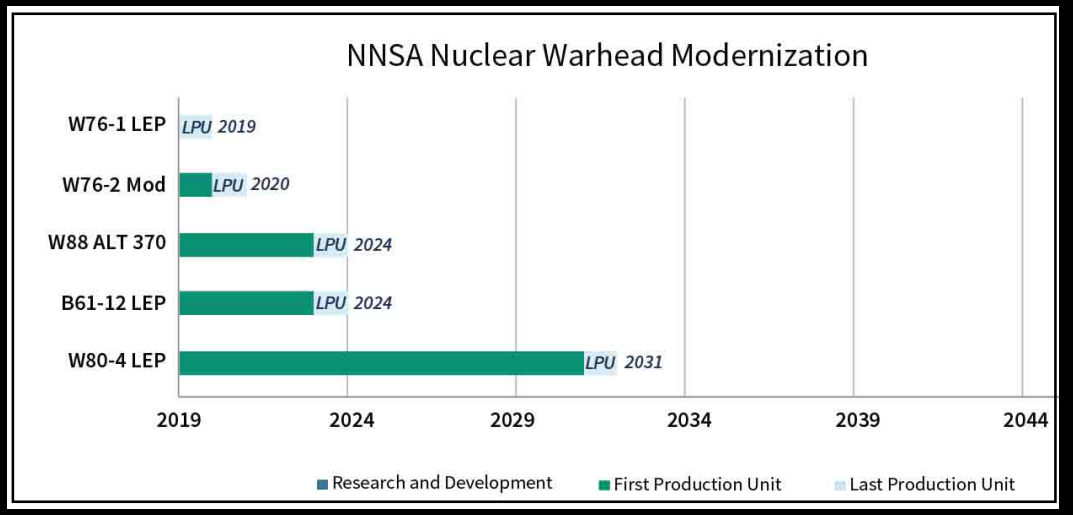



US Dept of Energy laboratories play a key role in stockpile management and are therefore expanding accordingly

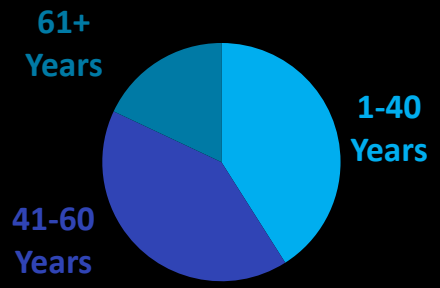
Images: Wikimedia

The view from outside the complex reveals a different view

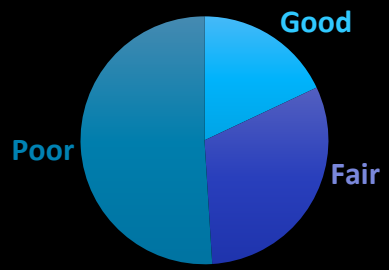
Much of the stockpile is already being renewed whereas the National Nuclear Security Administration (NNSA) has a difficult history delivering major projects and faces challenges to infrastructure and workforce.



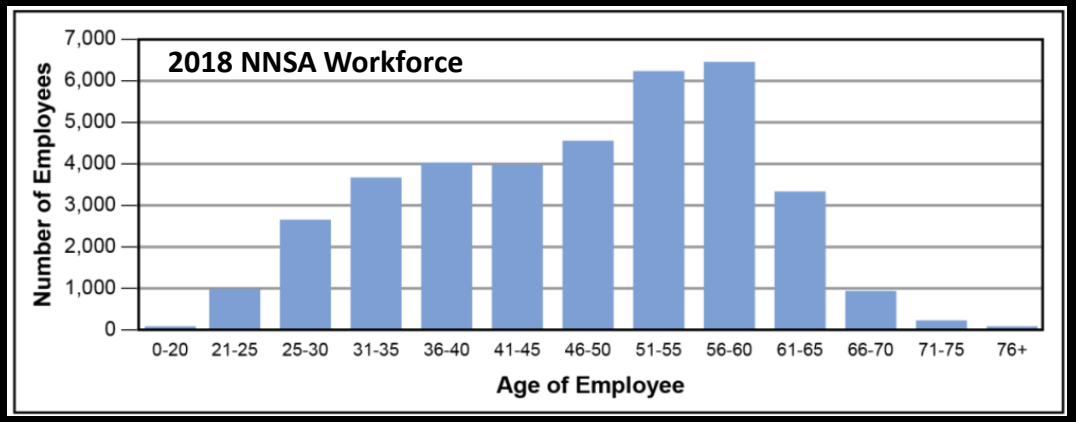
AGE OF INFRASTRUCTURE



CONDITION OF INFRASTRUCTURE



Per NNSA Office of Safety, Infrastructure and Operations, May 2021.

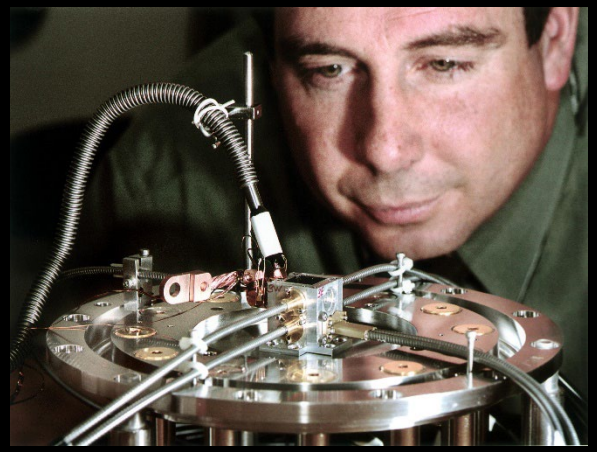


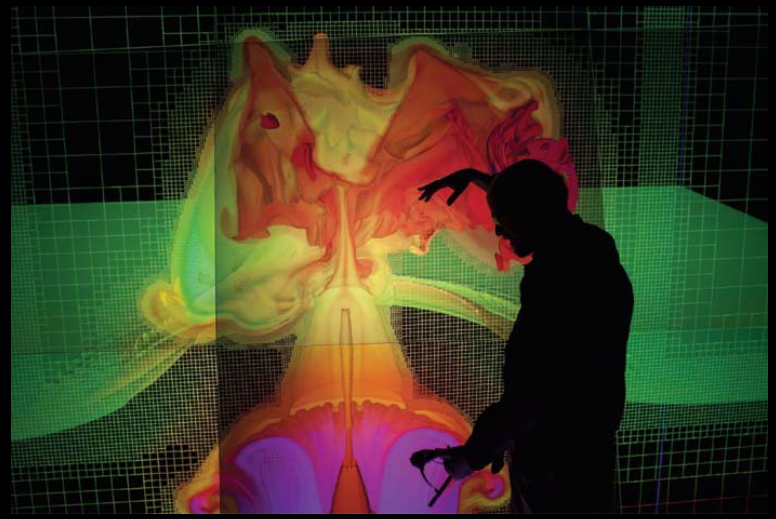
Images: NNSA 2018 SSMP, CSIS

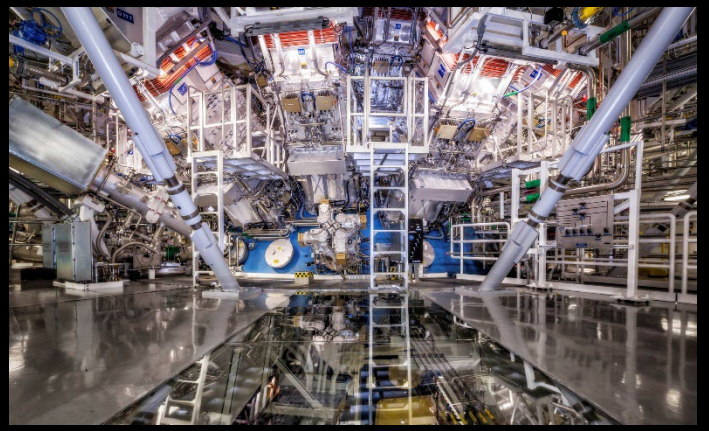
A Shift in Purpose Across the Nuclear Complex

A tradition of “science-based stockpile stewardship” has progressively given way to modernization and design alteration of warheads

The temptation is to incorporate newly developed capabilities in modeling, design, and manufacturing to enhance not only safety and security, but also performance.







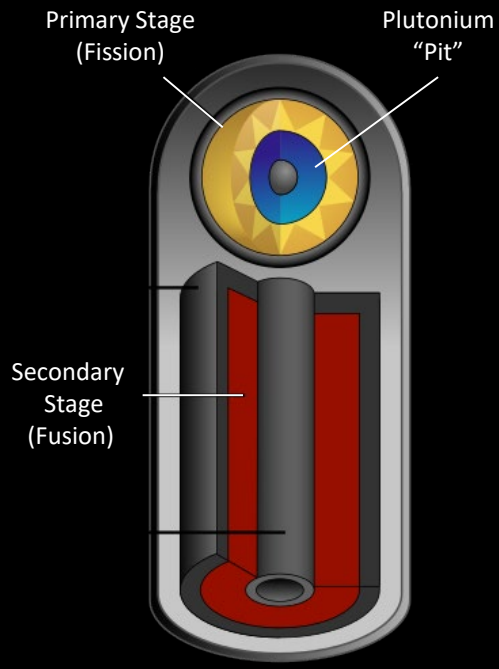
Images: Wikimedia, LLNL

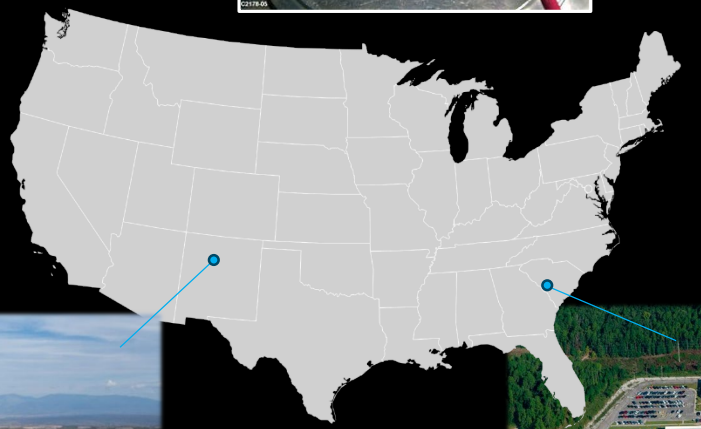
Remanufacture of Plutonium Bomb Cores (“Pits”)

The United States has not manufactured plutonium bomb cores (pits) in large number since 1989.

US is pursuing a plan to prepare two facilities to produce 80 pits/year

Pit production is set to be NNSA’s largest investment in weapons infrastructure to date ($18-24 billion through 2027 alone per GAO)





Images: Wikimedia, LANL, SC High Flyer

Facilities Face Difficulties

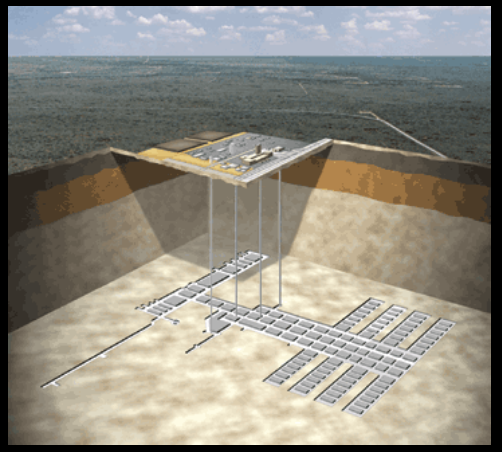
Los Alamos PF-4 facility is 45 years old and supports several additional missions, poor safety record, potentially lacking safety systems

Savannah River Site was not built for this purpose. Engineering retrofit is challenging

Waste Isolation Pilot Plant (WIPP) faces permitting and potential capacity issues. Potential single-source point of failure for production enterprise.

Los Alamos PF-4 facility, NM

Savannah River Site, SC



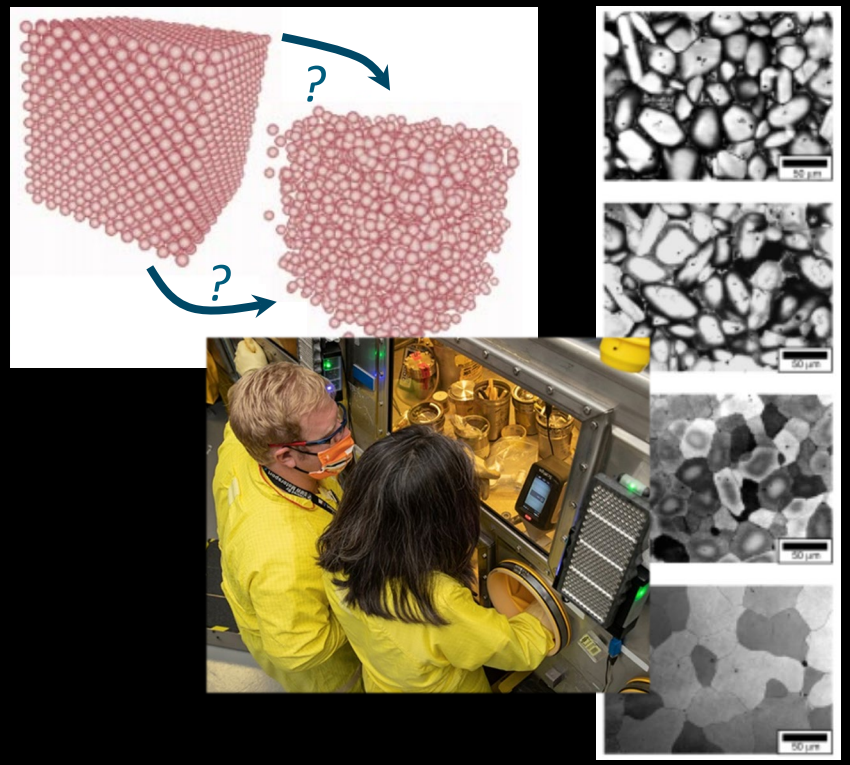
WIPP, Carlsbad, NM

Images: LANL, SC High Flyer, NNSA

Do we need new pits to maintain the stockpile?

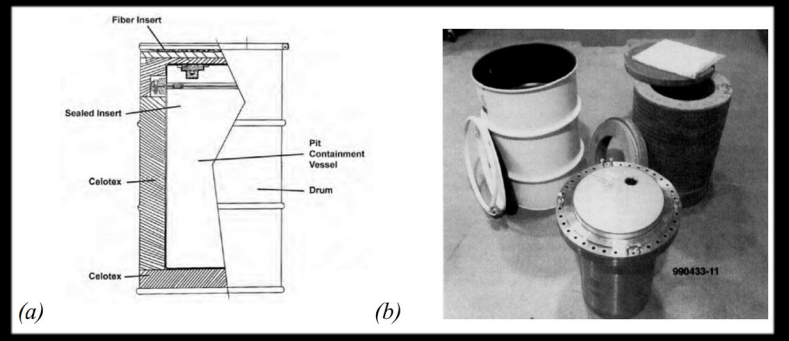
Aging of plutonium?

Plutonium pits are expected to have a life of at least ~85-100 years *(JASON Committee, 2006; LLNL Science & Technology Review, 2012; UCS Report in progress)*



Re-use of existing pits?

The US has thousands of excess pits that are 30-50 years old, many of which could be re-used



Images: LANL, DNFSB

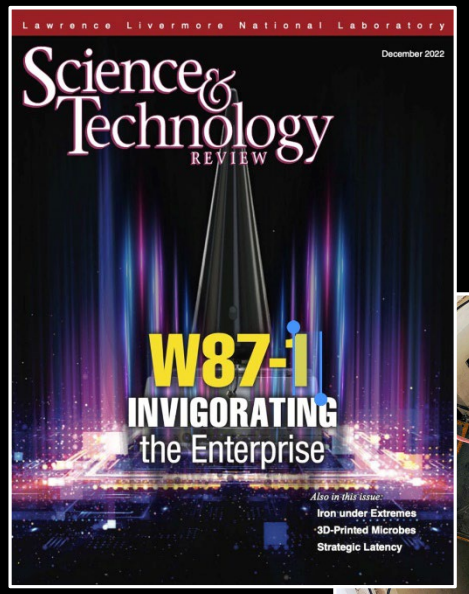
First New Warhead Designs: W87-1 and W93

The first ~10 years of new pit production would support manufacture of new warhead designs (the first to enter the stockpile since the end of the cold war)

These are closely related to the previously cancelled ‘Interoperable Warheads’, IW-1 and IW-2

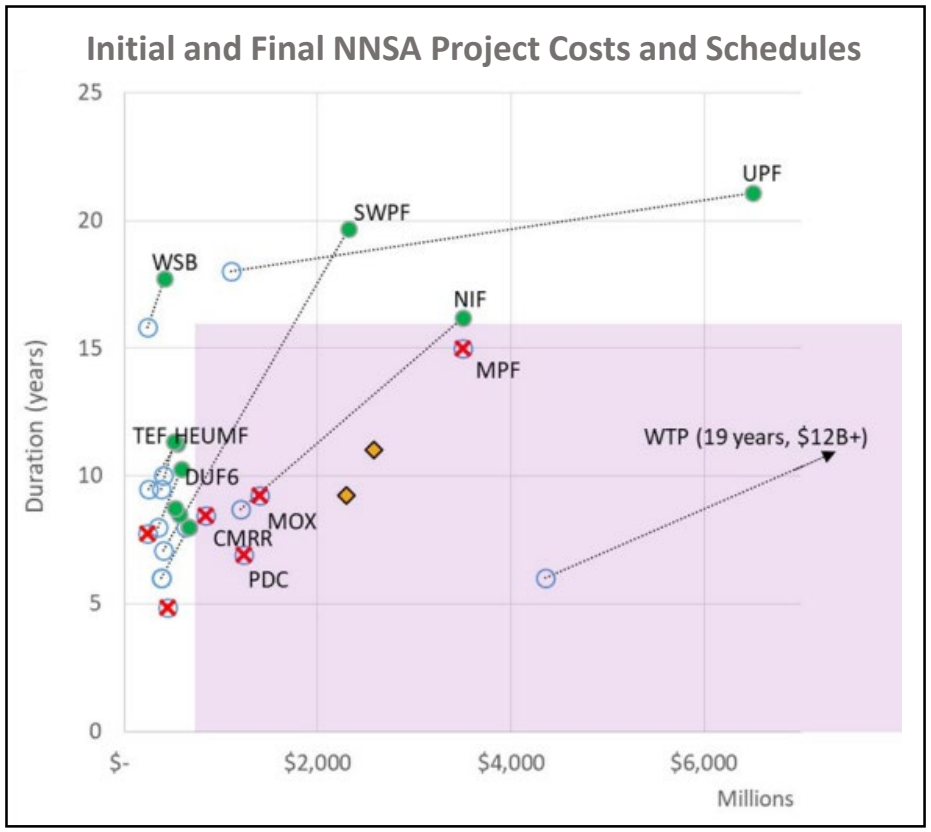
Pits are expected to be slight modifications to tested designs, potentially precluding re-use

Close cooperation with British Atomic Weapons Establishment (AWE) on W93



Images: LLNL, USN, USAF

Costs and Schedule Show Challenges



As of March 2023, NNSA's major projects collectively exceeded their cost estimates by over $2 billion. They also surpassed their collective schedules by almost 10 years *(GAO-23-104402)*

NNSA does not have a comprehensive schedule or cost estimate for pit production capability *(GAO-23-104661)*

NNSA acknowledges they will not meet statutory requirement for 80 pits/year by 2030

Sources: GAO-23-104661, IDA NS D-10711

Other Domestic Drivers for Nuclear Expansion

Sandia Natl. Lab

National Technology & Engineering Solutions of Sandia, LLC

Honeywell

NORTHROP GRUMMAN

Los Alamos Natl. Lab

Triad National Security LLC

BATTELLE

UNIVERSITY OF CALIFORNIA

THE TEXAS A&M UNIVERSITY SYSTEM

Lawrence Livermore

Lawrence Livermore National Security, LLC

BECHTEL

BWXT BWX Technologies, Inc.

amentum

UNIVERSITY OF CALIFORNIA

America's top 5 weapons contractors made $196B in 2022

Half of the world's 20 biggest arms makers are based in the US, according to a new ranking from Defense News.

Competition between the laboratories to maintain unique 'flagship' capabilities

Since 2005, labs have been run by contractor groups, changing cost and incentive structure

Lobbying by state governments to attract jobs

Sources: Wikimedia, Contractor sites

{ Thank You

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