

Realism, Risk, and Resilience: Assessing the U.S. Plutonium Strategy

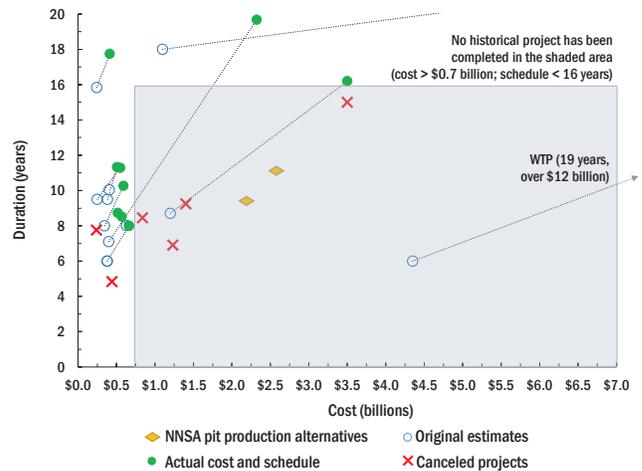
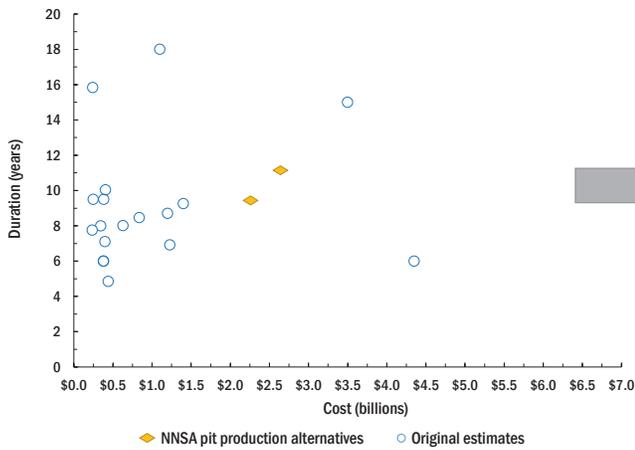
U.S. nuclear weapons and the associated infrastructure are undergoing extensive modernization. Included in this modernization effort are plutonium pits, the implosive cores of nuclear weapons. The 2018 Nuclear Posture Review stated that the Department of Defense (DoD) requires the National Nuclear Security Administration (NNSA) “to produce at least 80 plutonium pits per year [ppy] by 2030.” DoD and NNSA have proposed an approach that involves splitting pit production between two Department of Energy (DOE) sites—the Savannah River Site in South Carolina and Los Alamos National Laboratory (LANL) in New Mexico.

DoD and NNSA asked IDA to perform a congressionally mandated independent assessment of the NNSA’s plutonium strategy, including the decision to split production between two sites. IDA found that:

1. Eventually achieving a pit production rate of 80 ppy is possible for all options considered, but will be extremely challenging.
2. No available option can be expected to provide 80 ppy by 2030.

DOE historical data make it clear that difficulties are expected in a project of this scale. In fact, IDA’s analysis of past DOE projects found no historical precedent of project success on the timelines and budgets currently forecasted. The figure on the next page depicts the historical challenges for large DOE projects by showing first (on the left) the original estimates and then (on the right) the outcomes.

(continued)



DOE Projects Included

- 12-64 Production Bays Upgrade
- Chemistry & Metallurgy Research Facility Replacement (CMRR)
- Depleted Uranium Hexafluoride (DUF6) Conversion—Portsmouth and Paducah
- Highly Enriched Uranium Materials Facility, Building 9720-82 (HEUMF)
- Los Alamos Neutron Science Center Refurbishment (LANSCE-R)
- Microsystems and Engineering Sciences Applications
- Mixed Oxide Fuel Fabrication Facility (MOX)
- National Ignition Facility (NIF)
- Nuclear Materials Safeguards and Security Upgrades Project (NMSSUP) Phase II
- Pit Disassembly and Conversion (PDC)
- Salt Waste Processing Facility (SWPF)
- Seversk Plutonium Production Elimination Program
- Tritium Extraction Facility (TEF)
- Uranium Processing Facility (UPF)
- Waste Solidification Building (WSB)
- Waste Treatment and Immobilization Plant (WTP)
- Zheleznogorsk Plutonium Production-Elimination Program

IDA judged that pursuing a more aggressive schedule would create major risk to the modernization effort. A key milestone will be producing 30 ppy at LANL by 2026. Successfully demonstrating a pit production capability at this scale would greatly increase confidence in the ability to produce 80 ppy at some point in the future.

Eventual success of the effort to recapitalize plutonium pit production is far from certain. Careful, skilled management and consistent, focused leadership will be necessary if this effort is to succeed where many previous projects have failed.



David E. Hunter (dhunter@ida.org), Director of the Cost Analysis and Research Division in IDA's Systems and Analyses Center. For this project, David led a team that included Deputy Project Leader **Rhiannon T. Hutton** (rhutton@ida.org), a member of the research staff in the System Evaluation Division, and others.

Based on IDA Document **NS D-10711**, *Independent Assessment of the Two-Site Pit Production Decision: Executive Summary*, D. E. Hunter, R. T. Hutton, M. Breen, P. F. Bronson, W. A. Chambers, G. A. Davis, D. S. Disraelly, et al., May 2019.