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**Pits 101: The four types of nuclear weapons modernization activities**
*Where the pit mission fits into delivering a safe, secure and reliable deterrent*


We learned why we don't need plutonium to make new pits in an earlier edition of Pits 101, but why do we need new pits from a national security standpoint? A plutonium pit, or the core of a nuclear weapon, is like a weapon's battery. The pits that Los Alamos will make in coming years will be like new batteries for nuclear weapons in the existing stockpile.

Pit production is mandated in order to meet Department of Defense (DOD) requirements by our primary customer, the National Nuclear Security Administration (NNSA), which is a semi-autonomous agency within the Department of Energy. NNSA's mission is to "deliver safe, secure, reliable warheads for an effective nuclear deterrent." As Marv Adams, head of NNSA Defense Programs, describes, it's a mission that is simple to state, but challenging to deliver.

**A changing global environment**

Nuclear weapon production and refurbishment slowed significantly after the Cold War. Since 1992, the number of nuclear weapons in the stockpile has decreased by more than 9,950. According to a recent NNSA report, the active stockpile contained 3,750 weapons as of September 2020. Over that time of decreasing weapons in the stockpile, there hasn't been a need to make new ones – we have relied on a strategy of limited warhead life extensions to assure they remain safe and reliable. We will continue to extend the life of some systems, but also design and produce new ones.

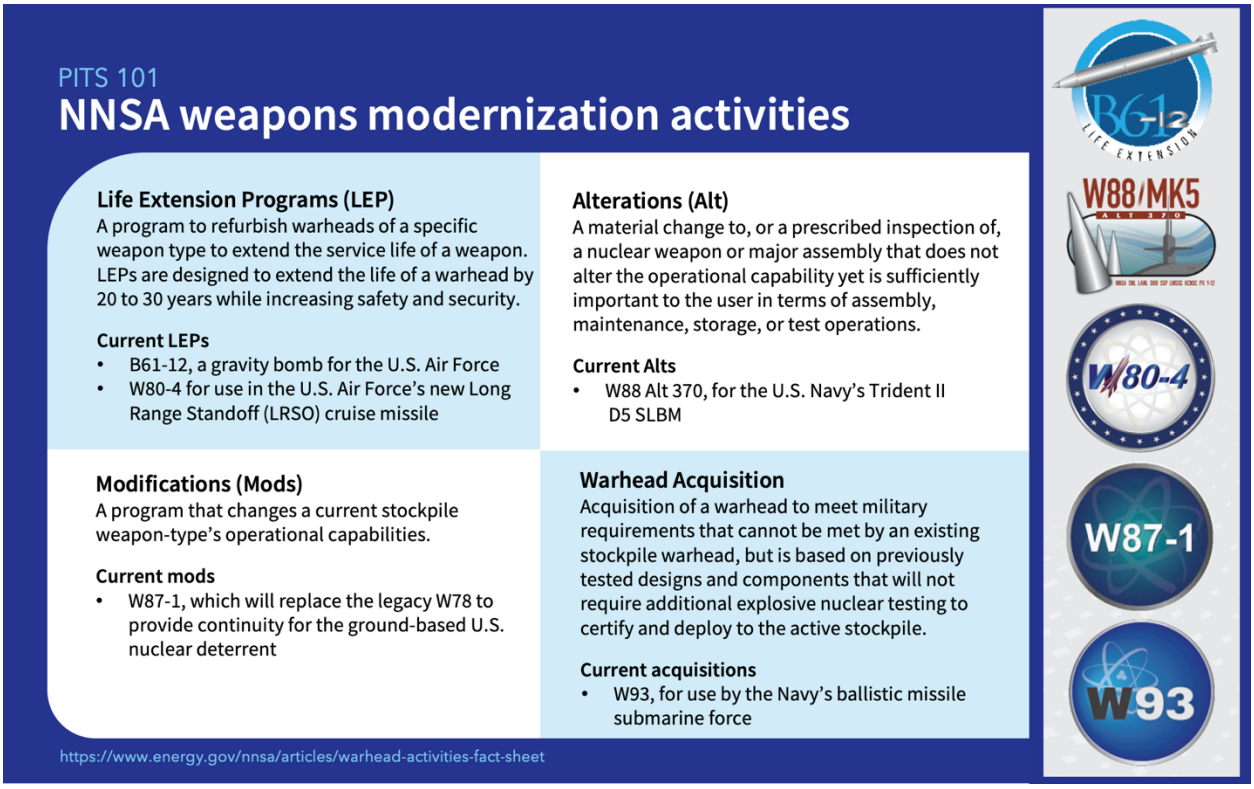
To that end, the plutonium pit mission at LANL is one of the activities that ensures a safe, secure and reliable nuclear weapon stockpile. As experts here at LANL and

across the country study topics such as plutonium pit aging, the global nuclear powers are shifting. The world looks very different than it did at the time the U.S. last churned out new nuclear weapons. NNSA administrator Jill Hruby described this in her remarks at the 2023 Nuclear Deterrence Summit: "The American people are hearing more about nuclear issues than at any time since the Cuban Missile Crisis or the collapse of the Soviet Union. In both the military and civilian world, nuclear is in the middle of a renaissance."

**Sustainable and strategic deterrence**

The pit mission is a major part of NNSA's modernization efforts to maintain sustainable, strategic deterrence amidst that renaissance. Modernization efforts address aging weapon parts, unavailability of replacement parts, and integration with DOD's modernized nuclear weapons delivery systems (such as modification to support military requirements). Pits made at LANL in coming years will support the Life Extension Program for the W87-1 warhead.

A Life Extension Program (LEP) is one of the four types of NNSA modernization activities:




LANL plays a key role in almost all of these modernization efforts, as the design agency on the B61, W88, and W93 and as the sole producer of plutonium pits for all systems. We work closely in collaboration with our partners across the nuclear enterprise on these systems, including Lawrence Livermore National Laboratory, which is the lead on the W80, and W87.

As the global security environment changes, the plutonium pit mission is one way that we are ensuring our nuclear stockpile will change to meet those new challenges.

**Pit production words to know**
(sidebar like in this article: https://int.lanl.gov/news/news_stories/2023/february/0208-pits-101.shtml)

- Modernization: NNSA activities to ensure that the U.S. nuclear weapons stockpile continues to meet Department of Defense (DoD) requirements while enhancing safety and security; address aging, unavailability of replacement parts, and integration with DOD's modernized nuclear weapons delivery systems without providing new military capabilities or the need for underground nuclear testing.
- Warheads: Weapons that are launched on missiles; have a "W" in their name
- Bombs: Weapons that are dropped from aircraft; have a "B" in their name
- Nuclear stockpile: Both active and inactive warheads held by the United States. Active warheads include strategic and nonstrategic weapons maintained in an operational, ready-for-use configuration; warheads that must be ready for possible deployment within a short timeframe; and logistics spares.
- War reserve: A collection of warfighting material held in reserve in pre-positioned storage to be used if needed in wartime.