



High Explosives Research and Development

What is High Explosives (HE) Research and Development (R&D)?

High explosives (HE) are used in nuclear weapon primaries to provide the energy needed for a modern nuclear weapon to function. HE is also used to actuate non-nuclear components and to enable in the hydrodynamic, dynamic, and sub-critical experiments required by the Stockpile Stewardship Program. Within the weapons complex, HE R&D focuses on a wide variety of areas including: new material development, engineering, and performance; safety and surety; vulnerability aging; diagnostics; enhanced surveillance, modeling and simulation; and compatibility testing.

Why is HE R&D needed?

HE R&D supports the NNSA mission to assure that nuclear weapons continue to be safe and reliable. It is required to assure stability and dependability of high explosives in nuclear weapons. HE R&D is required to support the improved predictive capability for performance, safety, and aging. HE R&D utilizes experiments with computer modeling and simulation to enhance the understanding of how HE and HE components work and to decrease the amount of testing required in development.



Where does NNSA currently conduct HE R&D?

HE R&D is currently conducted at five sites within the weapons complex. Los Alamos National Laboratory and Lawrence Livermore National Laboratory are where most of the R&D related to main charge explosives is performed. Los Alamos also performs HE R&D related to their detonator production role in the Complex. Sandia National Laboratories focus on smaller devices (non-nuclear components) actuated using explosives such as: gas generators, igniters, actuators, pyrotechnics, and propellants. HE R&D is conducted at the Pantex Plant, principally for safety and quality control purposes associated with HE manufacturing operations. Nevada Test Site (NTS) does not currently have an independent HE R&D program, but utilizes specific capabilities at various facilities to conduct testing with large quantities of HE.

What are the alternatives NNSA is evaluating for HE R&D?

Three alternatives are evaluated in the Complex Transformation SPEIS. The first alternative is the No Action Alternative, which evaluates continued operations at all sites. The Minor Consolidation Alternative evaluates multiple options to consolidate or transfer some operations but would continue operations at all sites. The Major Consolidation Alternative evaluates multiple options to consolidate or transfer operations to fewer sites, and discontinue operations at sites that transfer missions. NNSA's preferred alternative is to consolidate HE R&D operations in place and eliminate duplicative operations (Minor Consolidation Alternative).

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