



Tritium Research and Development

What is Tritium Research and Development (R&D)?

Tritium, a radioactive isotope of hydrogen, is an essential component of every warhead in the U.S. nuclear weapons stockpile. Tritium is used in nuclear weapons to boost the yield of warheads by releasing energy through fusion with deuterium. Because nuclear warheads depend on tritium to perform as designed, an understanding of the properties of tritium is essential, hence the existence of tritium R&D. Within the nuclear weapons complex, tritium R&D involves activities such as: storage, purification, separation, engineering and physics performance, aging, analysis of surveillance data, diagnostics, enhanced surveillance, modeling and simulation, and compatibility testing.

Why is Tritium R&D needed?

Tritium R&D supports the NNSA laboratories' science-based stockpile stewardship missions to assure that nuclear weapons continue to be safe and reliable. Tritium R&D supports the improved predictive capability for performance, safety, and aging.



Where does NNSA currently conduct Tritium R&D?

Tritium R&D is primarily conducted at the two nuclear design laboratories (Los Alamos National Laboratory and Lawrence Livermore National Laboratory), and at the Savannah River Site, where most of the large quantity tritium operations for the stockpile are performed. Tritium operations at Sandia National Laboratories/New Mexico (SNL/NM) are primarily associated with the Neutron Generator Production Facility (NGPF), which produces and manufactures neutron generators used in nuclear weapons. The Sandia operations would be unaffected by the alternatives in the Transformation SPEIS.

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

The No Action Alternative evaluates continued Tritium R&D operations at LLNL, LANL, SRS, and SNL/NM. The Consolidate Tritium R&D at SRS Alternative evaluates moving tritium gas transfer system R&D support from LLNL¹ and LANL to SRS. The Consolidate Tritium at LANL Alternative evaluates moving tritium gas transfer system R&D support from LLNL¹ to LANL. The Reduce Tritium R&D in Place Alternative evaluates reducing operations at all sites by identifying and eliminating unneeded and redundant capabilities. NNSA's preferred alternative is to consolidate Tritium R&D at SRS.

¹ does not include National Ignition Facility (NIF) target R&D and filling NIF targets.

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