



Highlights of [GAO-11-100](#), a report to the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives

Why GAO Did This Study

The National Nuclear Security Administration's (NNSA) Tritium Readiness Program aims to establish an assured domestic source of tritium—a key isotope used in nuclear weapons—in order to maintain the U.S. nuclear weapons stockpile. Because tritium decays at a rate of 5.5 percent annually, it must be periodically replenished in the stockpile. However, since 2003, NNSA's efforts to produce tritium have been hampered by technical challenges. In this context, GAO was asked to (1) determine the extent to which NNSA has been able to overcome technical challenges producing tritium, (2) determine the extent to which NNSA is able to meet current and future nuclear weapons stockpile requirements for tritium, and (3) assess the management of NNSA's Tritium Readiness Program. To do this, GAO visited facilities involved in tritium production and reviewed tritium requirements established by NNSA and the Department of Defense, among other things.

What GAO Recommends

GAO recommends that NNSA develop a plan to manage tritium releases from reactors, analyze alternatives to its current tritium production strategy, ensure its contracting complies with appropriate contracting procedures, and ensure its future budget requests account for the program's large unexpended balances. NNSA generally agreed with our recommendations.

View [GAO-11-100](#) or [key components](#). For more information, contact Gene Aloise at (202) 512-3841 or aloisee@gao.gov.

NUCLEAR WEAPONS

National Nuclear Security Administration Needs to Ensure Continued Availability of Tritium for the Weapons Stockpile

What GAO Found

NNSA has been unable to overcome the technical challenges it has experienced producing tritium. To produce tritium, stainless steel rods containing lithium aluminate and zirconium—called tritium-producing burnable absorber rods (TPBAR)—are irradiated in the Tennessee Valley Authority's (TVA) Watts Bar 1 commercial nuclear power reactor. Despite redesigns of several components within the TPBARs, tritium is still leaking—or “permeating”—out of the TPBARs into the reactor's coolant water at higher-than-expected rates. Because the quantities of tritium in the reactor coolant are approaching regulatory limits, TVA has been significantly restricting the number of TPBARs that it will allow NNSA to irradiate in each 18-month reactor fueling cycle, and, consequently, NNSA has not been producing as much tritium as it planned. NNSA and TVA officials are continuing to develop plans to increase the number of TPBARs that will be irradiated, as well as, if necessary, the number of reactors participating in the program. However, these plans have not been coordinated with the Nuclear Regulatory Commission (NRC), which ultimately must approve any changes to the operation of the TVA reactors.

NNSA currently meets the nuclear weapons stockpile requirements for tritium, but its ability to do so in the future is in doubt. NNSA officials told us that they will be able to meet future requirements through a combination of harvesting tritium obtained from dismantled nuclear warheads and irradiating TPBARs. Although the number of nuclear weapons in the U.S. stockpile is decreasing, these reductions are unlikely to result in a significant decrease of tritium requirements and will not eliminate the need for a reliable source of new tritium because of the need to periodically replenish it in the remaining nuclear weapons stockpile due to tritium's decay. While NNSA has not, to date, been required to use tritium from a reserve that it maintains, use of this reserve in the relatively near future may be necessary if NNSA is unable to increase tritium production beyond its current level.

Although NNSA has attempted to ensure a reliable long-term supply of tritium, GAO's review found two problems with NNSA's management of the Tritium Readiness Program. First, NNSA could not provide us with evidence that it adhered to the appropriate contracting procedures when purchasing components and services for the program. Second, due to, among other things, the way the program's contracts with its suppliers are structured, the program is spending its funds more slowly than planned and is accumulating large unexpended balances. The program is subject to thresholds established by the Department of Energy of acceptable levels of unexpended funds that may be carried over from one fiscal year to the next. However, the program exceeded these thresholds by more than \$48 million in 2008 and by more than \$39 million in 2009. While large unexpended balances are not necessarily an indication that the program is being mismanaged, it does indicate that the program is requesting more funding than it needs on an annual basis—funds that could be appropriated for other purposes.