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NUCLEAR WEAPONS

NNSA Needs to Refine and More Effectively Manage Its New Approach for Assessing and Certifying Nuclear Weapons

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Highlights

Highlights of GAO-06-261, a report to the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives

Why GAO Did This Study

In 1992, the United States began a unilateral moratorium on the testing of nuclear weapons. To compensate for the lack of testing, the Department of Energy's National Nuclear Security Administration (NNSA) developed the Stockpile Stewardship Program to assess and certify the safety and reliability of the nation's nuclear stockpile without nuclear testing. In 2001, NNSA's weapons laboratories began developing what is intended to be a common framework for a new methodology for assessing and certifying the safety and reliability of the nuclear stockpile without nuclear testing. GAO was asked to evaluate (1) the new methodology NNSA is developing and (2) NNSA's management of the implementation of this new methodology.

What GAO Recommends

GAO is making five recommendations to the Administrator of NNSA to (1) ensure that the three laboratories have an agreed-upon technical approach for implementing QMU and (2) improve NNSA's management of the development and implementation of QMU.

While NNSA raised concerns with some of GAO's recommendations, it agreed that it needed to better manage QMU's development and implementation. NNSA also said that GAO had not given it credit for its success in implementing QMU. GAO clarified its report to address NNSA's concerns.

www.gao.gov/cgi-bin/getrpt?GAO-06-261.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Gene Aloise at (202) 512-3841 or aloisee@gao.gov.

What GAO Found

NNSA has endorsed the use of the "quantification of margins and uncertainties" (QMU) methodology as its principal method for assessing and certifying the safety and reliability of the nuclear stockpile. Starting in 2001, Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL) officials began developing QMU, which focuses on creating a common "watch list" of factors that are the most critical to the operation and performance of a nuclear weapon. QMU seeks to quantify (1) how close each critical factor is to the point at which it would fail to perform as designed (i.e., the margin to failure) and (2) the uncertainty that exists in calculating the margin, in order to ensure that the margin is sufficiently larger than the uncertainty. According to NNSA and laboratory officials, they intend to use their calculations of margins and uncertainties to more effectively target their resources, as well as to certify any redesigned weapons envisioned by the Reliable Replacement Warhead program.

According to NNSA and weapons laboratory officials, they have made progress in applying the principles of QMU to the assessment and certification of nuclear warheads in the stockpile. NNSA has commissioned two technical reviews of the implementation of QMU. While strongly supporting QMU, the reviews found that the development and implementation of QMU was still in its early stages and recommended that NNSA further define the technical details supporting the implementation of QMU and integrate the activities of the three weapons laboratories in implementing QMU. GAO also found important differences in the understanding and application of QMU among the weapons laboratories. For example, while LLNL and LANL both agree on the fundamental tenets of QMU at a high level, they are pursuing different approaches to calculating and combining uncertainties.

NNSA uses a planning structure that it calls "campaigns" to organize and fund its scientific research. According to NNSA policies, campaign managers at NNSA headquarters are responsible for developing plans and high-level milestones, overseeing the execution of these plans, and providing input to the evaluation of the performance of the weapons laboratories. However, NNSA's management of these processes is deficient in four key areas. First, NNSA's existing plans do not adequately integrate the scientific research currently conducted across the weapon complex to support the development and implementation of QMU. Second, NNSA has not developed a clear, consistent set of milestones to guide the development and implementation of QMU. Third, NNSA has not established formal requirements for conducting annual, technical reviews of the implementation of QMU at the three laboratories or for certifying the completion of QMU-related milestones. Finally, NNSA has not established adequate performance measures to determine the progress of the three laboratories in developing and implementing QMU.