

Why GAO Did This Study

NNSA has several mission needs for enriched uranium, including providing LEU to fuel a nuclear reactor that produces tritium—a key isotope used in nuclear weapons. NNSA has a pressing defense need for unobligated LEU to fuel this reactor, meaning the uranium, technology and equipment used to produce the LEU, must be U.S. in origin. Because the United States lost its only source of unobligated LEU production in 2013, the supply is finite.

A House Armed Services Committee report included a provision for GAO to assess NNSA's plans to manage tritium and enriched uranium. This report examines (1) the actions NNSA is taking to extend its existing LEU inventories to address near-term tritium needs; (2) the extent to which NNSA's plan to analyze long-term options for supplying enriched uranium is consistent with DOE directives; and (3) NNSA's preliminary cost estimates for long-term uranium enrichment technology options and the extent to which they meet best practices for reliable estimates. GAO analyzed NNSA plans on costs, schedules, and risks; compared them with its guide on best practices in cost estimating; and interviewed NNSA and other officials.

What GAO Recommends

GAO is making two recommendations, including that NNSA revise the scope of its mission need statement and ensure that the scope of its cost estimates are aligned with the revised statement while developing estimates consistent with best practices. NNSA described actions planned and in process to address both recommendations.

View [GAO-18-126](#). For more information, contact Allison Bawden at (202) 512-3841 or bawdena@gao.gov.

NUCLEAR WEAPONS

NNSA Should Clarify Long-Term Uranium Enrichment Mission Needs and Improve Technology Cost Estimates

What GAO Found

The National Nuclear Security Administration (NNSA), a separately organized agency within the Department of Energy (DOE), is taking or plans to take four actions to extend inventories of low-enriched uranium (LEU) that is unobligated, or carries no promises or peaceful use to foreign trade partners until about 2038 to 2041. Two of the actions involve preserving supplies of LEU, and the other two involve diluting highly enriched uranium (HEU) with lower enriched forms of uranium to produce LEU. GAO reviewed these actions and found the actual costs and schedules for those taken to date generally align with estimates. NNSA and GAO have identified risks associated with two of these actions. One of these risks has been resolved; NNSA is taking steps to mitigate another, while others, such as uncertainty of future appropriations, are unresolved.

NNSA's preliminary plan for analyzing options to supply unobligated enriched uranium in the long term is inconsistent with DOE directives for the acquisition of capital assets, which state that the mission need statement should be a clear and concise description of the gap between current capabilities and the mission need. The scope of the mission need statement that NNSA has developed can be interpreted to meet two different mission needs: (1) a need for enriched uranium for multiple national security needs, including tritium, and (2) a specific need for enriched uranium to produce tritium. The DOE directives also state that mission need should be independent of and not defined by a particular solution. However, NNSA is showing preference toward a particular solution—building a new uranium enrichment capability—and the agency has not included other technology options for analysis. Without (1) revising the scope of the mission need statement to clarify the mission need it seeks to achieve and (2) adjusting the range of options it considers in the analysis of alternatives process, NNSA may not consider all options to satisfy its mission need.

Although the scope of the mission need statement is unclear, NNSA has prepared preliminary cost estimates for the two uranium enrichment technology options—the large and small centrifuge—that the agency considers to be the most feasible. However, these estimates are limited in scope and do not fully meet best practices for reliable cost estimates. Based on GAO's review of NNSA documents, NNSA appears to favor an incremental approach to reestablishing an enrichment capability that could ultimately meet all national security needs for enriched uranium. The estimates' scope is limited, however, in that they reflect only the costs of the first increment—producing LEU for tritium—and do not reflect the full costs of building a uranium enrichment facility that could meet the range of enriched uranium needs. GAO's cost guide—which provides cost estimating best practices—states that the scope of preliminary cost estimates should reflect full life-cycle costs. Also, NNSA's estimates for the two options minimally or partially met best practice characteristics for reliable cost estimates even when assessed for the more limited mission scope. For example, the estimates excluded certain costs and did not describe the calculations used. NNSA officials said that the cost estimates are preliminary and will be revised. By developing reliable cost estimates that are aligned with the revised mission need statement and consistent with best practices, NNSA will reasonably ensure that it has reliable information to make a decision about which option to select.