

Highlights of [GAO-14-295](#), a report to congressional committees

Why GAO Did This Study

NNSA conducts enriched uranium activities—including producing components for nuclear warheads and processing nuclear fuel for the U.S. Navy—at the Y-12 National Security Complex in Tennessee. NNSA has identified key shortcomings in the Y-12 plant's current uranium operations, including rising costs due to the facility's age. In 2004, NNSA decided to build a more modern facility—the UPF—which will use nine new technologies that may make enriched uranium activities safer and more efficient.

In November 2010, GAO reported on the UPF and identified risks associated with the use of new technologies ([GAO-11-103](#)). The Fiscal Year 2013 National Defense Authorization Act mandated that GAO assess the UPF quarterly. This is the third report, and it assesses (1) additional technology risks, if any, since GAO's November 2010 report and (2) NNSA's actions to address any risks. GAO reviewed NNSA and contractor documents and interviewed NNSA officials and contractor personnel.

GAO is not making any new recommendations. However, NNSA should continue actions to address the two recommendations—which NNSA generally agreed with—in GAO's November 2010 report related to ensuring that technologies reach optimal levels of maturity prior to critical project decisions. In commenting on a draft of this report, NNSA said its current technology maturation guidance is adequate.

View [GAO-14-295](#). For more information, contact David C. Trimble at (202) 512-3841 or trimbled@gao.gov.

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NUCLEAR WEAPONS

Technology Development Efforts for the Uranium Processing Facility

What GAO Found

GAO has identified five additional risks since its November 2010 report ([GAO-11-103](#)) associated with using new technologies in the National Nuclear Security Administration's (NNSA) Uranium Processing Facility (UPF), which is to be built in three interrelated phases. These risks and the steps that NNSA is taking to address them include the following:

- **Technology integration risks.** An August 2013 UPF independent peer review team concluded that the microwave casting technology—a process that uses microwave energy to melt and form uranium into various shapes—has not been demonstrated in a relevant environment, which is a requirement to reach a key technology maturity milestone. To address this risk, NNSA officials said they plan to accelerate the procurement and environmental testing of a microwave casting prototype.
- **Technology development risks.** A key insulation material planned as a nuclear safety control during uranium casting failed a series of performance tests in fiscal year 2013. According to UPF contractor representatives, this risk is now the project's most significant technological risk. To address this risk, these representatives said they are trying to identify a replacement insulation material and exploring the use of a different safety control.
- **Technology transition risks.** NNSA is currently evaluating an alternative technology to the UPF's baseline uranium purification technology, which has been under development since 2005. The alternative technology may generate less radioactive waste and may be more efficient to operate than the baseline technology. If NNSA switches technologies, NNSA officials said that the UPF contractor (1) will have to redesign the processing area and equipment; (2) may have to add utilities; and (3) will have to revise the UPF's nuclear safety analysis, creating the potential for further project risks.
- **Performance assurance risks.** NNSA stopped development efforts on a key machining technology, which is part of the UPF's second phase. As a result, NNSA may not have optimal assurance that the technology will work as intended before starting construction. However, in January 2014, NNSA began (1) reevaluating alternatives to the UPF that may not include machining operations and (2) developing a uranium infrastructure strategy, which is a framework for how NNSA will maintain all uranium capabilities into the future. It is too soon to determine if the draft uranium strategy, scheduled to be issued in April 2014, will outline actions to address this risk.
- **Funding risk.** Instead of using UPF project funds, NNSA has primarily funded UPF technology development activities from a limited research and development program. As a result of budget constraints in this program, for fiscal year 2014, 7 of the 19 technology projects the UPF contractor considered priority were not funded. Per a corrective action plan recently developed, the UPF Assistant Project Manager for Technology is responsible for determining which technology development activities should be funded directly with UPF project funds and is to prepare a cost estimate for those activities. This official said he expects to complete these estimates in March 2014.