GAO Highlights

NATIONAL NUCLEAR SECURITY ADMINISTRATION

Improvements Needed for Managing Recapitalization of Fusion Facilities

GAO-25-107204 September 2025

A report to congressional committees.

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What GAO Found

The National Nuclear Security Administration's (NNSA) January 2023 recapitalization plan for the three Inertial Confinement Fusion (ICF) program facilities—National Ignition Facility (NIF), Z Pulsed Power Facility (Z), and Omega Laser Facility—contained sufficient information for decision-makers on sustaining the facilities in the near-term. However, NNSA's plans for facility upgrades in the mid-term have evolved.

For the near-term, the plan outlined 110 discrete sustainment activities to be completed among the three facilities within 6 to 8 years at a total estimated cost of $492 million. These activities could help the facilities continue to support stockpile stewardship experiments with a reduced risk of catastrophic failure.

Example of a Sustainment Activity at the National Ignition Facility, Laser Amplifier to be Refurbished

Source: Lawrence Livermore National Laboratory; National Nuclear Security Administration information. | GAO-25-107204

For the mid-term, NNSA plans to upgrade NIF at an estimated cost of $470 million to $1 billion. For Z, NNSA's planned approach for upgrades is no longer current; officials said they are exploring an additional upgrade option. NNSA has not documented the options under consideration, but such a step would help decision-makers, including Congress, understand the potential options, estimated costs, and relevance to mission needs. At Omega, no upgrades are planned.

GAO found the ICF program has not developed and used performance measures, such as scope, cost, and time frame baselines, to evaluate progress of the near-term sustainment activities. NNSA has generally managed the facilities' sustainment as an annual activity rather than as a multi-year surge of work. Without developing and using such measures, NNSA management and decision-makers have incomplete information on whether NNSA is achieving its recapitalization objective to ensure the ICF facilities continue to operate at their originally designed performance levels.

Why GAO Did This Study

NNSA relies on three facilities to conduct the ICF Program's high energy density experiments in support of nuclear stockpile stewardship and modernization: NIF, Z, and Omega. These facilities are aging and need recapitalizing to maintain experimental operations and continue supporting mission needs. In January 2023, NNSA submitted to Congress a recapiltalization plan for the three facilities.

A Senate report accompanying a bill for the National Defense Authorization Act for Fiscal Year 2024 includes a provision for GAO to assess NNSA's plan for the facilities.

This report examines the extent to which NNSA (1) included sufficient information in the plan to support decision-making for sustaining and upgrading the three facilities in the near- and mid-term and (2) has made progress on near-term sustainment efforts included in the plan.

GAO reviewed the recapitalization plan, conducted site visits to the three facilities, and interviewed agency officials and site representatives to observe the current conditions and ongoing sustainment and upgrade activities. GAO also collected information on NNSA's approach to following program management requirements and guidance.

What GAO Recommends

GAO is making two recommendations: that NNSA (1) document the options under consideration for upgrades to Z and (2) develop and use performance measures, consistent with NNSA's program management guidance, to evaluate the progress of sustainment activities for all three ICF facilities against a baseline. NNSA concurred with both recommendations and stated it would take action to address them.