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Report to the Committee on Armed Services, U.S. Senate

February 2026

NUCLEAR SECURITY ENTERPRISE

Assessments of NNSA Major Projects

GAO-26-107777

GAO Highlights

NUCLEAR SECURITY ENTERPRISE

Assessments of NNSA Major Projects

GAO-26-107777 February 2026

A report to the Committee on Armed Services, U.S. Senate

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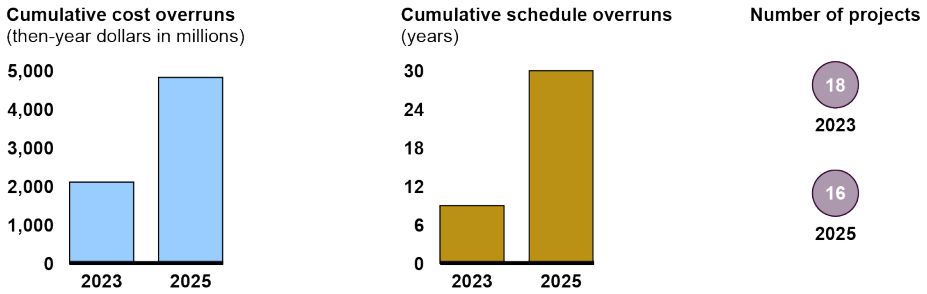
What GAO Found

The National Nuclear Security Administration (NNSA) is overseeing the design or construction of 28 major construction projects—each estimated to cost $100 million or more—that collectively are estimated to cost more than $30 billion.

Since GAO's 2023 report, cumulative cost and schedule overruns have increased for NNSA's portfolio of major projects in the execution phase (which have approved cost and schedule baselines). Specifically, as of June 2025, NNSA's cumulative cost overrun for the portfolio had increased from $2.1 billion in 2023 to $4.8 billion, and the cumulative schedule delay increased from 9 years to 30 years (see figure).

Cumulative Cost and Schedule Overruns for NNSA's Portfolio of Major Projects in Execution Phase, 2023–2025



Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

Two of NNSA's 16 major projects in the execution phase—the Uranium Processing Facility (UPF) Main Process Building and UPF Salvage and Accountability Building at the Y-12 National Security Complex—are responsible for most of the cumulative cost overrun and schedule delay. However, seven other major projects in this phase have incurred or expect to incur a cost overrun of more than 20 percent compared with their originally approved cost baselines.

According to NNSA documents and officials, cost or schedule overruns for major projects in the execution phase were often associated with inadequate project management by NNSA's management and operating (M&O) contractors; poor performance by vendors or subcontractors overseen by M&O contractors; or increased costs of equipment, materials, or vendors.

Of the 12 NNSA major projects in the definition phase (which do not yet have cost and schedule baselines),

- eight are either on hold, implementing design changes, experiencing design challenges, or assessing the effect of these issues on their cost and schedule estimates; and
- four have identified critical technologies and have met milestones for maturing these technologies, according to project documents and officials.

Why GAO Did This Study

NNSA—a separately organized agency within the Department of Energy (DOE)—plans to invest tens of billions of dollars in major construction projects to modernize the research and production infrastructure supporting the nuclear weapons stockpile.

Senate Report 117-130, accompanying a bill for the National Defense Authorization Act for Fiscal Year 2023, includes a provision for GAO to review NNSA's major projects on a biennial basis. GAO assessed (1) the performance of NNSA's portfolio of major projects in the execution phase, and (2) the development and maturity of project designs and critical technologies for projects in the definition phase. This report also includes summaries of NNSA's 28 major projects.

GAO collected and analyzed data on NNSA's 28 major projects and interviewed officials. GAO analyzed information on cost and schedule performance for 16 projects in the execution phase. GAO also collected information on the status of design and technology maturity for 12 projects in the definition phase. GAO's review excluded major projects that did not have approved preliminary cost and schedule estimates or were not subject to certain DOE acquisition requirements.

What GAO Recommends

In prior work, GAO made multiple recommendations to improve NNSA's management of its major projects. NNSA agreed with most of those recommendations and has implemented many changes. However, as of December 2025, NNSA had not fully addressed eight of the 21 recommendations.

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Abbreviations

ASD	Advanced Sources and Detectors
CDR	Conceptual Design Review
CMRR	Chemistry and Metallurgy Research Replacement
CNS	Consolidated Nuclear Security, LLC
D&D	Decontamination and Decommissioning
DCM-BLF	Direct Chip Melt Bottom Loading Furnace
DOE	Department of Energy
ECSE	Enhanced Capabilities for Subcritical Experiments

EVMS	Earned Value Management System
FDR	Final Design Review
HESE	High Explosives Science and Engineering
HESFP	High Explosives Synthesis, Formulation, and Production
HFTOC	High-Fidelity Training and Operations Center
HVAC	heating, ventilation, and air conditioning
LANL	Los Alamos National Laboratory
LAP4	Los Alamos Plutonium Pit Production Project
LPF	Lithium Processing Facility
LSI	Laboratory and Support Infrastructure
MSTS	Mission Support and Test Services, LLC
M&O	management and operating
MPB	Main Process Building
NTESS	National Technology and Engineering Solutions of Sandia
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
ORR	Operational Readiness Review
PARS	Project Assessment and Reporting System
PDR	Preliminary Design Review
PEI2	Plutonium Facility-4 Equipment Installation, Phase 2
PIDAS	Perimeter Intrusion Detection Assessment System
R&D	research and development
SPD	Surplus Plutonium Disposition
SRPPF	Savannah River Plutonium Processing Facility
SRNS	Savannah River Nuclear Solutions, LLC
TA-55	Technical Area-55
TFF	Tritium Finishing Facility
TLW	Transuranic Liquid Waste
TRA	technology readiness assessment
TRL	technology readiness level
TRP III	Technical Area-55 Reinvestment Project Phase III
TVA	Tennessee Valley Authority
UPF	Uranium Processing Facility
WEPAR	West End Protected Area Reduction

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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February 26, 2026

The Honorable Roger Wicker
Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate

Over the next 2 decades, the United States plans to spend more than $100 billion dollars to modernize its nuclear weapons stockpile and the research and production infrastructure on which stockpile programs depend. The National Nuclear Security Administration (NNSA)—a separately organized agency within the Department of Energy (DOE)—is responsible for managing the efforts to modernize the nation's nuclear stockpile and its related infrastructure. To help meet these responsibilities, NNSA is overseeing the design or construction of 28 capital asset projects that individually have an estimated cost of $100 million or more and collectively are estimated to cost more than $30 billion to complete.[1]

NNSA's portfolio of capital asset projects, which we refer to as major projects, includes efforts that are located across the nuclear security enterprise and vary widely in their purposes and costs.[2] Some projects include efforts to identify and mature critical technologies that may make

[1]For purposes of this report and consistent with the congressional reporting provision under which we conducted our review, we define a major project as a capital asset project with an estimated total project cost of $100 million or more. In contrast, DOE's order on project management for capital asset acquisitions defines a "major system" project to be any project with an estimated cost of over $750 million. Department of Energy, *Program and Project Management for the Acquisition of Capital Assets*, DOE Order 413.3B (Washington, D.C.: June 21, 2023). However, DOE's order generally applies to projects estimated to cost $50 million or more.

[2]NNSA's nuclear security enterprise comprises a nationwide network of government-owned, contractor-operated research laboratories and nuclear weapons production facilities. These facilities provide the research, development, testing, and production capabilities needed to maintain and modernize the nation's nuclear weapons stockpile and the infrastructure on which the stockpile depends.

nuclear or high-hazard operations safer or more efficient.[3] For example, NNSA's portfolio of major projects includes

- four multi-billion-dollar projects to construct new or modify existing enriched uranium and plutonium production facilities in New Mexico, South Carolina, and Tennessee;
- a $2 billion project for a linear accelerator that will be installed about 1,000 feet underground in Nevada, along with multiple critical technologies to produce X-ray images during plutonium experiments; and
- a $300 million project to build a high explosives laboratory and related facilities in Texas.

NNSA relies on management and operating (M&O) contractors to conduct most of the work needed to fulfill NNSA's mission.[4] Historically, DOE and NNSA have had difficulties managing and overseeing their contractors to complete projects on time and within budget. We designated this area as high risk starting in 1990 because DOE's record of inadequate management and oversight of contracts left it vulnerable to waste, fraud, abuse, or mismanagement. We updated our assessment of this high-risk area most recently in February 2025.[5]

Senate Report 117-130, accompanying a bill for the National Defense Authorization Act for Fiscal Year 2023, includes a provision for us to review NNSA's major projects on a biennial basis.[6] This report assesses (1) the performance of NNSA's portfolio of major projects that have cost and schedule baselines, and (2) the development and maturity of project designs and critical technologies for projects that do not yet have cost

[3]According to DOE guidance, technologies are critical if they are new or novel, or used in a new or novel way, and needed for a system to meet its operational performance requirements within defined cost and schedule parameters.

[4]M&O contracts are agreements under which the government contracts for the operation, maintenance, or support, on its behalf, of government-owned or government-controlled research, development, special production, or testing establishments wholly or principally devoted to one or more of the major programs of the contracting agency.

[5]GAO, *High-Risk Series: Heightened Attention Could Save Billions More and Improve Government Efficiency and Effectiveness*, GAO-25-107743 (Washington, D.C.: Feb. 25, 2025). We found that NNSA had met one criterion (for leadership commitment) and partially met the four remaining criteria for removal from the high-risk list.

[6]S. Rep. No. 117-130, at 371 (2022) (accompanying James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, S. 4543, 117th Cong. (2022)).

and schedule baselines. Our report also includes individual summaries of NNSA's 28 major projects, which we provide in appendix I.

This is our second biennial report assessing selected NNSA major projects.[7] We included NNSA's 28 major projects that had an estimated cost greater than $100 million, had identified a specific facility or approach to meet a mission need by January 2025, and were conducted under the requirements of DOE's order on project management.[8] For the purposes of this report, we divided the major projects into those with approved cost and schedule baselines, which we refer to as the execution phase, and those without, which we refer to as the definition phase.

We focused our initial efforts on identifying, collecting, and analyzing information to develop the 28 individual project summaries provided in appendix I. Specifically, we reviewed information from DOE's project assessment database, standard project documents (such as monthly status reports), and congressional budget justifications in fiscal years 2023 to 2026. To assess the reliability of the data, we reviewed related documentation (such as project execution plans and project reviews) and interviewed knowledgeable NNSA officials, among other things. We determined that the data were reliable for purposes of identifying and assessing cost and schedule information for NNSA's major projects. We also interviewed NNSA officials responsible for each project to discuss the project's status and corroborate the information we collected.

To assess the performance of NNSA's portfolio of major projects that have cost and schedule baselines, we collected cost and schedule information from DOE's project assessment database as of June 2025. We compared this information with the original cost and schedule baselines that NNSA approved for these projects at the baseline approval milestone to calculate performance against the portfolio's cumulative cost and schedule baselines. We then reviewed relevant project documentation, such as monthly status reports and annual reviews, and interviewed project officials to identify any cost and schedule performance challenges.

[7]Our prior report is GAO, *National Nuclear Security Administration: Assessments of Major Projects*, GAO-23-104402 (Washington, D.C.: Aug. 17, 2023).

[8]Department of Energy, *Program and Project Management for the Acquisition of Capital Assets*, DOE Order 413.3B. For example, certain information technology acquisition projects are subject to the requirements of a different DOE order.

To assess the development and maturity of project designs for projects that do not yet have cost and schedule baselines, we reviewed relevant documentation, including projects' design management plans and most recently completed design reviews as of June 2025. We compared the documentation and findings from the design reviews with DOE and NNSA requirements, such as those found in DOE's project management order. In addition, we reviewed monthly status reports to see if the project office had identified any design issues that occurred between design reviews. We also reviewed project documents and interviewed NNSA project officials to determine if any design issues have had, or could have, effects on project costs and schedules.

To assess the development and maturity of critical technologies for projects that do not yet have cost and schedule baselines, we relied on information about the number of critical technologies for each project and their associated technology readiness levels (TRL) provided by the NNSA project offices. We then reviewed relevant documentation, such as technology readiness assessments and technology maturation plans. For projects that identified critical technologies and completed an assessment, we compared the reported TRLs with the technology maturity milestones outlined in DOE's project management order. For more details on our scope and methodology, see appendix II.

We conducted this performance audit from August 2024 to February 2026 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Acquisition Process for NNSA Major Projects

DOE's project management order requires NNSA to manage the construction of capital asset projects with a total cost of greater than $50

million.[9] We included two types of capital asset projects in our review if their total estimated cost exceeds $100 million:

- **Line-item construction project (21 projects in our review)**. This type of project is a distinct design, construction, betterment, or fabrication of real property for which Congress will be requested to authorize and appropriate specific funds. It has a total cost greater than the minor construction threshold (currently $34 million). NNSA must request funding using a project data sheet in a budget justification.[10] An example of a line-item construction project is the Surplus Plutonium Disposition project at the Savannah River Site.
- **Major item of equipment (seven in our review)**. This type of project is for capital equipment or software that is designed and fabricated or acquired in support of a DOE mission activity. In addition, this type of project is for equipment that is not integral to a facility or related to, designed for, or specifically adapted to the functional or productive capacity of a facility. Major items of equipment generally exceed $2 million. Funding generally comes from operating funds, and NNSA is not required to request funding using a project data sheet. An example of a major item of equipment is the Calciner project at the Y-12 National Security Complex.

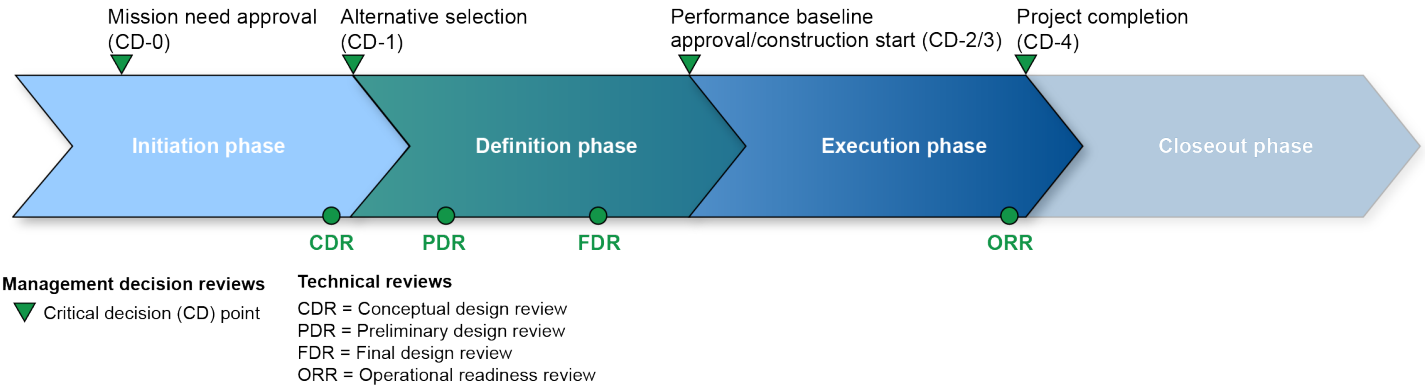
The life cycle for NNSA major projects consists of several key decision points—referred to as "critical decisions"—when projects must get approval from senior NNSA or DOE officials before they can move forward. DOE uses these critical decision points to define the stage of project activities and the status of cost and schedules. For the purposes of our report, we grouped the projects by three main phases—initiation, definition, and execution—to make it easy to distinguish projects that are conducting different types of activities (e.g., design work compared with construction work) and have different cost and schedule statuses (i.e.,

[9]Department of Energy, *Program and Project Management for the Acquisition of Capital Assets*, DOE Order 413.3B. In March 2025, the Secretary of Energy directed that delegated project authority within DOE Order 413.3B be revised, and that independent project reviews only be required at specific critical decision points for projects with an estimated total project cost between $300 million and $1 billion. The order has not yet been revised to implement these changes, and GAO conducted this review under the terms of the order as it currently exists, last revised in June 2023.

[10]A project data sheet is a document that contains summary project data, and the justification required to include the entire project effort as a part of the departmental budget. In its budget justification, NNSA may include multiple subprojects within a single line-item construction project. For purposes of this report, we consider each subproject with an estimated cost of $100 million or more to be a major project.

those without performance baselines compared with those with performance baselines) (see fig. 1).

Figure 1: GAO Presentation of Acquisition Phases for NNSA Major Projects



Source: GAO analysis of Department of Energy (DOE) and National Nuclear Security Administration (NNSA) documentation. | GAO-26-107777

Note: For the purposes of our report, we defined these phases to make it easy to distinguish projects that are conducting different types of activities (e.g., design work compared with construction work) and have different cost and schedule statuses (i.e., those without performance baselines compared with those with performance baselines).

During the **initiation phase**, a project develops a mission need statement and a rough-order-of-magnitude cost estimate range. A senior official reviews and approves these documents at the mission need approval milestone.[11] After this decision, NNSA conducts an analysis of alternatives and appoints a federal project director to manage the project.[12] The project then develops an acquisition strategy, design management plan, and a technology maturation plan (if applicable), and performs a conceptual design review. This phase culminates in the alternative selection milestone, when a senior official approves the project's scope and preliminary estimates for cost and completion (which

[11]A key feature of the mission need statement is that it should be solution-neutral—that is, the mission need statement should not propose the construction of a specific facility but rather should identify a gap in existing capability that can be closed through a variety of potential solutions.

[12]The analysis of alternatives process is an analytical study that is intended to compare the operational effectiveness, cost, and risks of several potential alternatives to address valid needs and shortfalls in operational capability. This process helps ensure that the best alternative that satisfies the mission need is chosen based on the selection criteria, such as safety, cost, or schedule.

are expressed as a range of estimates) for the preferred alternative selected from among those considered in the analysis of alternatives.

During the **definition phase**, a project continues to refine its design and conducts both a preliminary design review and a final design review. The project finalizes its cost and schedule estimates. In some cases, a project may conduct site preparation activities (e.g., install security fencing and utility lines) or procure specialized equipment (referred to as "long-lead procurement" activities). This phase culminates in a baseline approval and construction start milestone, when a senior official approves the project's scope, cost, and completion date baselines (referred to collectively as the performance baseline).[13]

During the **execution phase**, a project starts construction and major procurement activities. After completing construction activities, the project conducts a readiness review, which reviews the project's readiness to operate or maintain the system, facility, or capability.[14] This phase culminates in a project completion milestone, when a senior official verifies that the project has achieved its completion criteria and approves the transition to operations. At this point, the project is operational and enters the closeout acquisition phase, when it performs any remaining administrative, contractual, and financial activities.

NNSA Cost and Schedule Commitments

A major project's performance baseline includes the cost, schedule, and scope baselines against which the agency's performance on a project is measured. A performance baseline includes (1) the estimated total project cost, consisting of design, procurement, construction, and management costs, as well as a management reserve and contingency (discussed below) to cover the risk of cost and schedule overruns; (2) an estimate for the date of completion, which represents when construction activities are planned to be complete for the project's transition to operations; and (3) scope, including key performance parameters that define essential characteristics, functions, or requirements associated with the completed facility or capability. The performance baseline represents NNSA's commitment to Congress and is formally tracked in

[13]DOE's project management order identifies this milestone as two separate critical decisions (critical decisions 2 and 3). However, NNSA has combined these two milestones into a single milestone in its implementation of DOE's project management order.

[14]After completing construction activities, certain projects (such as a chemical or nuclear processing facility) may need to conduct commissioning activities during the startup and testing phase of the facility, according to NNSA officials.

DOE's project management database—the Project Assessment and Reporting System (PARS).

In developing the cost and schedule baselines for a project, NNSA conducts an analysis of the risks that might result in cost increases and schedule delays and develops mitigation strategies to lessen or eliminate these risks. A project's cost and schedule estimates include cost and time to cover contingency in case these risks are realized. DOE defines "management reserve" as the costs included for risks for which the contractor is responsible, and DOE defines the time included for such risks as "contractor schedule reserve." DOE defines "contingency" as the costs and time included to address risks related to factors outside of the contractor's control, which include changes to regulations or funding below expected levels, according to NNSA officials.

Even with contingency and management reserve, a project may encounter unforeseen or unplanned challenges during the execution phase that affect its ability to meet its performance baseline. In such cases, NNSA must formally approve a change to the project's performance baseline (referred to as "rebaselining" a project or a "baseline change"). Specifically, senior management must approve a new performance baseline for a project in cases where the project cannot meet the cost baseline, schedule baseline, or scope, including key performance parameters established at the baseline approval milestone.[15]

In addition, major projects must use earned value management to track their cost and schedule performance after NNSA approves a project's performance baseline. Earned value is the budgeted value of work actually accomplished in a given time. Before a performance baseline is approved, DOE requires each project to have an earned value

[15]The NNSA Administrator must notify congressional defense committees within 30 days of setting a baseline in excess of $65 million for a defense-funded construction project and must notify the committees within 30 days of a determination that such a project will experience cost growth that exceeds 125 percent of the original baseline. Within 90 days after the cost growth notification, the NNSA Administrator must provide a third notification regarding whether the construction project will be terminated or continued. If the project is continued, NNSA must make certain certifications relating to the revised baseline, the continuing necessity of the program, the lack of alternatives, and the adequacy of the management structure for controlling future cost and schedule growth. NNSA is also required to submit an assessment of the root causes of the cost growth within 90 days of the cost growth notification. 50 U.S.C. § 2753.

management system that is certified to ensure that it meets the national standard for earned value management systems.[16]

Design and Technology Maturity

DOE's project management order requires major projects to conduct the following three design reviews prior to the approval of the performance baseline: conceptual design review, preliminary design review, and final design review. In addition, DOE's order requires its more costly projects (including NNSA's projects) to develop a design management plan, which establishes the anticipated levels of design maturity at each acquisition phase. The design management plan should include a design baseline, which establishes the estimated cost and schedule associated with design activities for the project.

A critical technology is a new or novel technology—or technology being used in a new or novel way—that is needed for a system to meet its operational performance requirements within defined cost and schedule parameters. NNSA uses a nine-level scale, called TRLs, for determining how far a critical technology has matured and to evaluate the technology's readiness to be integrated into a system for inclusion in a facility. This approach is intended to ensure that new technologies are sufficiently mature in time to be used successfully when a project becomes operational and to reduce the technical and cost risks associated with the introduction of new technologies.[17] TRLs progress—based on the environment in which a technology is tested (e.g., lab environment)—from the least mature level, in which the basic technological principles are observed (TRL 1), to the highest maturity level, in which the actual system is used successfully in operations (TRL 9). See appendix VII for more detail on the nine TRLs.

For projects with estimated costs of $750 million or more, or for first-of-a-kind engineering endeavors, DOE's project management order requires that each critical technology first be validated in a laboratory environment (TRL 4) before the project's alternative selection and cost range are approved at the alternative selection milestone. The technology must then be demonstrated as a prototype in a relevant environment (TRL 7) before the project's performance baselines are approved at the baseline

[16]National Defense Industrial Association, *EIA-748 D Earned Value Management System (EVMS) Standard* (Sunnyvale, Calif.: January 2019).

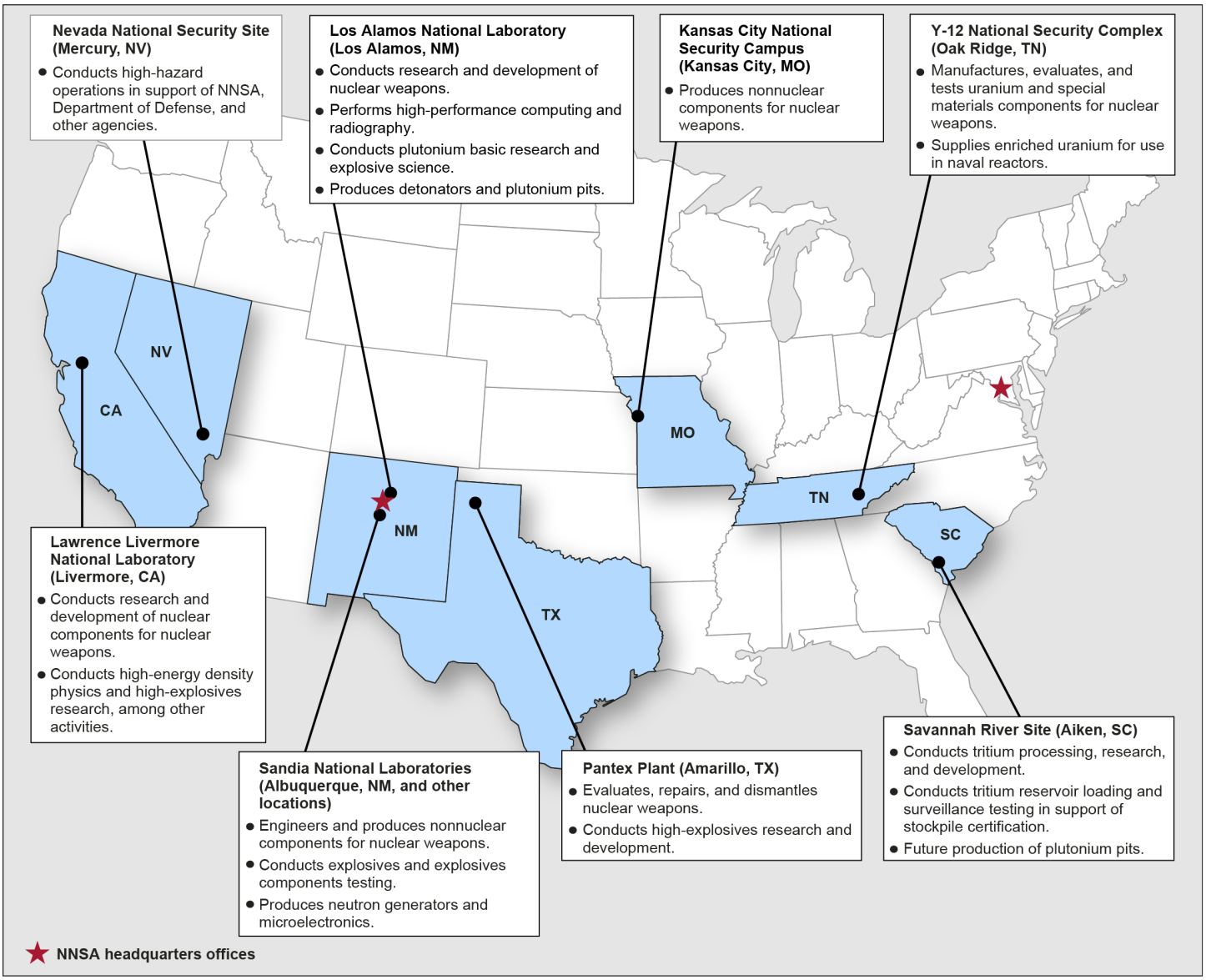
[17]According to NNSA officials, the number of critical technologies identified for potential use in a project can change during the definition phase for multiple reasons, such as changes to the project's design or cost and schedule considerations. It can take years to successfully mature a technology.

approval milestone. DOE's order also recommends the achievement of these TRLs for projects with estimated costs of less than $750 million. Moreover, for critical technologies that have not yet met the required level of maturity for a milestone, the order calls for projects to develop maturation plans that detail the steps necessary for developing the technologies to the desired level of maturity.

Nuclear Security Enterprise Sites

M&O contractors perform the work needed to fulfill NNSA's missions at the eight government-owned sites of the nuclear security enterprise. As shown in figure 2, each of NNSA's eight sites has specific responsibilities within the nuclear security enterprise.

Figure 2: Sites in the Nuclear Security Enterprise



Sources: GAO presentation of National Nuclear Security Administration information; Map Resources (map). | GAO-26-107777

NNSA Major Projects Reviewed in GAO's Assessment

Table 1 includes a list of the 28 major projects included in this report. Appendix I contains a summary of each project, and appendix III includes cost and schedule estimates for each project. Most of these projects support production capabilities for NNSA's Production Modernization

portfolio, which focuses on the weapon materials or components that are critical to weapon performance.

Table 1: NNSA's 28 Major Projects Assessed by GAO, by Phase and Site, as of June 2025

Phase[a]	Site	Project name
Definition	Los Alamos National Laboratory	Electrical Power Capacity Upgrade[b]
		Los Alamos Plutonium Pit Production Project (LAP4) 30 Reliable Equipment Installation
		LAP4 Training and Development Center
	Pantex Plant	High Explosives Synthesis, Formulation, and Production Facility
	Sandia National Laboratories	Power Sources Capability[b]
	Savannah River Site	Savannah River Plutonium Processing Facility (SRPPF) High-Fidelity Training and Operations Center
		SRPPF Main Process Building
		Tritium Finishing Facility Process Buildings
	Y-12 National Security Complex	Lithium Processing Facility (LPF) East End Substation[b]
		LPF Main Process Facility
		Direct Chip Melt Bottom Loading Furnace (DCM-BLF) Chip Compaction[b]
		DCM-BLF Compacted Chip Processing
Execution	Los Alamos National Laboratory	Chemistry and Metallurgy Research Replacement Plutonium Facility-4 Equipment Installation, Phase 2
		LAP4 30 Base Equipment Installation
		LAP4 Decontamination and Decommissioning
		LAP4 West Entry Control Facility
		Technical Area-55 Reinvestment Project, Phase III
		Transuranic Liquid Waste Facility
	Nevada National Security Site	Enhanced Capabilities for Subcritical Experiments (ECSE) Laboratory and Support Infrastructure
		ECSE Advanced Sources and Detectors Major Item of Equipment
	Pantex Plant	High Explosives Science & Engineering Facility
	Savannah River Site	Surplus Plutonium Disposition
	Y-12 National Security Complex	Calciner Project
		Electrorefining Project[c]
		Uranium Processing Facility (UPF) Main Process Building
		UPF Process Support Facilities[c]
		UPF Salvage and Accountability Building
		West End Protected Area Reduction Project

Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

[a]Definition refers to the acquisition phase that occurs after the alternative selection milestone (critical decision 1) but prior to the baseline approval and construction start milestones (critical decisions 2

and 3). Execution refers to the acquisition phase that occurs after the baseline approval and construction start milestones (critical decisions 2 and 3) but prior to the project completion milestone (critical decision 4).

[b]According to NNSA officials, the agency approved a performance baseline for this project after June 2025, and the project has transitioned to the execution phase.

[c]According to NNSA officials, the agency approved project completion (critical decision 4) for this project after June 2025, and the project has transitioned to the closeout phase.

NNSA Major Projects Excluded from GAO's Assessment

For purposes of our report, we excluded two categories of major projects from our assessment. First, we excluded nine major projects in the initiation phase from our scope because NNSA has not yet selected a preferred solution or approved preliminary cost and schedule estimates for these projects. For a list of these projects, along with their initial cost and schedule estimates, see appendix IV.

Second, we excluded projects from our scope that are not subject to the requirements of DOE's project management order and do not report detailed information into DOE's PARS because these projects do not have the same requirements for cost and schedule estimating, making them difficult to reliably assess. This category includes the following types of projects:

- We excluded the two projects managed by NNSA's Office of Naval Reactors, which are not subject to the requirements of DOE's project management order.[18] This office is responsible for U.S. Navy nuclear propulsion work, including reactor design, operation, and maintenance, as well as waste disposition. For a list of these projects, along with their cost and schedule estimates, see appendix V.
- We excluded projects associated with NNSA's Kansas City Non-Nuclear Expansion Transformation plan. As we reported in November 2023, this plan is a phased real estate acquisition involving a series of lease-purchase agreements for both the land and the facilities, once privately constructed.[19] Specifically, NNSA plans to acquire a parcel of land east of its existing campus at the Kansas City Nuclear Security Complex in a series of 15 lease-purchase agreements. The 15

[18]The Office of Naval Reactors is not directly subject to the requirements contained in DOE Order 413.3B but implements similar procedures.

[19]GAO, *National Nuclear Security Administration: Update on Actions to Manage Production Challenges at the Kansas City Site,* GAO-24-105858 (Washington, D.C.: Nov. 16, 2023).

phases are expected to provide a total of over 1.1 million square feet of manufacturing space and 675,000 square feet of office space.[20]

- We excluded information technology acquisition projects, such as those associated with NNSA's high-performance computing platforms.[21] The management of these projects is subject to the requirements of a separate DOE order.[22] Further, as we reported in April 2021, due to the uncertain nature of the high-performance computing acquisition process, these types of projects follow tailored requirements that allow deferral of decisions on certain requirements into later in the acquisition process.[23]

Recent GAO Work on Selected NNSA Projects

Over the past 10 years, we have issued multiple reports assessing NNSA's progress in managing specific major projects in more depth and in support of the programs that require their capabilities.[24] For example:

- In September 2025, we reported that NNSA rebaselined its Uranium Processing Facility (UPF) project, which increased its cost by nearly $4 billion and delayed its schedule by 6 years.[25] To accommodate the delay, NNSA will continue to use an existing building at the Y-12 National Security Complex until the new facility is operational in 2034. However, we found that NNSA did not have a comprehensive plan to safely operate the existing building, which would provide consistent

[20]According to NNSA officials, the first phase will cost about $200 million for an office building with supporting parking and infrastructure, and NNSA expects to take possession during 2026. NNSA officials are targeting completion of the entire project by fiscal year 2043 at a total cost of several billion dollars.

[21]For example, NNSA approved the mission need for the Trinity Platform in 2012 with an initial cost estimate of $150 million to $240 million, and it approved the alternative selection for the Sierra Platform in 2013 with a preliminary estimate of $170 million.

[22]See Department of Energy, *Information Technology Project Management*, DOE Order 415.1 (Washington, D.C.: Jan. 13, 2017).

[23]GAO, *High-Performance Computing: NNSA Could Improve Program Management Processes for System Acquisitions*, GAO-21-194 (Washington, D.C.: Apr. 29, 2021).

[24]See Related GAO Products at the end of this report.

[25]GAO, *Modernizing the Nuclear Security Enterprise: Opportunities Exist to Better Prepare for Delay in the New Uranium Processing Facility*, GAO-25-107330 (Washington, D.C.: Sept. 18, 2025).

information to better manage tradeoffs and address risks to continued safe operations.[26]

- In March 2025, we reported that NNSA's explosives program—which includes the High Explosives Synthesis, Formulation, and Production (HESFP) facility—generally followed supply chain risk management leading practices, including developing an agencywide supply chain risk management strategy.[27] However, we found that NNSA had not developed a resiliency strategy—a strategy to ensure the supply chain is flexible and adaptable enough to mitigate future adverse events—that comprehensively covers all identified risks.[28]
- In August 2023, we reported that NNSA's Enhanced Capabilities for Subcritical Experiments (ECSE) program was building two instruments to improve NNSA's ability to assess the performance, safety, and reliability of nuclear weapons without nuclear explosive testing.[29] We found that NNSA had identified and appropriately managed risks related to one instrument, but used less rigorous processes for the other instrument, resulting in increased costs and schedule delays.[30]
- In January 2023, we reported that NNSA had not developed a comprehensive schedule for managing its plan to produce 80 plutonium pits—the central core of a nuclear weapon—per year at two

[26]We recommended that NNSA establish a comprehensive plan to maintain safe operations at the existing facility until 2035 or operations are ceased. NNSA concurred and has begun to take action to address our recommendation.

[27]GAO, *National Nuclear Security Administration: Explosives Program Is Mitigating Some Supply Chain Risks but Should Take Additional Actions to Enhance Resiliency*, GAO-25-107016 (Washington, D.C.: Mar. 12, 2025).

[28]We recommended, among other things, that NNSA ensure its strategy for supply chain resilience within the explosives enterprise is comprehensive and addresses all identified risks. NNSA agreed with our recommendation. As of July 2025, the agency planned to reexamine the explosives enterprise strategy and ensure it comprehensively addresses all risks and aligns with NNSA's vision.

[29]GAO, *Nuclear Weapons: Program Management Improvements Would Benefit U.S. Efforts to Build New Experimental Capabilities*, GAO-23-105714 (Washington, D.C.: Aug. 30, 2023).

[30]We recommended that NNSA ensure that program management processes—including documented risk management plans—are adopted to appropriately address risk to designing and building the instrument and associated infrastructure. As of September 2024, NNSA had implemented our recommendation.

sites (Los Alamos National Laboratory and Savannah River Site).[31] These plans include the construction of six of the projects listed in table 1. As a result, we reported that NNSA's pit production schedule did not meet minimum qualifications to be considered an integrated master schedule.[32]

- In August 2021, we reported that NNSA's preliminary cost estimates for the construction of the Lithium Processing Facility at the Y-12 National Security Complex had substantially increased compared with earlier estimates, due in part to changes in the design for the size of the facility.[33] We found that NNSA's preliminary cost estimate was substantially comprehensive, but NNSA did not collect all the data it needed to fully evaluate the new critical technology included in the facility design.[34]

NNSA's Portfolio of Major Projects in the Execution Phase Continues to Face Cost Overruns and Schedule Delays

Since our 2023 report, cumulative cost and schedule overruns against the original baselines have increased for NNSA's portfolio of major projects in the execution phase. Specifically, as of June 2025, NNSA's cumulative cost overrun for the portfolio increased from $2.1 billion in 2023 to $4.8 billion in 2025, and its cumulative schedule delay increased from 9 years to 30 years (see fig. 3). Moreover, NNSA was in the process of revising the cost and schedule baselines of five projects that may result in

[31]GAO, *Nuclear Weapons: NNSA Does Not Have a Comprehensive Schedule or Cost Estimate for Pit Production Capability*, GAO-23-104661 (Washington, D.C.: Jan. 12, 2023).

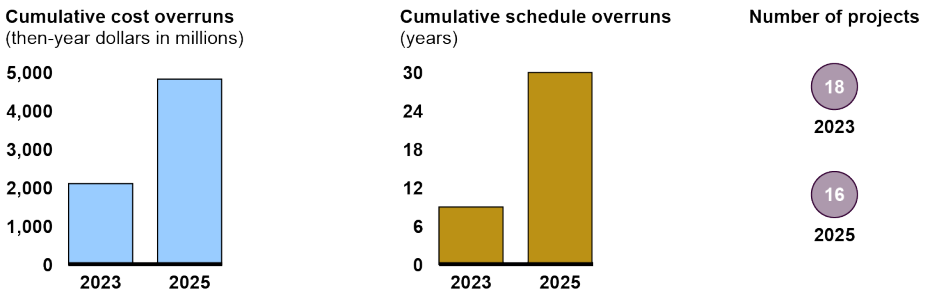
[32]We reiterated our existing recommendation, which NNSA had not yet implemented as of September 2025, that NNSA develop an integrated master schedule for its plutonium production activities. This recommendation was originally included in GAO, *Nuclear Weapons: NNSA Should Further Develop Cost, Schedule, and Risk Information for the W87-1 Warhead Program*, GAO-20-703 (Washington, D.C.: Sept. 9, 2020). We also recommended that NNSA develop a life cycle cost estimate that aligns with GAO cost estimating best practices. NNSA agreed with our recommendations, and as of September 2025, had not taken actions to address them.

[33]GAO, *Nuclear Weapons: Actions Needed to Improve Management of NNSA's Lithium Activities*, GAO-21-244 (Washington, D.C.: Aug. 12, 2021).

[34]Among other recommendations, we recommended that the Lithium Processing Facility project collect and assess all key data before completing future technology readiness assessments and achieving key project milestones. As of September 2025, NNSA had implemented our recommendation.

additional overruns or delays.[35] The number of projects in the execution phase decreased by two (from 18 to 16) since 2023.[36]

Figure 3: Cumulative Cost and Schedule Overruns for NNSA's Portfolio of Major Projects in Execution Phase, 2023 to 2025



Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

As shown in table 2, individual projects in the execution phase performed differently against cost and schedule baselines. For additional information on estimated cost and completion dates for all projects we reviewed, see appendix III.

Table 2: Cost and Schedule Performance of 16 NNSA Major Projects in the Execution Phase, as of June 2025

		Changes from original baseline to current assessment		
Project	**Baseline cost (millions of dollars)**	**Cost (millions of dollars)**	**Cost (percent)**	**Schedule (months)**
Meeting original cost and schedule baseline				
CMRR Plutonium Facility-4 Equipment Installation, Phase 2[a]	1,188	0	0	0
LAP4 30 Base Equipment Installation[b]	1,864	0	0	0
LAP4 Decontamination and Decommissioning[b]	529	0	0	0

[35]As of June 2025, NNSA officials were either considering or in the process of obtaining approval on revised cost and schedule baselines for the following projects: Enhanced Capabilities for Subcritical Experiments Advanced Sources and Detectors, Los Alamos Plutonium Pit Production Project 30 Base Equipment Installation, Los Alamos Plutonium Pit Production Project Decontamination and Decommissioning, Technical Area-55 Reinvestment Project Phase III, and Transuranic Liquid Waste Facility.

[36]During the course of our 2023 report, five of the 18 projects in the execution phase reached completion, bringing the number of projects in this phase down to 13. As of January 2025, NNSA had approved baselines for three additional projects, bringing the total number of projects in the execution phase up to 16.

Project	Baseline cost (millions of dollars)	Changes from original baseline to current assessment: Cost (millions of dollars)	Cost (percent)	Schedule (months)
LAP4 West Entry Control Facility[a]	209	0	0	0
Surplus Plutonium Disposition[a]	997	0	0	0
Transuranic Liquid Waste Facility[b]	215	0	0	0
Overrunning original cost or schedule baseline				
Calciner Project[a]	108	105	97	51
ECSE Advanced Sources and Detectors[a]	1,800	391	22	32
ECSE Laboratory and Support Infrastructure	560	270	48	35
Electrorefining Project[c]	101	38	38	35
High Explosives Science and Engineering Facility	228	72	32	12
TA-55 Reinvestment Project, Phase III[b]	236	12	5	17
UPF Main Process Building	4,732	2,718	57	73
UPF Process Support Facilities[c]	140	42	30	-2
UPF Salvage and Accountability Building	1,180	1,070	91	73
West End Protected Area Reduction	160	105	66	33
Totals	**14,247**	**4,823**	**N/A**	**359**

Legend: Chemistry and Metallurgy Research Replacement Facility (CMRR); Los Alamos Plutonium Pit Production Project (LAP4); Enhanced Capabilities for Subcritical Experiments (ECSE); Technical Area-55 (TA-55); Uranium Processing Facility (UPF); not applicable (N/A).

Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

Note: Positive values indicate increases in estimates for cost or schedule. Negative values indicate decreases in estimates for cost or schedule. The original baseline refers to the cost or schedule baseline (and associated scope) that NNSA approved at the combined baseline approval/construction start milestone. Schedule refers to the baseline schedule date approved at the combined baseline approval/construction start milestone and the current estimated date for project completion milestone. All figures are rounded to the nearest whole number.

[a]NNSA approved cost and schedule baselines for these projects during or shortly before the beginning of our review. As a result, the projects had only recently started reporting performance data that would have allowed an assessment of whether they were on track.

[b]As of June 2025, the cost and schedule estimates for these projects were under review by NNSA management and therefore subject to revision under NNSA's baseline change approval process.

[c]According to NNSA officials, the agency approved project completion (critical decision 4) for this project after June 2025, and the project has transitioned to the closeout phase.

As reflected in table 2, NNSA data show that six of the 16 major projects in the execution phase were expected to meet their original cost and schedule baselines, as of June 2025. However, of these six projects, three are currently in the process of revising cost and schedule baselines, and the other three have not reported project data long enough to assess performance:

- **Revising baselines to reflect strategy**: NNSA was replanning the Los Alamos Plutonium Pit Production Project (LAP4) 30 Base Equipment Installation (30B) and Decontamination and Decommissioning (D&D) projects to reflect NNSA's 30 Diamond strategy. In April 2024, NNSA approved the 30 Diamond strategy to support the fastest path to a production rate of 30 war reserve pits per year at Los Alamos National Laboratory by December 2028.[37] Under this strategy, NNSA plans to transfer several less critical items of equipment from the scope of the LAP4 30B and D&D projects to the scope of the LAP4 30 Reliable Equipment Installation (30R) project. NNSA also plans to transfer 22 critical items and six program priorities from the LAP4 30R project to the LAP4 30B project. This realignment reflects the prioritization of items across these three projects to support the planned production rate. NNSA officials told us they expect the implementation of the strategy to result in increased costs and schedule delays for the LAP4 30B project. They said that they expect NNSA to approve revised cost and schedule baselines for the LAP4 30B and D&D projects by early 2026.
- **Revising baselines to expand scope**: NNSA is considering revising the cost and schedule baselines for the Transuranic Liquid Waste Facility. According to NNSA documentation, the project may experience cost overruns and schedule delays due to factors such as the contractor not originally accounting for some activities that fell within the scope of work and poor construction productivity.
- **Recent baseline approvals**: DOE or NNSA approved cost and schedule baselines for three projects—Chemistry and Metallurgy Research Replacement Plutonium Facility-4 Equipment Installation, Phase 2; LAP4 West Entry Control Facility; and Surplus Plutonium Disposition—during or shortly before the beginning of our review. As a result, all three projects have only recently started reporting actual performance data that will allow an assessment of whether they are on track.[38]

As of June 2025, the remaining 10 projects in the execution phase reported cost or schedule overruns for multiple reasons. These included

[37]War reserve pits are pits that have been certified for use in nuclear weapons.

[38]According to NNSA officials, it is common for projects to have a lag time between the approval of baselines and the reporting of actual performance data for multiple reasons, such as the time needed to collect, review, and load these data into DOE's project management database. In addition, according to DOE's project management order, contractors must start reporting performance data no later than 3 months after the baseline approval milestone.

inadequate project management by M&O contractors; poor performance by vendors or subcontractors overseen by M&O contractors; or increased costs of equipment, materials, or vendors, according to NNSA officials. Due to these and other issues, nine of these 10 projects have incurred (or expect to incur) cost overruns of over 20 percent compared with their originally approved cost baselines.[39]

Two of these 10 projects—UPF Main Process Building and UPF Salvage and Accountability Building—are responsible for most of the cumulative cost overruns and schedule delays associated with NNSA's portfolio of major projects in the execution phase. Specifically, these two projects together accounted for $3.8 billion (or almost 80 percent) of the $4.8 billion in cumulative cost overruns for NNSA's portfolio of major projects in the execution phase. These two projects also accounted for a combined 148 months (or about 12 years) of schedule delays. For purposes of this analysis, we combined the schedule delay for each UPF project, which results in a cumulative 12-year delay for the two projects. However, because both projects are conducting activities on a similar schedule, the delay for the overall UPF project is 6 years. Putting these two projects aside, the cumulative schedule overrun for the remaining 14 projects in the execution phase is about 18 years, and the cumulative cost overrun is $1.0 billion.

NNSA documentation attributed these cost increases and schedule delays to multiple problems with the site contractor's management of the projects, such as inadequate cost and schedule forecasting; frequent replanning that masked performance; and not including incentives or penalties for key subcontracted work, resulting in late deliveries of services, materials, and equipment.[40] DOE approved revised cost and schedule baselines for both projects in December 2024.

DOE also recently approved revised cost and schedule baselines for two other projects of the 10 in the execution phase—ECSE Laboratory and Support Infrastructure, and Calciner. For example, DOE approved revised

[39]NNSA has an internal performance metric to complete 90 percent of its projects within 10 percent of their cost baselines.

[40]As of July 2025, NNSA had implemented 19 of 20 corrective actions to address the root causes and factors that led to UPF cost increases and schedule delays. For example, NNSA directed the contractor to develop alternative performance metrics and a plan for improving the level of detail in the schedule. However, independent reviews identified significant areas of concern with the UPF project's EVMS implementation that will require additional monitoring and review.

cost and schedule baselines for the former project—representing a cost increase of 48 percent and almost 3 years of schedule delay—in January 2025 due to, among other things, inaccurate cost estimates for materials and subcontracts at the original baseline approval milestone.

In addition, NNSA was reviewing revised cost and schedule baselines for two projects—ESCE Advanced Sources and Detectors, and Technical Area 55 (TA-55) Reinvestment Project, Phase III—and expects to approve these baselines in early 2026. Both projects are expected to experience cost overruns and schedule delays. In particular, NNSA expects the cost of the ESCE Advanced Sources and Detectors project to increase by 22 percent to over $2 billion and be delayed by approximately 3 years due to several factors, such as additional activities that the project did not include in its original performance baseline but later identified.

Most Projects in Definition Phase Are Implementing Significant Design Changes, and Those with Critical Technologies Have Reached Maturity Milestones

As of June 2025, the 12 NNSA major projects in the definition phase are in different stages of design maturity. Two of these projects are or had recently been put on hold, and six have experienced challenges with design. In addition, four of the 12 projects in the definition phase have identified critical technologies for use in their designs and have reached technology maturity milestones consistent with the phase of the project.

Projects Are at Different Stages of Design Maturity, and Most Are Implementing Design Changes or Experiencing Design Challenges

As of June 2025, the 12 NNSA major projects in the definition phase were in different stages of the design review process, as measured by the most

recent overall design review completed by a project as of June 2025 (see table 3).[41]

Table 3: Design Review Status for NNSA's 12 Major Projects in the Definition Phase, as of June 2025

Status of design review	Site	Project
Conceptual design review completed	Los Alamos National Laboratory	Electrical Power Capacity Upgrade[a]
	Savannah River Site	Tritium Finishing Facility Process Buildings
Preliminary design review completed	Los Alamos National Laboratory	Los Alamos Plutonium Pit Production Project (LAP4) Training and Development Center
	Savannah River Site	Savannah River Plutonium Processing Facility (SRPPF) High-Fidelity Training and Operations Center
		SRPPF Main Process Building
	Y-12 National Security Complex	Lithium Processing Facility East End Substation[a]
Final design review completed	Los Alamos National Laboratory	LAP4 30 Reliable Equipment Installation
	Pantex Plant	High Explosives Synthesis, Formulation, and Production Facility
	Sandia	Power Sources Capability[a]
	Y-12 National Security Complex	Direct Chip Melt Bottom Loading Furnace (DCM-BLF) Chip Compaction[a]
		DCM-BLF Compacted Chip Processing
		Lithium Processing Facility Main Processing Facility

Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

[a]According to NNSA officials, the agency approved a performance baseline for this project after June 2025, and the project has transitioned to the execution phase.

Of these 12 projects, NNSA placed two projects on hold—one in 2023 and one in 2025. However, it has since resumed work on one of these projects.

- **High Explosives Synthesis, Formulation, and Production Facility (Pantex Plant)**. NNSA placed the project on hold starting in March 2023, according to officials. NNSA did not request funding for the

[41]As part of the normal cycle of design maturity during the definition phase, a project continues to mature its design and build off the results of its technical design reviews as it passes from one stage of design (e.g., conceptual design) to the next (e.g., preliminary design). In addition, some projects use a design approach, where certain portions of the design (e.g., processing operations and specialized equipment) are matured before other portions of the design (e.g., facility structure and support systems). For more information on the cost and schedule estimates to complete design activities for projects in definition, see appendix VI.

project in fiscal year 2024 but restarted it in August 2024 after receiving appropriations for fiscal year 2024. NNSA officials said that they are reviewing contractor plans for early site preparation and long-lead procurement activities. Officials stated that the project may increase its preliminary cost estimate from $699 million—at the high end of the preliminary cost range approved at the alternative selection milestone—to $721 million and delay the completion date estimate by about 4 years due to budget concerns, including competing priorities for other projects across the nuclear security enterprise.

- **Direct Chip Melt Bottom Loading Furnace Compacted Chip Processing (Y-12 National Security Complex)**. In February 2023, NNSA restructured the overall Direct Chip Melt Bottom Loading Furnace project into two related projects—Chip Compaction and Compacted Chip Processing—in part to ensure that the agency could establish a chip compaction capability more quickly than originally planned.[42] In April 2024, the NNSA program office notified the Compacted Chip Processing project of a funding gap for fiscal years 2026 and 2027 due to cost overruns on other projects at the site. As a result, NNSA placed the project on hold in May 2025. NNSA officials said they plan to resume the project and establish cost and schedule baselines in fiscal year 2028.

In addition, six projects have recently completed or are currently implementing significant design changes, experiencing design challenges, or assessing the cost and schedule impacts from these issues (see table 4).

Table 4: NNSA Major Projects in the Definition Phase Implementing Design Changes or Facing Design Challenges, as of June 2025

Site	Project
Los Alamos National Laboratory	Los Alamos Plutonium Pit Production Project (LAP4) 30 Reliable Equipment Installation
	LAP4 Training and Development Center
Savannah River Site	Savannah River Plutonium Processing Facility (SRPPF) High-Fidelity Training and Operations Center
	SRPPF Main Process Building
	Tritium Finishing Facility Process Buildings

[42]Enriched uranium metal chip processing is the multi-step recovery of machine turnings generated during the nuclear weapon components fabrication stage. The Y-12 Complex recovers and recycles the resulting enriched uranium metal “chips,” which is a process necessary to meeting U.S. national security requirements. The modified chip recovery process at Y-12 is designed to address inefficiencies—including long cycle times and low metal recovery rates—in the current process.

Site	Project
Y-12 National Security Complex	Lithium Processing Facility Main Processing Facility

Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

Examples of these design challenges follow.

- **LAP4 30 Reliable Equipment Installation Project (Los Alamos National Laboratory)**. Based on NNSA's 30 Diamond strategy, the agency plans to transfer several less critical items of equipment from the scope of the LAP4 30 Base Equipment Installation and Decontamination and Decommissioning projects to the scope of the 30 Reliable Equipment Installation project. This scope realignment increases the number of items of equipment within the scope of the project by 92 percent compared with preliminary estimates. NNSA officials told us that, as a result, they expect the implementation of this strategy to increase costs and delay the schedule of the project beyond preliminary cost and schedule ranges approved at the alternative selection milestone.
- **SRPPF High Fidelity Training and Operations Center (Savannah River Site)**. In January 2023, NNSA adopted a revised tailoring strategy that restructured the overall SRPPF project into six projects, including the High-Fidelity Training and Operations Center (HFTOC) and Main Process Building (MPB).[43] As part of the revised tailoring strategy, NNSA increased the scope of the nonnuclear training center to add higher fidelity equipment and additional requirements and renamed it to the HFTOC accordingly. Since that time, NNSA officials told us that the project experienced design challenges, including inadequate contractor performance, that resulted in cost increases and schedule delays. Further, according to NNSA budget documents, the agency expects the design changes it implemented to increase the estimated cost of the project to over $2 billion (from a previous preliminary estimate of $370 million). These changes included upgrades to the facility's equipment to replicate the equipment in the Main Process Building. However, officials told us that in August 2025, NNSA rescinded certain requirements for the HFTOC gloveboxes, which significantly reduced project costs. According to NNSA officials, the project completed final design in December 2025.

[43]In October 2024, NNSA adopted a second revised tailoring strategy that restructured the overall SRPPF project into three projects—the HFTOC, MPB, and an administrative building. The estimated cost of the administrative building is under $100 million and outside the scope of our review.

- **SRPPF Main Process Building (Savannah River Site)**. As part of its second revised tailoring strategy for the overall SRPPF project, in October 2024, NNSA transferred the scope of three other projects to the MPB project. The revised tailoring strategy allows the project to establish performance baselines with a design maturity of 60 percent instead of 90 percent as would otherwise be required by DOE's project management order. The revised strategy also allows the project to begin construction before establishing performance baselines. Prior to the revised tailoring strategy, officials told us that NNSA required the project to implement key design changes, such as revising the scope to address single points of failure and add more space for future capabilities, and that the scope has been stable since that time. However, they stated that they continue to experience design challenges, such as difficulties hiring qualified design engineers and the inability of the contractor to meet performance targets. Due in part to these issues, NNSA officials said the project's final design review could be delayed by 6 months (from March 2026 to September 2026). In addition, as part of the revised tailoring strategy, NNSA officials told us that they approved 10 early procurement and site preparation work packages, which allowed the project to start construction earlier on lower risk activities and spread the work out over time. However, NNSA was not able to fully implement the revised strategy related to these packages because of delays receiving design packages from the contractor, according to officials. Similarly, officials said the package the contractor submitted in May 2025 for an independent cost estimate was insufficient to conduct the estimate. A resubmittal is scheduled for early 2026, at which time the project's design should be matured closer to 90 percent, according to officials.

  As of June 2025, NNSA was in the process of updating the project's cost and schedule estimates. According to NNSA's fiscal year 2026 budget justification, the project's cost may increase to over $22 billion (up from a preliminary cost range of $6.9 billion to $11.1 billion) with a completion date of September 2035 (the top of the preliminary schedule range). However, officials told us the completion date may be delayed. They said that they plan to submit revised cost and schedule estimates for senior NNSA management review and approval by September 2026.
- **Lithium Processing Facility Main Processing Facility (Y-12 National Security Complex)**. In January 2025, officials said the site contractor submitted recommendations for an updated construction execution strategy based on a constrained funding profile, which NNSA was evaluating. According to NNSA officials, the project is

likely to significantly increase its cost estimate and delay its completion date estimate—which could result in a total cost of more than $6 billion (from a previous preliminary cost range of $871 million to $1.5 billion) and a delay of about 6 years. They attributed these effects to a variety of factors, including an inadequate conceptual design and flawed initial planning assumptions. Accordingly, NNSA officials said they plan to reduce the scope of the project.

Projects in the Definition Phase with Critical Technologies Have Reached Maturity Milestones

Four of the 12 projects currently in the definition phase have identified critical technologies (see table 5).

Table 5: Four NNSA Major Projects in the Definition Phase Have Identified Critical Technologies, as of June 2025

Project	Number of critical technologies
Los Alamos Plutonium Pit Production Project 30 Reliable Equipment Installation	113
Savannah River Plutonium Processing Facility Main Process Building	33
High Explosives Synthesis, Formulation, and Production	1
Lithium Processing Facility Main Processing Facility	1
Total	**148**

Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

According to NNSA documents and officials, at the time of their alternative selection milestones, contractors had assessed all critical technologies for the four projects at TRL 4 or higher, in accordance with DOE's maturity milestones.[44] In addition, as of June 2025, NNSA officials reported that the four projects had assessed all critical technologies at TRL 7 or higher, which DOE's project management order requires for performance baseline approval.[45]

Agency Comments

We provided a draft of this report to NNSA for review and comment. NNSA provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Energy, the Administrator of NNSA, and

[44]See appendix VII for DOE's description of each TRL.

[45]Department of Energy, *Program and Project Management for the Acquisition of Capital Assets*, DOE Order 413.3B.

other interested parties. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

If you or your staff have any questions about this report, please contact me at BawdenA@gao.gov. Contact points for our Offices of Congressional Relations and Media Relations may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VIII.

//SIGNED//

Allison Bawden
Director, Natural Resources and Environment

Appendix I: Individual Project Summaries

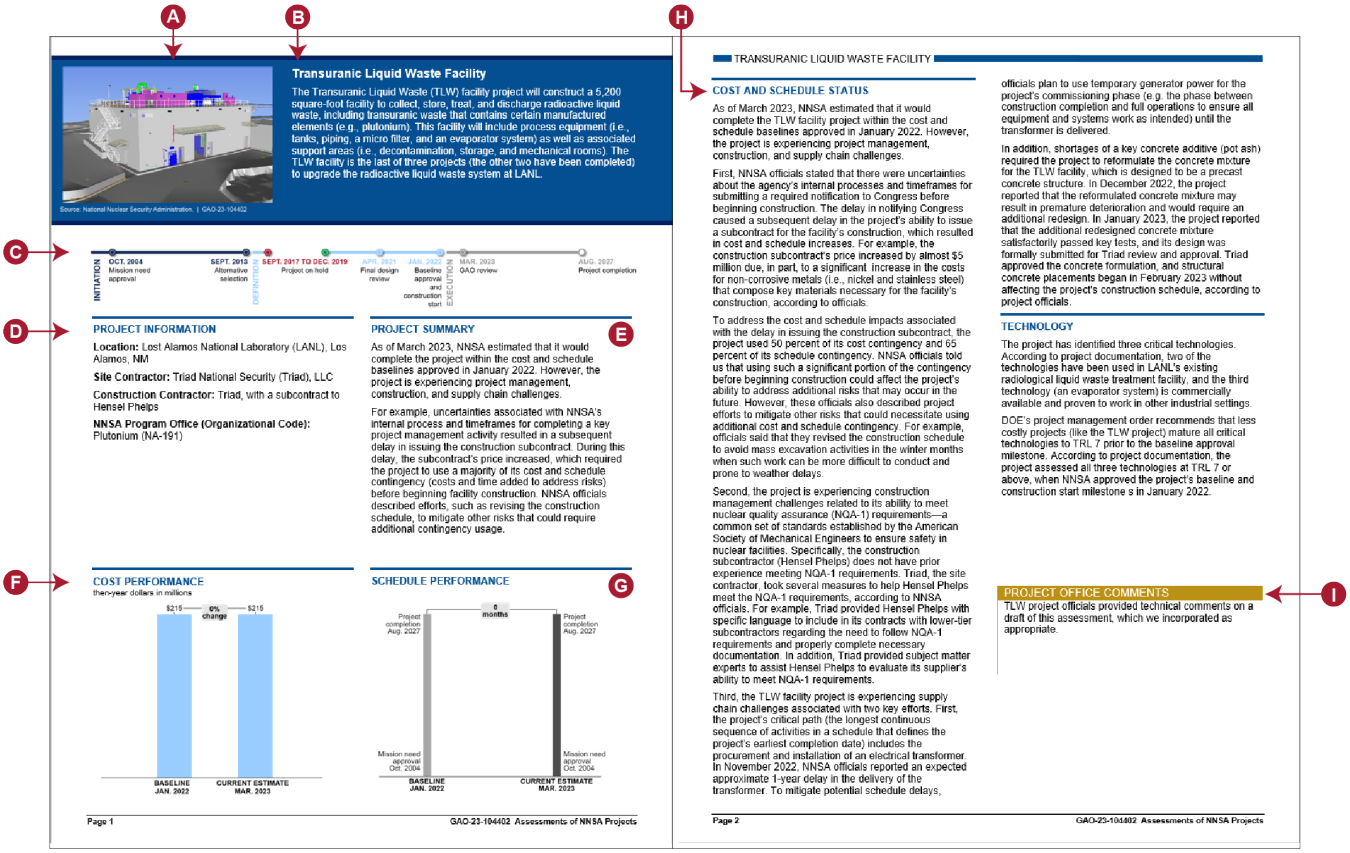
In the following section, we present summaries of 28 National Nuclear Security Administration (NNSA) major projects in a two-page or one-page profile format.

- Each summary generally includes a description of the project's objectives, information about location and contractors involved in the project, cost and schedule performance or status (as of June 2025), a timeline identifying key project dates, and a brief narrative describing the status of the project. Each summary also describes the challenges identified by the project, if applicable, and the extent to which the project faces cost or schedule risks because of these challenges.
- Two-page summaries are for major projects with estimated costs of $750 million or more. One-page summaries are for major projects with estimated costs less than $750 million.

We provided NNSA's project offices with a draft of these summaries for review and comment. We present cost and schedule information as of June 2025. However, in their comments, NNSA project officials provided updates to this information for some projects, including transitions between project phases (e.g., from the definition phase to the execution phase). We have included this information in the project office comment sections of the applicable summaries.

See figure 4 for an illustration of a sample assessment layout. Additional source information for images and figures can be found in appendix IX.

Figure 4: Illustration of a Sample Project Summary



- **A** Illustration of the building, equipment, or system.
- **B** General description of the project's objectives.
- **C** Timeline identifying key dates for the project including when the project began, selected the alternative, held major design reviews, began execution, and reached completion.
- **D** Project Information: Identifies the project's type, location, site contractor, design or construction contractor, NNSA program office critical technologies, and related projects.
- **E** Project Summary: Brief narrative describing the current status of the project.
- **F** Cost: For projects in definition, the preliminary cost estimate (or range of costs) approved at alternative selection and latest estimate. For projects in execution, the original approved cost baseline and latest estimate.
- **G** Schedule: For projects in definition, the preliminary completion date estimate (or range of dates) approved at alternative selection and latest estimate. For projects in execution, the original approved schedule baseline and latest estimate.
- **H** The second page of the assessment presents an analysis of project challenges and the extent to which the project faces cost, schedule, design, technology, or performance risks because of these challenges.
- **I** Project Office Comments: General comments provided by the cognizant project office.

Source: GAO analysis. | GAO-26-107777

Los Alamos National Laboratory

Conducts research and development of nuclear weapons.
Performs high-performance computing and radiography.
Conducts plutonium basic research and explosive science.
Produces detonators and plutonium pits.

PRIME CONTRACTOR (MANAGEMENT AND OPERATING)

Triad National Security, LLC

PARTIES TO PRIME CONTRACT

Battelle Memorial Institute

The Texas A&M University System

The Regents of the University of California

PROJECTS IN DEFINITION PHASE

Electrical Power Capacity Upgrade

Los Alamos Plutonium Pit Production Project (LAP4) 30 Reliable Equipment Installation

LAP4 Training/Development Center

PROJECTS IN EXECUTION PHASE

Chemistry and Metallurgy Research Replacement (CMRR) Plutonium Facility-4 Equipment Installation, Phase 2

LAP4 30 Base Equipment Installation

LAP4 Decontamination and Decommissioning

LAP4 West Entry Control Facility

Technical Area-55 Reinvestment Project, Phase III

Transuranic Liquid Waste Facility

Source: © 2024, Triad National Security, LLC. | GAO-26-107777

Electrical Power Capacity Upgrade

The Electrical Power Capacity Upgrade (EPCU) project plans to increase capability and improve reliability and resiliency of the existing electrical transmission and distribution systems at the site. The project intends to improve the site's electrical utility infrastructure to support future load demands of several key programs that will support the broader nuclear and global security missions of NNSA.

INITIATION

- **AUG. 2018** Mission need approval
- **AUG. 2021** Conceptual design review
- **NOV. 2022** Alternative selection

DEFINITION

- **JUNE 2025** GAO review
- **SEPT. 2025** Baseline approval and construction start

EXECUTION

- **JAN. 2026** Preliminary design review
- **OCT. 2026** Final design review
- **DEC. 2031** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Design Contractor: Nova-Probst Joint Venture (NP)

NNSA Program Office: Infrastructure

Critical Technologies: None

Related Projects: None

PROJECT SUMMARY

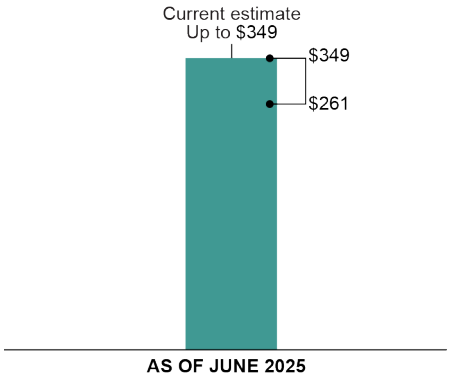
NNSA estimated that it will complete the project 18 months later than estimated at the alternative selection milestone, yet within the approved cost range. According to NNSA officials, as of June 2025 the agency will complete an external independent review by August 2025, and the project expects NNSA to approve its cost and schedule baselines in September 2025.

According to NNSA documents, the project awarded a subcontract in January 2024 to design and build the transmission line. NNSA officials told us they approved early procurement activities in February 2025 to obtain equipment such as transformers and breakers ahead of the project's construction. In addition, the subcontractor continues to mature the final design, including elements associated with overhead transmission and underground distribution.

According to NNSA documents and officials, one of the main challenges facing the new transmission line had been completing a multi-agency environmental assessment of cultural and biological resources for the siting. In August 2025, DOE determined that taking the further step of completing an environmental impact statement under the National Environmental Protection Policy Act would not be required. This determination supported the project in reaching the baseline approval and construction start milestone.

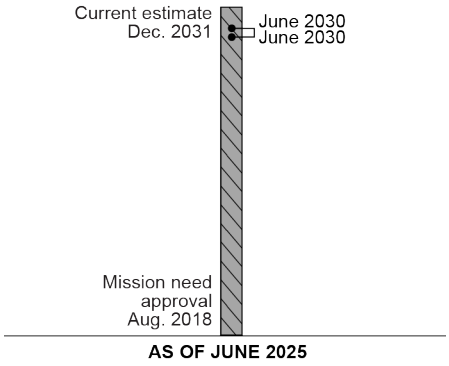
PRELIMINARY COST[a]

then-year dollars in millions



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE[a]



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate. In October 2025, NNSA approved cost and schedule baselines for the project with an estimated cost of $428 million and a completion date of September 2031.

Source: Los Alamos National Laboratory. | GAO-26-107777

Los Alamos Plutonium Pit Production Project, 30 Reliable Equipment Installation

The 30 Reliable Equipment Installation (30R) project plans to design and install new processing equipment and gloveboxes to ensure the reliable capability (i.e., having no single points of failure) to produce plutonium pits, the fissile core of a nuclear weapon. This project is one of five that comprise the overall Los Alamos Plutonium Pit Production Project (LAP4) to modify existing nuclear facilities, construct new nonnuclear training and support facilities, and install equipment and enclosures to enable production rate of 30 war reserve pits (certified for use in nuclear weapons) per year at the site.

INITIATION

- **NOV. 2015** Mission need approval
- **DEC. 2020** Conceptual design review
- **APR. 2021** Alternative selection

DEFINITION

- **MAY 2023** Preliminary design review
- **OCT. 2024** Final design review
- **JUNE 2025** GAO review
- **APR. 2026** Baseline approval and construction start

EXECUTION

- **TBD** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Design Contractor: Triad with subcontract to Merrick & Company (Merrick)

NNSA Program Office: Plutonium

Critical Technologies: 113

Related Projects: LAP4 30 Base Equipment Installation (30B); LAP4 Decontamination and Decommissioning (D&D); LAP4 Training and Development Center; and LAP4 West Entry Control Facility

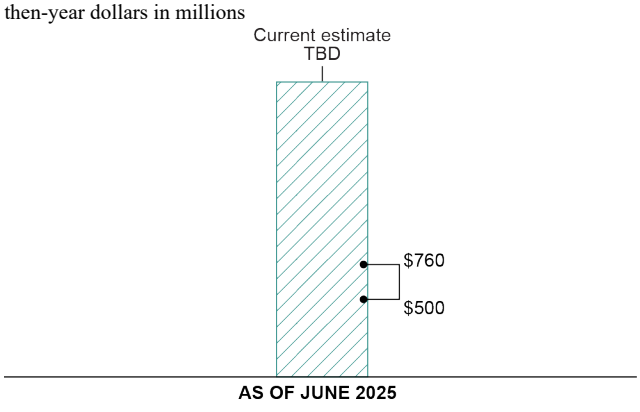
PROJECT SUMMARY

As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to its replanning efforts. Specifically, as part of the 30 Diamond (30D) strategy NNSA approved in April 2024, the agency is replanning the scope of the project—along with the scope of two other LAP4 projects (30B and D&D)—to support the fastest path to a production rate of 30 war reserve pits per year at LANL by December 2028. According to NNSA documents and officials, the project is waiting on revised cost and schedule baselines for 30B and D&D before preparing baselines for the 30R project.

As part of this effort, NNSA plans on transferring over 50 less-critical items of equipment for installation and demolition from 30B and D&D to 30R. Additionally, NNSA will transfer six program priorities from 30R to 30B for expedited execution. NNSA officials stated they expect the implementation of the 30D strategy to exceed the preliminary cost and schedule estimates established in April 2021 for 30R. According to NNSA documents, it may approve 30R's cost and schedule baselines by April 2026.

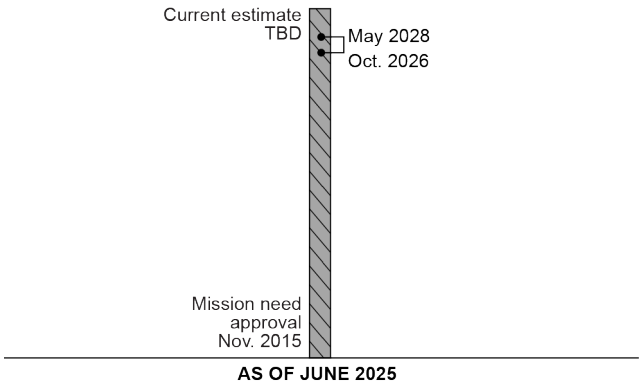
PRELIMINARY COST[a]

then-year dollars in millions



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE[a]



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

COST AND SCHEDULE STATUS

As of June 2025, NNSA was reviewing the 30R project's cost and schedule estimates due to replanning efforts. Officials said they were waiting for NNSA to approve revised baselines for the LAP4 D&D and 30B projects as part of NNSA's 30D strategy and were continuing to advance planning for the 30R project.

Specifically, as part of the 30D strategy NNSA approved in April 2024, the agency is replanning the scope of the 30B, 30R, and D&D projects to support the fastest path to a production rate of 30 war reserve pits per year at LANL by December 2028. NNSA officials stated that they expect implementation of the 30D strategy to increase costs and delay the schedule for the 30R project compared to the preliminary cost and schedule ranges approved at the alternative selection milestone. The current program focus is on the 30D strategy, and the enduring mission capability will be phased in based on ongoing planning and decisions within the next year.

Under the 30D strategy, NNSA has defined a prioritized list of equipment (called the Equipment and Infrastructure List) needed to achieve the required pit production capacity at LANL. According to NNSA officials and documents, they will revise the project's scope to align with this equipment list and transfer lower priority items from the 30B and D&D projects into the 30R project's scope. Specifically, officials will increase the 30R project's originally planned set of items of equipment from 59 items to 113 items that are considered less critical to achieving the initial pit production capacity. However, NNSA will also transfer six program priorities from 30R to the 30B project's scope for expedited execution in support of the required pit production capacity.

NNSA officials said they expect the scope realignment to increase the project's total cost and delay its completion. Specifically, the scope realignment (increase of equipment from 59 to 113 items) will result in a 92 percent increase in the items of equipment within the project's scope (compared to the preliminary estimates). Officials also said they expect design and fabrication costs to increase based on cost estimates from the 30B and D&D projects. In addition, officials said that the realignment will delay some of the project's planned activities.

According to NNSA documents, the project team previously expected NNSA to approve cost and schedule baselines in October 2024. However, after NNSA approved the 30D strategy, the project's scope and preliminary cost range estimates were no longer valid. As of June 2025, NNSA is evaluating tailoring options both from a budget and scope perspective in coordination with the NNSA Plutonium Modernization Program Office.

In March 2023, according to NNSA documents, NNSA approved one early procurement package for $99 million, which included glovebox fabrications. NNSA officials noted challenges related to limited qualified vendors and competing vendor projects, which caused delays. The project team expects to complete the work package by December 2025. However, the NNSA 30D strategy's scope realignment reprioritized and paused the project's other procurement activities based on need date and execution phasing of critical equipment.

DESIGN

The project completed its final design review in October 2024 with the exception of one design package that was placed on hold in order to clarify its scope. NNSA officials said that they expect the design of the last package to be completed by March 2026.

TECHNOLOGY

The project team had identified 107 critical technologies prior to the finalization of its scope under the 30D strategy. However, according to NNSA documents, this number may change once NNSA has approved revised cost and schedule estimates for the 30B and D&D projects.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Los Alamos National Laboratory. | GAO-26-107777

Los Alamos Plutonium Pit Production Project, Training and Development Center

The Training and Development Center (TDC) project plans to design and construct a facility that supports training on production equipment in a nonnuclear environment, laboratory space for equipment testing, a process improvement area, and a development area, among others. This project is one of five that comprise the overall Los Alamos Plutonium Pit Production Project (LAP4) to modify existing nuclear facilities, construct new nonnuclear training and support facilities, and install equipment and enclosures to enable a production rate of 30 plutonium pits (the fissile core of a nuclear weapon) per year at the site.

INITIATION

- **NOV. 2015** Mission need approval
- **DEC. 2020** Conceptual design review
- **APR. 2021** Alternative selection

DEFINITION

- **MAY 2025** Preliminary design review
- **JUNE 2025** GAO review
- **TBD** Final design review
- **TBD** Baseline approval and construction start

EXECUTION

- **TBD** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Design Contractor: Triad, with a planned subcontract

NNSA Program Office: Plutonium

Critical Technologies: None

Related Projects: LAP4 30 Base Equipment Installation; LAP4 30 Reliable Equipment Installation; LAP4 Decontamination and Decommissioning; and LAP4 West Entry Control Facility

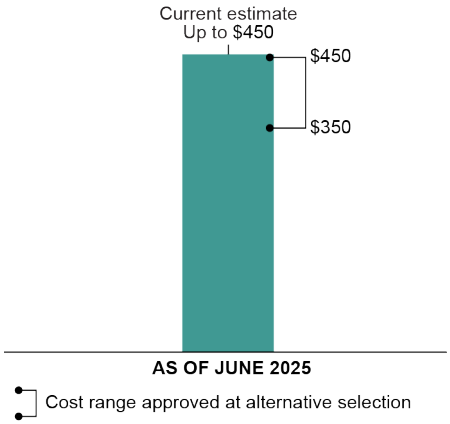
PROJECT SUMMARY

As of June 2025, NNSA was replanning the project's acquisition strategy to keep within its preliminary cost estimate. According to NNSA officials, the project plans to keep its total cost within the $450 million threshold but has not determined the impact of the new strategy on its schedule. According to officials in March 2025, based on information provided by a subcontractor, officials estimated that the cost of the project would exceed $450 million (the high end of the cost estimate range approved at the alternative selection milestone). In response, according to NNSA documents and officials, NNSA directed Triad in February 2025 to cease activities associated with the previous acquisition strategy and begin implementing a new acquisition strategy.

According to NNSA officials, the project is in the process of establishing a new design-build subcontract that will include both the design and construction of the facility. The schedule for conducting the preliminary and final design reviews, as well as for seeking approval of cost and schedule baselines, will be dependent on the bids the contractor receives on this subcontract in fiscal year 2026. As a result, the project has not yet determined the dates for these milestones.

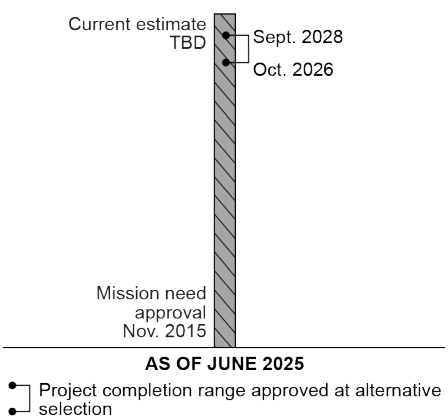
PRELIMINARY COST[a]

then-year dollars in millions



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE[a]



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

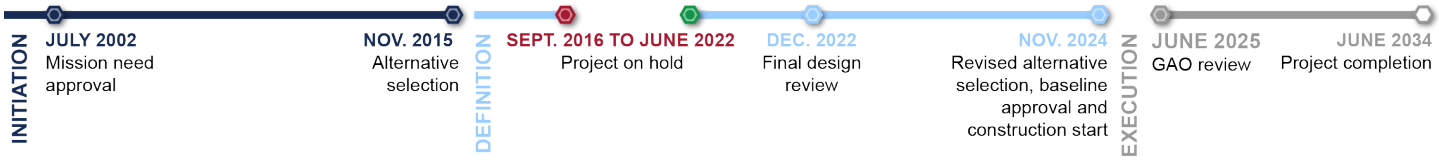
PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Los Alamos National Laboratory. | GAO-26-107777

Chemistry and Metallurgy Research Replacement – Plutonium Facility-4 Equipment Installation, Phase 2

The Chemistry and Metallurgy Research Replacement (CMRR) Plutonium Facility-4 Equipment Installation, Phase 2 (PEI2) project plans to decontaminate and decommission existing and legacy equipment in the Plutonium Facility-4 (PF-4) building; install new plutonium analysis equipment in the building; and complete multiple supporting infrastructure activities, such as upgrades to existing security posts. This is one of five related projects for transferring and modernizing existing plutonium analysis operations from a 1950s-era building to two newer facilities and constructing new supporting infrastructure for planned workload increases.



PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Construction Contractor: Triad

NNSA Program Office: Plutonium

Critical Technologies: None

Related Projects: Four completed CMRR projects

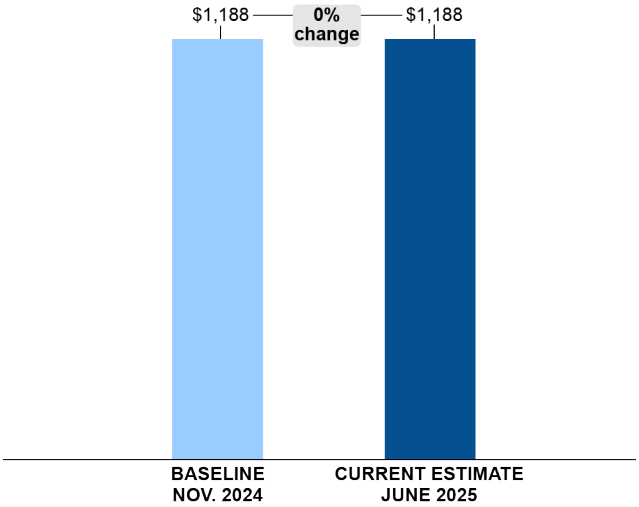
PROJECT SUMMARY

In November 2024, NNSA revised the project's alternative selection decision and approved its cost and schedule baselines. The baselines are about $500 million more and almost 10 years later than the high end of the preliminary cost and schedule ranges approved in November 2015. NNSA documentation and officials cited multiple reasons for these changes.

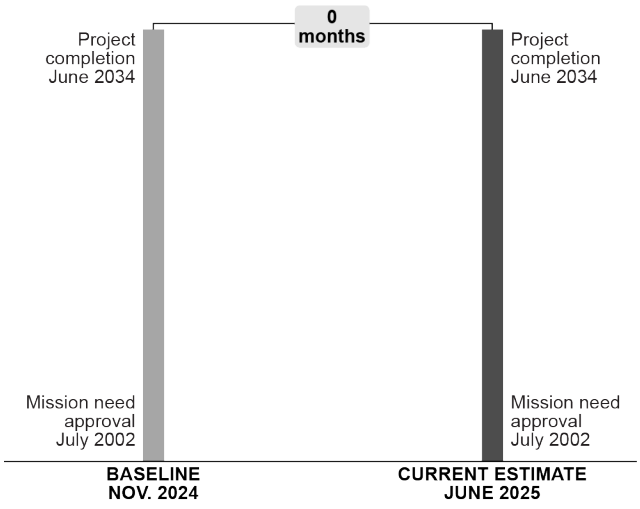
For example, NNSA placed the project on hold from September 2016 to June 2022. During this time, NNSA tailored the project's strategy to execute prioritized activities by certain milestones to support the plutonium program. According to NNSA officials, the project may not obtain the resources it seeks due to prioritization of the Los Alamos Plutonium Pit Production Project. Officials stated that the PEI2 project is planning to work with subcontractors to mitigate this ongoing risk.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



COST AND SCHEDULE STATUS

NNSA approved the project's cost and schedule baselines in November 2024, at which time the agency also revised its alternative selection decision. The project's baselines are about $500 million more and almost 10 years later than the high end of the preliminary cost and schedule ranges approved in November 2015. The project began reporting its performance related to these baselines in March 2025.

According to NNSA officials and documents, the changes in the project's cost and schedule are due to multiple factors. First, according to officials, the PEI2 project is the last project of the overall CMRR project. As part of its revised alternative selection decision in November 2024, NNSA approved a revised cost range that was consistent with the range it approved for the overall CMRR project in 2014.

Second, NNSA placed the project on hold from September 2016 to June 2022. During this time, NNSA revised the project's strategy to execute prioritized activities by certain milestones to support the plutonium program.

Third, as part of its revised alternative selection decision, the project expanded its scope by including an increase to the vehicle access capacity of both the east and west sides of the TA-55 protected area (which includes PF-4).

Fourth, the project's three ongoing site preparation or procurement activities experienced delays, including the project's procurement of gloveboxes (a sealed, protectively lined compartment having holes to which gloves are attached for safe use in handling plutonium inside the compartment), security equipment, and other items.

In addition, according to NNSA officials, the project paused some early site preparation activities in late 2023 when Triad released the original subcontractors for some of this work due to performance issues, including a security violation. Also, officials told us a piece of equipment required rework because Triad did not provide the proper design specifications. According to project documents, these three activities were included in the overall PEI2 project's baseline as they were not completed before the project reached the baseline approval milestone. The combined scope for all three activities at the time of their approval totaled approximately $231 million. One of the three activities was completed and became operational in September 2025.

In addition, according to NNSA officials, the project's resources have been affected by NNSA's prioritization of the 30 Diamond strategy to support the fastest path to a rate production of 30 war reserve pits per year. Officials stated that because CMRR PEI2 and the three projects in the 30 Diamond strategy require the majority—if not all—of its work to be performed in the PF-4 building, CMRR PEI2 has been impacted by its designation as a lower priority project. According to NNSA officials, the project has awarded a task order agreement with a new subcontractor to mitigate this risk. According to officials, this subcontractor has expertise from previously working in nuclear facilities such as PF-4. The task order agreement will provide additional craft resource and construction supervision for the project, reducing its reliance on experienced internal resources at LANL.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Los Alamos National Laboratory. | GAO-26-107777

Los Alamos Plutonium Pit Production Project, 30 Base Equipment Installation

The 30 Base Equipment Installation (30B) project plans to design and install new processing equipment and gloveboxes to ensure a base capability to produce 30 plutonium pits (the fissile core of a nuclear weapon) per year. This project is one of five that comprise the overall Los Alamos Plutonium Pit Production Project (LAP4) to modify existing nuclear facilities, construct new nonnuclear training and support facilities, and install equipment and enclosures to enable production capacity of 30 war reserve pits (certified for use in nuclear weapons) per year at the site.

INITIATION

- **NOV. 2015** Mission need approval
- **APR. 2021** Alternative selection

DEFINITION

- **SEPT. 2022** Final design review
- **JAN. 2023** Baseline approval and construction start

EXECUTION

- **JUNE 2025** GAO review
- **AUG. 2030** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Construction Contractor: Triad

NNSA Program Office: Plutonium

Critical Technologies: 51

Related Projects: LAP4 Decontamination and Decommissioning (D&D); LAP4 30 Reliable Equipment Installation (30R); LAP4 Training and Development Center; and LAP4 West Entry Control Facility

PROJECT SUMMARY

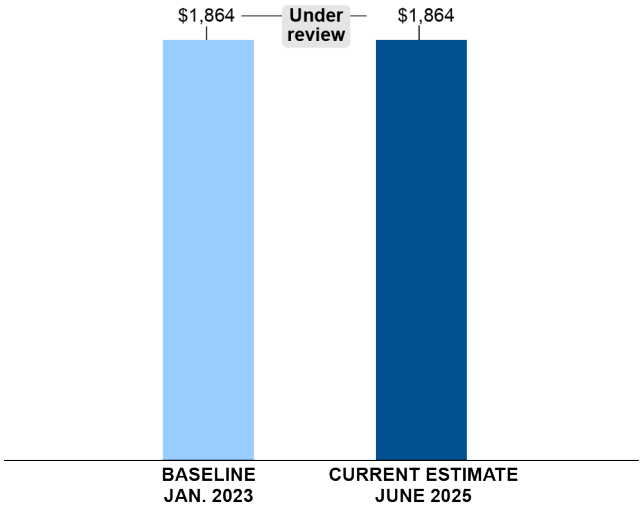
As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. Specifically, as part of the 30 Diamond (30D) strategy NNSA approved in April 2024, the agency is realigning the scope of the LAP4 30B, 30R, and D&D projects to support the fastest path to rate production for 30 war reserve pits per year at LANL by December 2028.

As part of this realignment, NNSA is prioritizing the procurement and installation of certain items of equipment by transferring less critical items from 30B's scope to 30R. NNSA also plans to transfer six program priorities from the 30R project to the 30B project.

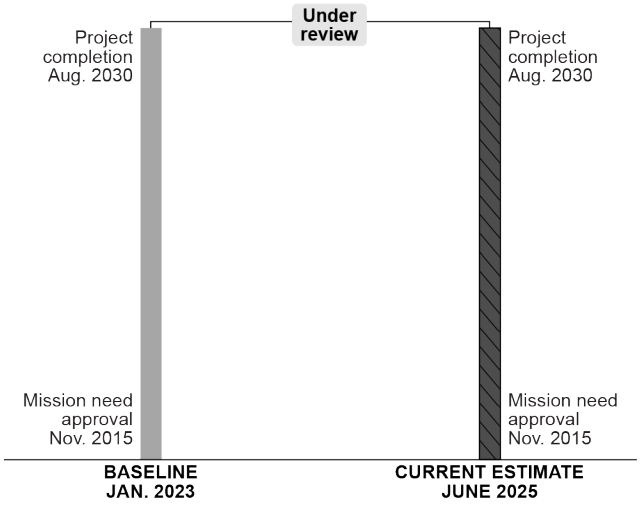
NNSA officials stated that they expect the implementation of the 30D strategy to slightly increase the cost of the 30B project and delay its completion. Officials told us that they expect NNSA to approve revised cost and schedule baselines for the project by early 2026.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



COST AND SCHEDULE STATUS

As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. Specifically, as part of its 30D strategy that NNSA approved in April 2024, the agency is realigning the scope of the LAP4 30B, 30R, and D&D projects to support the fastest path to rate production to produce 30 war reserve pits per year at LANL by December 2028.

According to NNSA officials, NNSA and LANL have refined program requirements for the pit production mission at LANL, which NNSA first established in October 2020, based on lessons learned from qualifying pit production processes and maturing the design of process equipment. LANL developed the 30D strategy during 2023 and defined a prioritized list of equipment to deliver the fastest path to the rate production of 30 pits per year. However, the 30D strategy differs from NNSA's original strategy when it approved the performance baselines for the D&D project (in November 2021) and the 30B project (in January 2023).

As part of the realignment, according to NNSA officials and documents, the agency will revise the 30B project's scope to align with the revised equipment list and transfer lower priority items to the scope of the 30R project. Specifically, NNSA will reduce 30B's originally planned set of 62 items of equipment to 50 items of equipment that are considered more critical to achieving the pit production capacity.

Prior to the approval of the 30D strategy, DOE's Office of Project Management had assessed the project as behind schedule. According to NNSA officials, delays to the 30B baseline plan were attributed to several factors, including prioritizing resources to achieve the first production unit for W87-1 through late 2024, realigning activities based on implementing the 30D strategy, and glovebox procurements taking longer than planned. With the implementation of the 30D strategy, DOE's Office of Project Management is finalizing its external independent review of the 30B project, after completing the onsite portion of its review in February 2025.

Although the overall number of items that will be procured through the 30B project will be reduced from 62 to 50, NNSA officials said they expect the implementation of the 30D strategy to slightly increase the cost of the 30B project and revise its completion date due to the scope realignment and the risks associated with executing its scope. Officials told us that they expect NNSA to approve revised cost and schedule baselines for the project by early 2026.

TECHNOLOGY

The project team identified 51 critical technologies for the revised project under the 30D strategy.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Los Alamos National Laboratory. | GAO-26-107777

Los Alamos Plutonium Pit Production Project, Decontamination and Decommissioning

The Decontamination and Decommissioning (D&D) project plans to decontaminate and remove legacy plutonium processing equipment and waste from an operating nuclear facility to create space for new equipment for pit production (the fissile core of a nuclear weapon) that will be installed in subsequent projects. This project is one of five that comprise the overall Los Alamos Plutonium Pit Production Project (LAP4) to modify existing nuclear facilities, construct new nonnuclear training and support facilities, and install equipment and enclosures to enable production capacity of 30 war reserve pits (certified for use in nuclear weapons) per year at the site.

INITIATION

- **NOV. 2015** Mission need approval
- **APR. 2021** Alternative selection

DEFINITION

- **OCT. 2021** Final design review
- **NOV. 2021** Baseline approval and construction start

EXECUTION

- **JUNE 2025** GAO review
- **MAR. 2027** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Construction Contractor: Triad

NNSA Program Office: Plutonium

Critical Technologies: 80 (under review)

Related Projects: LAP4 30 Base Equipment Installation (30B); LAP4 30 Reliable Equipment Installation (30R); LAP4 Training and Development Center; and LAP4 West Entry Control Facility

PROJECT SUMMARY

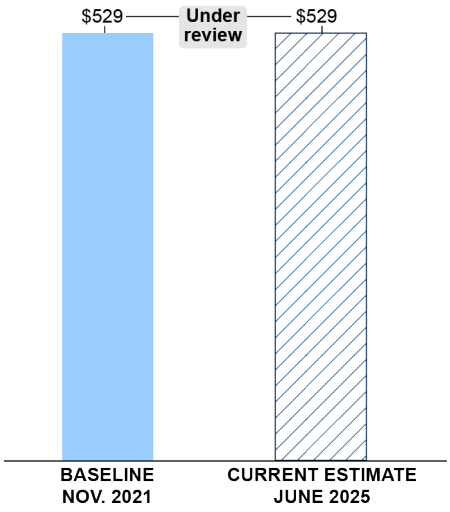
As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. Specifically, as part of the 30 Diamond strategy that NNSA approved in April 2024, the agency is realigning the scope of the LAP4 D&D, 30B, and 30R projects to support the fastest path to rate production for the 30 war reserve pits per year at LANL by December 2028.

As part of this realignment, NNSA is prioritizing the decontamination and demolition of existing equipment in the D&D project scope that it considers more critical to establishing the required pit production capacity. Additionally, NNSA will transfer other, less critical items to the scope of the 30R project.

DOE's Office of Project Management is finalizing its independent review of the project, after completing the onsite portion of the review in February 2025. NNSA officials did not indicate whether they expected cost or schedule overruns compared to the baselines approved in November 2021. However, according to NNSA documents, the project has identified issues with the rate at which Triad has completed construction activities. As of November 2025, officials expected NNSA to approve revised cost and schedule baselines for the project by January 2026, according to NNSA documents.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Los Alamos National Laboratory. | GAO-26-107777

Los Alamos Plutonium Pit Production Project, West Entry Control Facility

The West Entry Control Facility (WECF) project plans to design and construct a new, secure worker entry facility to accommodate 800 additional employees who are expected to work inside a restricted area. This facility will include employee identification booths and X-ray machines, as well as space for additional security measures. This project is one of five that comprise the overall Los Alamos Plutonium Pit Production Project (LAP4) to modify existing nuclear facilities, construct new nonnuclear training and support facilities, and install equipment and enclosures to enable production capacity of 30 plutonium pits (the fissile core of a nuclear weapon) per year at the site.

INITIATION
- NOV. 2015 — Mission need approval
- APR. 2021 — Alternative selection

DEFINITION
- OCT. 2024 — Final design review
- JAN. 2025 — Baseline approval and construction start

EXECUTION
- JUNE 2025 — GAO review
- SEPT. 2029 — Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Construction Contractor: Triad, with subcontract to Hensel Phelps Construction New Mexico, LLC

NNSA Program Office: Plutonium

Critical Technologies: None

Related Projects: LAP4 30 Base Equipment Installation; LAP4 30 Reliable Equipment Installation; and two additional LAP4 projects

PROJECT SUMMARY

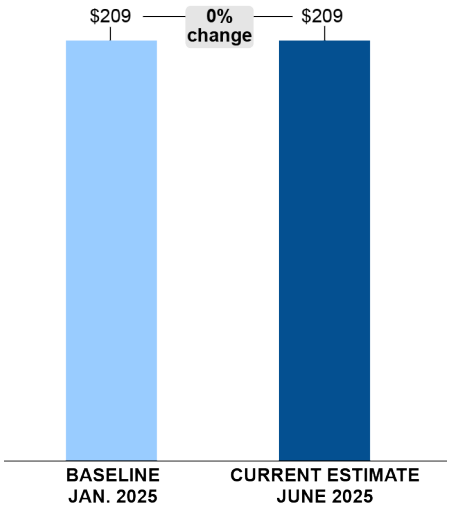
NNSA approved the project's cost and schedule baselines in January 2025. These baselines are $79 million above and 2 and a half years longer than the high end of the preliminary cost and schedule ranges approved in April 2021.

According to NNSA officials, the higher cost estimate is due in part to the cost of the construction subcontract award. The bids for this subcontract exceeded previously estimated costs due to final design changes (such as security modifications) that took place after the alternative selection milestone—as well as to general price increases that were reflected in construction bids.

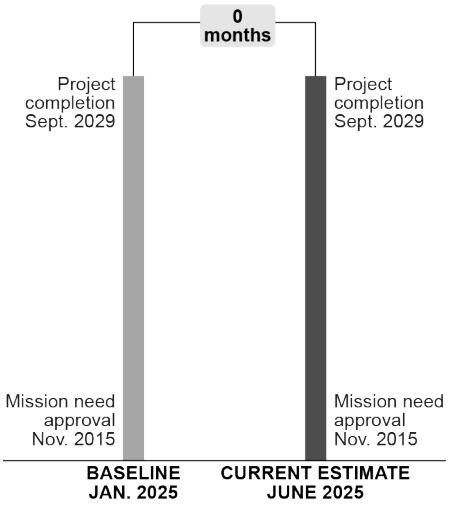
According to NNSA officials, the longer schedule is due in part to unanticipated conditions at the site. During early site preparation activities, the project found asphalt and debris mixed in with existing soil at the facility, which delayed potholing activities and raised concerns about the suitability of the soil for use as fill material. As of June 2025, officials stated most of the issues had been resolved and that surface preparations for the facility were underway.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Los Alamos National Laboratory. | GAO-26-107777

Technical Area-55 Reinvestment Project Phase III

The Technical Area-55 Reinvestment Project Phase III (TRP III) project plans to replace and expand an existing fire alarm system so the system is up to code in both nuclear and nonnuclear facilities located in Technical Area-55, including the 233,000-square-foot Plutonium Facility-4 (PF-4), the nation's only fully operational, full-capacity plutonium facility. The project plans to install system components, including area-wide smoke and heat detectors, water flow switches, and audio and visual notification devices throughout PF-4, as well as consolidate over 2,000 monitoring devices spread throughout 199 fire protection zones. The new system will also separate the fire alarm functions of nuclear facilities from nonnuclear facilities.

INITIATION
- **MAR. 2005** Mission need approval
- **JAN. 2021** Final design review
- **MAY 2021** Alternative selection

DEFINITION
- **MAY 2021** Baseline approval and construction start

EXECUTION
- **JUNE 2025** GAO review
- **NOV. 2028** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Construction Contractor: Triad, with subcontracts to Premier Fire and Beltline Electric

NNSA Program Office: Plutonium

Critical Technologies: None

Related Projects: None

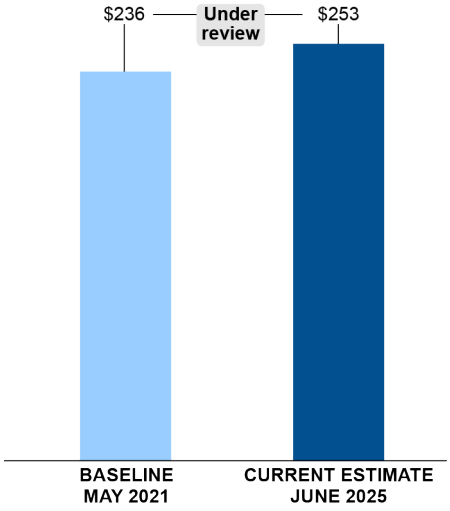
PROJECT SUMMARY

As of June 2025, NNSA estimated that it will complete the project at a cost of about $253 million (baseline is $236 million) in November 2028 (baseline is June 2027). NNSA officials primarily attributed the cost overrun and delay to the complex task of working in an operational facility undergoing parallel construction projects. Specifically, according to NNSA documents, higher priority projects—such as the Los Alamos Plutonium Pit Production (LAP4) projects—have affected the schedule for the TRP III project because they require the same space in the PF-4 facility to perform their work. According to NNSA documents, officials requested an internal review of the project to evaluate (among other things) its coordination with other project work in PF-4, beginning in May 2025.

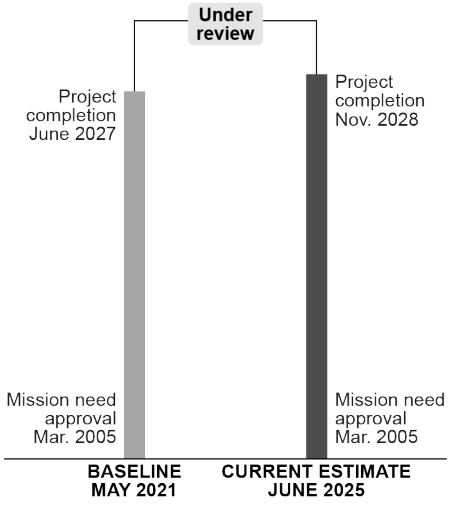
In addition, according to NNSA officials and documentation, other factors contributed to the project's cost overrun and schedule delay. For example, NNSA officials told us the project previously experienced delays because Triad did not provide the planned number of electricians. However, according to officials, Triad has improved its training of skilled labor for the project, contributing to an increase of qualified electricians. NNSA officials said they expect the agency to approve revised project cost and schedule baselines in March 2026.

COST PERFORMANCE

then-year dollars in millions

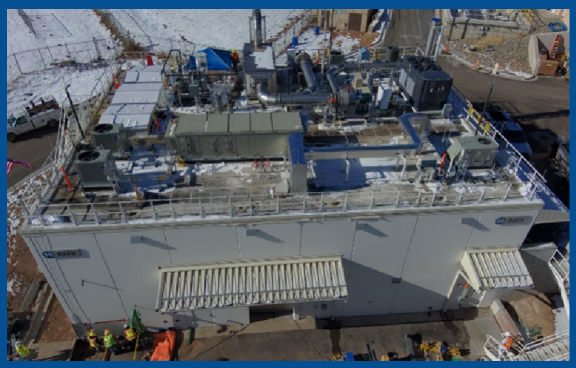


SCHEDULE PERFORMANCE



PROJECT OFFICE COMMENTS

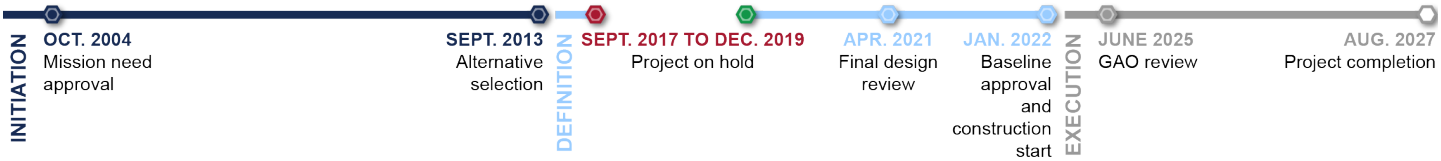
Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.



Source: Los Alamos National Laboratory. | GAO-26-107777

Transuranic Liquid Waste Facility

The Transuranic Liquid Waste (TLW) facility project plans to construct a 5,200 square-foot facility to collect, store, treat, and discharge radioactive liquid waste, including transuranic waste that contains certain manufactured elements (e.g., plutonium). This facility is designed to include process equipment (i.e., tanks, piping, a micro filter, and an evaporator system) as well as associated support areas (i.e., decontamination, storage, and mechanical rooms). The TLW facility is the last of three projects to upgrade the radioactive liquid waste system at the site, with the other two having been completed.



PROJECT INFORMATION

Type: Line-item construction

Location: Los Alamos National Laboratory (LANL), Los Alamos, NM

Site Contractor: Triad National Security, LLC (Triad)

Construction Contractor: Triad, with subcontract to Hensel Phelps

NNSA Program Office: Plutonium

Critical Technologies: 3

Related Projects: None

PROJECT SUMMARY

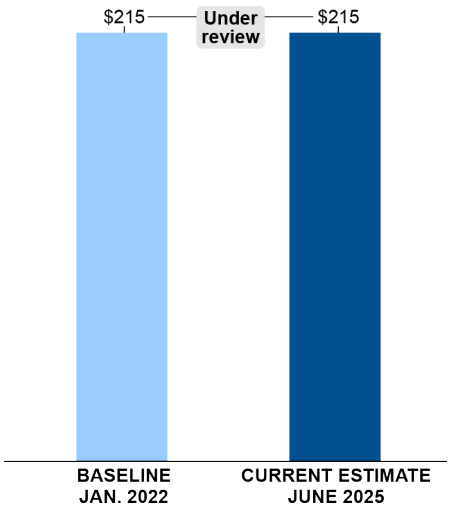
As of June 2025, NNSA estimated that it would complete the project within the cost and schedule baselines approved in January 2022. However, according to NNSA documents, the project may experience a cost overrun and schedule delay.

For example, according to NNSA officials, the project may experience cost growth of up to 10 percent over its baseline due to activities like project start-up. According to NNSA documentation, the anticipated cost overruns are primarily due to Triad not planning for some activities that fell within the scope of work. This included oversight of field activities such as testing of welders. Officials stated that the project completed a limited peer review in April 2025 to support replanning efforts and to address expected cost increases. As of June 2025, the project was considering revising its cost and schedule baselines.

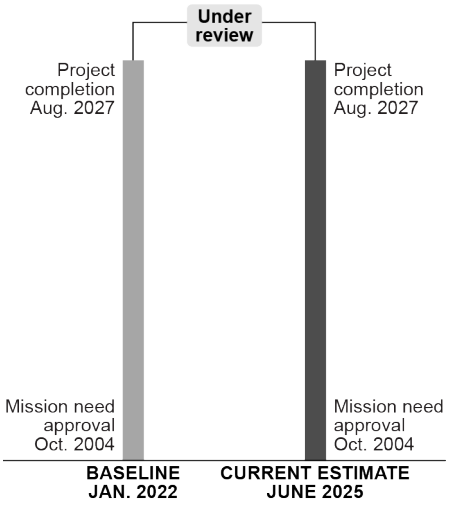
In addition, as of March 2025, according to DOE's Office of Project Management, the project was at risk of not meeting its approved completion date due to poor construction productivity. According to NNSA officials, the project experienced a misalignment in how work was planned between the project's baseline and the subcontractor's schedule, which produced variances in its reported progress against its planned work (i.e., earned value).

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Nevada National Security Site

Conducts high-hazard operations in support of NNSA, Department of Defense, and other agencies.

PRIME CONTRACTOR (MANAGEMENT AND OPERATING)

Mission Support and Test Services, LLC

PARTIES TO PRIME CONTRACT

Honeywell International, Inc.

Jacobs Engineering Group, Inc.

HII Nuclear Inc.

PROJECTS IN DEFINITION PHASE

Not applicable

PROJECTS IN EXECUTION PHASE

Enhanced Capabilities for Subcritical Experiments (ECSE) Advanced Sources and Detectors

ECSE Laboratory and Support Infrastructure

Source: Mission Support and Test Services, LLC. | GAO-26-107777

Enhanced Capabilities for Subcritical Experiments Advanced Sources and Detectors

Located nearly 1,000 feet underground, the Enhanced Capabilities for Subcritical Experiments (ECSE) Advanced Sources and Detectors (ASD) project plans to design, fabricate, install, and commission a 22-million electron volt accelerator to generate X-ray images of subcritical implosion experiments to measure the dynamic behavior of plutonium under weapons-relevant conditions. The configuration and quantities of high explosives and plutonium are designed to ensure that no self-sustaining nuclear fission chain reaction will occur. The related ECSE Laboratory and Support Infrastructure (LSI) project intends to provide the ASD project with needed utilities, as well as diagnostic and control rooms. NNSA collectively refers to the ECSE ASD and LSI projects as the Scorpius Test Bed.

INITIATION

- **SEPT. 2014** Mission need approval
- **FEB. 2019** Alternative selection

DEFINITION

- **JAN. 2022** Final design review
- **NOV. 2022** Revised alternative selection, baseline approval and construction start

EXECUTION

- **JUNE 2025** GAO review
- **JAN. 2033** Project completion

PROJECT INFORMATION

Type: Major item of equipment

Location: Nevada National Security Site (NNSS), Mercury, NV

Site Contractor: Mission Support and Test Services, LLC (MSTS)

Other Contractors: Triad National Security, LLC; Lawrence Livermore National Security, LLC; and National Technology & Engineering Solutions of Sandia, LLC

NNSA Program Office: Experimental Sciences

Critical Technologies: 9

Related Projects: ECSE LSI

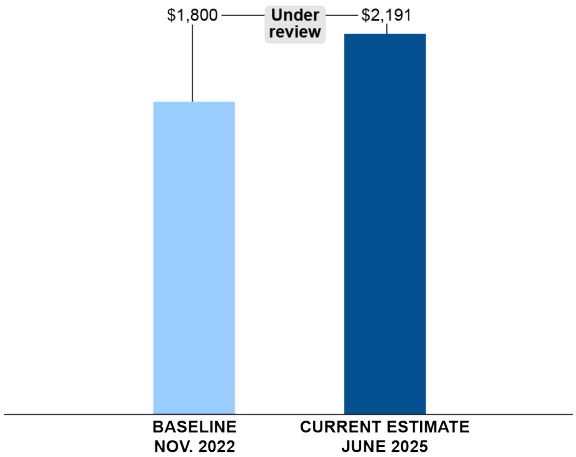
PROJECT SUMMARY

As of June 2025, NNSA estimated that it will complete the project at a cost of about $2.2 billion (baseline is $1.8 billion) in January 2033 (baseline is May 2030) based on an updated estimate from the project team accounting for previously unidentified activities. Increased costs for vendors and equipment were included in the estimate.

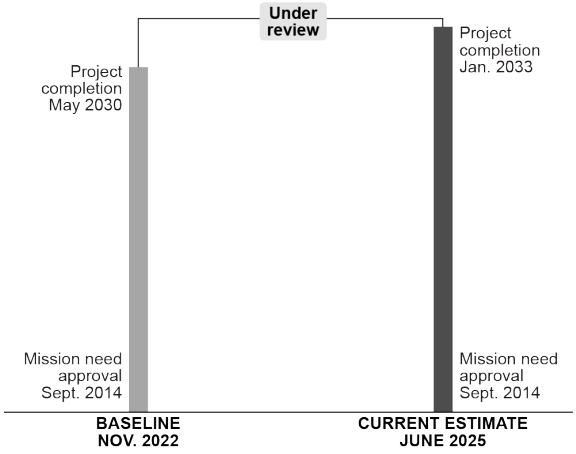
According to NNSA documentation, officials are preparing to seek approval for revised baselines based on increased costs for equipment and installation. Officials said that they originally expected the review of the revised baselines to occur in May 2025 but that resignations at DOE headquarters have affected the assignment of review teams. The review is now planned to occur in early 2026.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



COST AND SCHEDULE STATUS

As of June 2025, NNSA estimated that the project will cost about $2.2 billion, compared to its original baseline of $1.8 billion. NNSA also estimated that the project will be completed in January 2033, compared with the original baseline of May 2030.

According to NNSA documents and officials, the cost increase is due primarily to two issues. First, the project's original cost baseline did not account for all activities within the project's scope, such as integration and testing activities as well as staging and storage of equipment and materials. Second, the costs for some equipment (such as radiographic system components) and its installation have increased.

Regarding the schedule delay, according to officials, NNSA requested reduced funding for the project in fiscal year 2025 by $125 million to support higher-priority needs within the agency, which resulted in the project team replanning the project's pace of work. According to officials, the project had to replan its schedule for long-lead procurement activities in fiscal year 2025 to align the project's activities with the funding reduction, which combined with the activities discussed above, resulted in the completion date being delayed.

According to NNSA officials and documents, the project is seeking NNSA approval of the revised cost and schedule baselines. Officials said that they originally expected the reviews, which will be conducted partly by DOE personnel, to occur in May 2025. However, resignations at DOE headquarters have affected the assignment of review teams, and officials said that the review is now planned to occur in early 2026.

In terms of the project's acquisition strategy, NNSA designated Triad National Security, LLC, site contractor for Los Alamos National Laboratory, as the lead integrating contractor to manage the project. In addition, according to NNSA documents the Los Alamos National Laboratory is leading the multi-site approach being used to manage the project—which includes contractors at the Lawrence Livermore National Laboratory, Sandia National Laboratories, and Nevada National Security Site.

According to the project's schedule, the project has seven key subsystems that generally require separate procurement, assembly, and testing activities before all subsystems can be integrated together. For example, the project team expects to complete two long-lead procurements by the end of December 2026, compared with the 2023 estimate of June 2025. These procurements include key equipment (e.g., the imaging camera and detector); specialized components (e.g., semiconductors, housings, and vacuum systems); and equipment and materials for the Integrated Test Stand, which is an aboveground location in Nevada where NNSA will assemble and test some subsystems before installing them underground.

TECHNOLOGY

The project has identified nine critical technologies, such as a solid state pulsed power system and the detector itself, which is a key diagnostic tool that converts generated X-rays into visible light that is captured and stored in an imager for later processing.

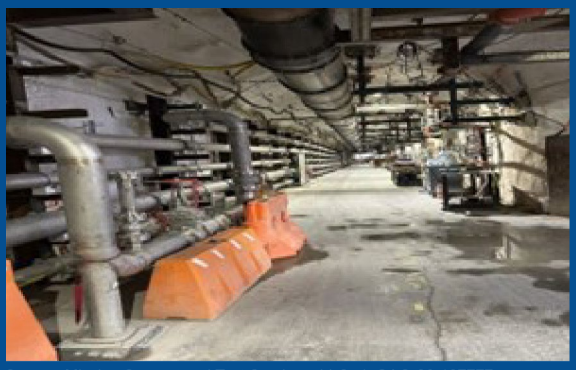
DOE's project management order requires that more costly projects (like the ASD project) mature all critical technologies to TRL 7 prior to the baseline approval milestone.

However, in October 2020, the NNSA Administrator approved an exemption to this requirement because, according to project documentation, there was no way to achieve TRL 7 without essentially building the entire accelerator. Instead, the NNSA Administrator required that the critical technologies achieve TRL 6 by the time of the combined baseline approval and construction start milestone.

In March 2022, a group of independent subject matter experts assessed all critical technologies to be at TRL 6, and NNSA approved the project's baselines in November 2022.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.



Source: Mission Support and Test Services, LLC. | GAO-26-107777

Enhanced Capabilities for Subcritical Experiments Laboratory and Support Infrastructure

The Enhanced Capabilities for Subcritical Experiments (ECSE) Laboratory and Support Infrastructure (LSI) project (a subproject of the U1a Complex Enhancements Project) includes mining new tunnels in an existing underground experimental complex, modifying existing tunnels, constructing power and cooling utilities aboveground, and constructing diagnostic and control rooms belowground. The LSI project will support the ECSE ASD project, which will be installed underground, to analyze subcritical plutonium experiments (i.e., experiments that do not produce a self-sustaining nuclear fission chain reaction). NNSA collectively refers to the ECSE LSI and ASD projects as the Scorpius Test Bed.

INITIATION

- **SEPT. 2014** Mission need approval
- **JULY 2017** Alternative selection

DEFINITION

- **FEB. 2021** Revised alternative selection
- **FEB. 2022** Final design review
- **JUNE 2022** Baseline approval and construction start

EXECUTION

- **JAN. 2025** Revised baseline approval
- **JUNE 2025** GAO review
- **NOV. 2029** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Nevada National Security Sites (NNSS), Mercury, NV

Site Contractor: Mission Support and Test Services, LLC (MSTS)

Construction Contractor: MSTS

NNSA Program Office: Experimental Sciences

Critical Technologies: None

Related Projects: ECSE ASD

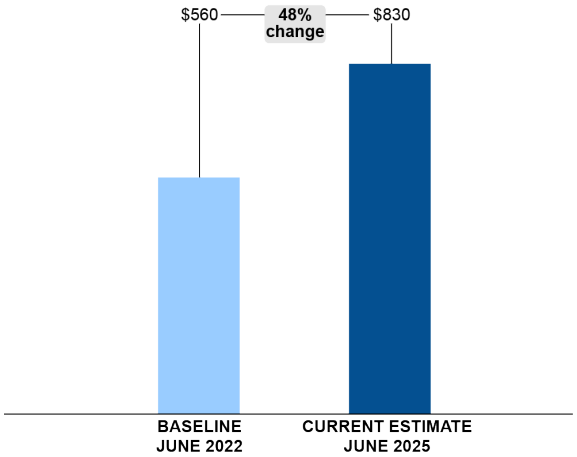
PROJECT SUMMARY

NNSA approved revised cost and schedule baselines for the project in January 2025. The new baselines reflect a cost increase of $270 million and a schedule delay of 35 months compared with the originally approved baselines.

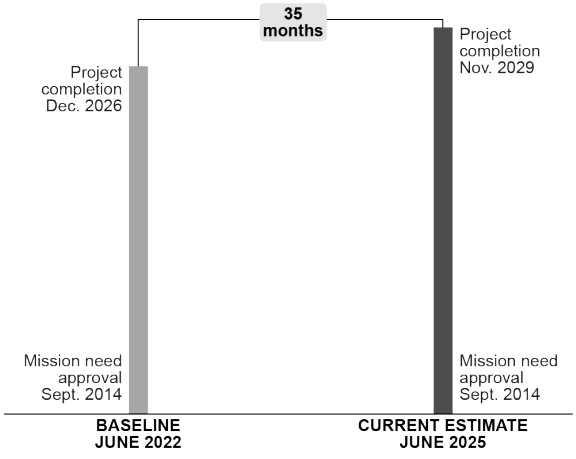
NNSA officials attributed the cost growth to increased costs for materials and subcontracts due to inaccurate cost estimates and other factors. According to NNSA officials, a concern related to the project's fire extinguishing system resulted in a pause in the project's design, contributing to the schedule delay. Officials stated that while the project team has resumed working on the project design, design activities may be halted again due to disagreements on the appropriateness of the system. As of June 2025, NNSA identified an alternate strategy that may reduce costs and schedule delays.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



COST AND SCHEDULE STATUS

In January 2025, NNSA approved revised cost and schedule baselines that reflect a 48 percent cost increase and a 35-month schedule delay compared with the June 2022 baselines. The new cost baseline is $830 million (original baseline $560 million), and the new schedule baseline for project completion is November 2029 (original baseline December 2026).

According to NNSA officials, the cost increase was due to inaccurate estimates of material and subcontract costs at the time of the initial baseline approval. For example, according to project documents, MSTS lacks experience in managing major construction projects, and its initial cost estimate assumed a rate of productivity that was optimistic. In addition, officials noted that residual impacts of COVID-19, including inflation, resulted in increased costs for materials, equipment, and subcontracts. Further, officials stated that schedule delays increased costs associated with ongoing project activities (e.g., procurement of equipment).

According to NNSA officials, the project's schedule delay was most recently impacted by issues related to the project's fire extinguishing system. Specifically, officials told us that in April 2023, a fire protection engineer from the Nevada Field Office filed a notice of concern related to the fire extinguishing system selected for the project and called for its reevaluation. NNSA paused the project's design for 4 months while a committee reviewed the concern. The committee completed its review in August 2023 and determined that the fire extinguishing system was appropriate for the project.

However, officials told us that NNSA's Office of Research, Development, Test, and Evaluation subsequently challenged the use of the system, stating that the selection did not account for cost and schedule considerations. According to NNSA documents, the agency reevaluated the implementation of the system, and in April 2025 determined it would terminate the selected system. Officials stated NNSA selected an alternate strategy that was identified by MSTS that may be implemented at the Principal Underground Laboratory for Subcritical Experimentation facility and may save the project $20 million and reduce the project's schedule by 2 months.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Pantex Plant

Evaluates, repairs, and dismantles nuclear weapons. Conducts high-explosives research and development.

PRIME CONTRACTOR (MANAGEMENT AND OPERATING)

PanTeXas Deterrence, LLC

PARTIES TO PRIME CONTRACT

BWX Technical Services Group, Inc.

Fluor Federal Services, Inc.

SOC, LLC

The Texas A&M University System

PROJECTS IN DEFINITION PHASE

High Explosives Synthesis, Formulation, and Production Facility

PROJECTS IN EXECUTION PHASE

High Explosives Science & Engineering Facility

Source: National Nuclear Security Administration. | GAO-26-107777

High Explosives Synthesis, Formulation, and Production Facility

The High Explosives Synthesis, Formulation, and Production (HESFP) Facility project plans to design and construct five new buildings that total nearly 100,000 square feet. These buildings are to house the following three high explosives capabilities: (1) synthesis, which produces raw explosive molecules; (2) formulation, which combines raw explosive molecules with binding ingredients to form an explosive mixture; and (3) blending, which will blend the formulated mixture. The completed project would allow NNSA to bring large-scale high explosives production in-house rather than continuing to rely on a single, external producer that primarily supplies high explosives to the Department of Defense.

INITIATION

- **JAN. 2019** Mission need approval
- **JUNE 2020** Conceptual design review
- **FEB. 2021** Alternative selection

DEFINITION

- **AUG. 2022** Preliminary design review
- **JAN. 2023** Final design review
- **OCT. 2023 TO AUG. 2024** Project on hold

EXECUTION

- **JUNE 2025** GAO review
- **TBD** Baseline approval and construction start
- **DEC. 2034** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Pantex Plant, Amarillo, TX

Site Contractor: PanTeXas Deterrence, LLC (PXD)

Design Contractor: PXD, with subcontract to Burns & McDonnell

NNSA Program Office: High Explosives and Energetics

Critical Technologies: 1

Related Projects: None

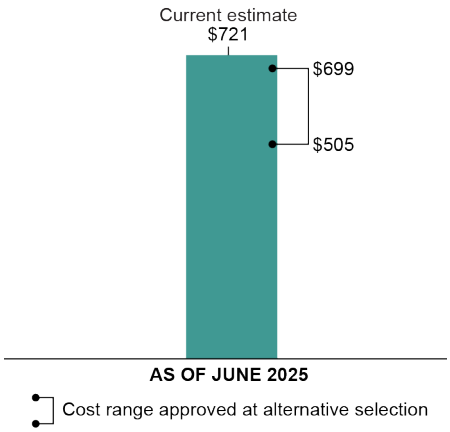
PROJECT SUMMARY

As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. Specifically, according to NNSA documents, the agency placed the project on hold in October 2023 due to higher priority projects supporting the timely delivery of warheads. According to officials, after receiving appropriations for the project in fiscal year 2024, NNSA restarted the project in August 2024.

In February 2025, according to project documents, the project team submitted plans for early site preparation and long-lead procurement activities. NNSA officials said that they are reviewing these plans and do not expect to formally update the project's cost and schedule estimates until the project's design has been updated (in December 2025). However, according to officials, the project may cost $721 million—about $22 million above the top end of the cost range approved at the alternative selection milestone. Additionally, the project may be completed in December 2034—about 4 years later than the top end of the schedule range approved at the alternative selection milestone.

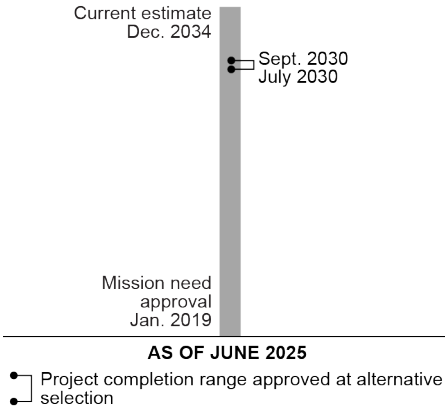
PRELIMINARY COST[a]

then-year dollars in millions



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Burns and McDonnell. | GAO-26-107777

High Explosives Science and Engineering Facility

The High Explosives Science and Engineering (HESE) facility project plans to construct three new interconnected facilities—a high explosives laboratory, a high explosives temporary staging area, and a technology development and deployment laboratory—totaling approximately 70,000 square feet. The HESE facility is designed to increase the amount of high explosives that can be used in the laboratory, reduce inefficiencies in moving high explosives between buildings, and increase the capability to develop diagnostic tools for the evaluation, manufacturing, and testing of materials.

INITIATION

- **NOV. 2011** Mission need approval
- **JAN. 2015** Alternative selection

DEFINITION

- **JULY 2018** Final design review
- **SEPT. 2018 TO JAN. 2020** Project on hold
- **APR. 2022** Baseline approval and construction start

EXECUTION

- **JUNE 2024** Revised baseline approval
- **JUNE 2025** GAO review
- **NOV. 2028** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Pantex Plant, Amarillo, TX

Site Contractor: PanTeXas Deterrence, LLC (PXD)

Construction Contractor: PXD, with subcontract to Hensel Phelps

NNSA Program Office: High Explosives and Energetics

Critical Technologies: None

Related Projects: None

PROJECT SUMMARY

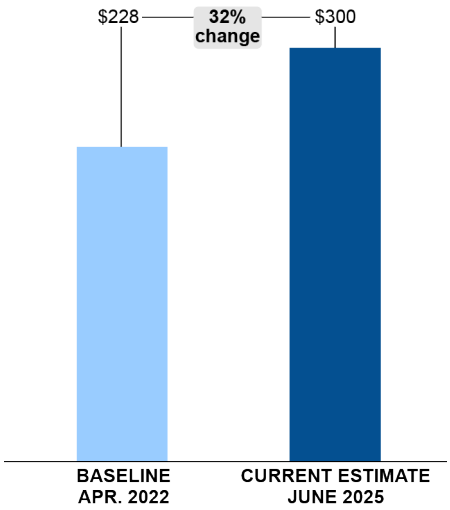
In June 2024, NNSA approved revised cost and schedule baselines reflecting a $72 million cost increase and 12-month delay compared with the original baselines approved in April 2022. According to NNSA officials, several factors contributed to the cost increase and schedule delay—with the primary cause identified as design issues discovered while blast testing.

In 2022, the project found that multiple walls designed to resist blast pressures from high explosives had insufficient tensile strength. Officials stated the design issues were discovered before construction activities began. In July 2024, the project encountered another challenge while testing the blast resistant tanks. According to NNSA documents, the project identified design errors for the tanks, requiring further design work and delaying the delivery of the tanks to February 2025.

Officials also identified poor subcontractor performance on the fire water pump and tank as a factor in the project's schedule delay. As of June 2025, PXD had provided two delinquency notices to the subcontractor to address its performance issues and delayed schedule, according to NNSA documents.

COST PERFORMANCE

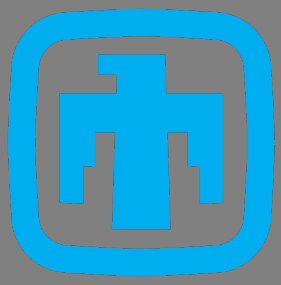
then-year dollars in millions



SCHEDULE PERFORMANCE

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.



Sandia National Laboratories

Sandia National Laboratories

Develops, tests, and produces specialized nonnuclear components and quality assurance and systems engineering in support of all U.S. nuclear weapons.

PRIME CONTRACTOR (MANAGEMENT AND OPERATING)

National Technology and Engineering Solutions of Sandia, LLC

PARTIES TO PRIME CONTRACT

Honeywell International, Inc.

PROJECTS IN DEFINITION PHASE

Power Sources Capability

PROJECTS IN EXECUTION PHASE

Not applicable

Source: National Nuclear Security Administration. | GAO-26-107777

Power Sources Capability

The Power Sources Capability (PSC) project plans to construct a new facility to support the research, development, production, and surveillance needs of the nuclear security enterprise for all power sources technologies. The facility will include space for specialized laboratories, as well as for general use and office spaces, totaling approximately 134,000 gross square feet. The facility will replace existing capabilities being executed across numerous buildings at the site or procured from outside vendors.

INITIATION

- **JULY 2019** Mission need approval
- **JULY 2021** Conceptual design review
- **SEPT. 2022** Revised conceptual design review
- **DEC. 2022** Alternative selection

DEFINITION

- **MAY 2024** Preliminary design review
- **DEC. 2024** Final design review
- **JUNE 2025** GAO review
- **AUG. 2025** Baseline approval and construction start

EXECUTION

- **SEPT. 2030** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Sandia National Laboratories (SNL), Albuquerque, NM

Site Contractor: National Technology and Engineering Solutions of Sandia (NTESS)

Design Contractor: NTESS, with subcontract to Smith Group

NNSA Program Office: Warhead Assembly and Non-Nuclear Modernization

Critical Technologies: None

Related Projects: None

PROJECT SUMMARY

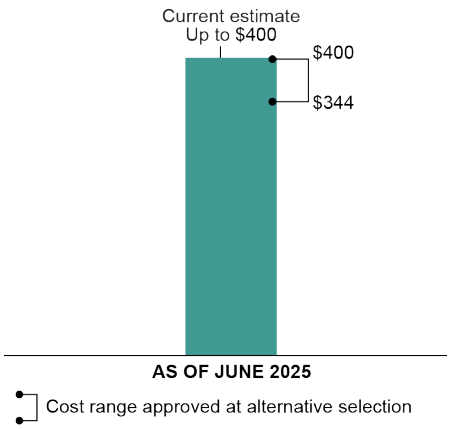
As of June 2025, NNSA estimated that it will complete the project near the cost and schedule ranges approved at the alternative selection milestone.

According to NNSA officials, the project conducted a second conceptual design review in September 2022 to analyze a less expensive alternative for meeting the project's mission need. NNSA had determined that the previous alternative (based on a conceptual design review in July 2021) was too costly. The selected alternative reduces the building's footprint by 20 percent compared with the original alternative.

The project has initiated early long-lead procurement and site preparation activities. Specifically, NNSA approved early site preparation work in October 2024 and the procurement of electrical equipment in November 2024. According to NNSA documents, the project awarded a subcontract for procurement of the equipment in December 2024. NNSA officials stated that the project also awarded additional pre-construction services in May 2025. According to NNSA officials, DOE completed an independent cost estimate in May 2025 and an external independent review of the project in June 2025.

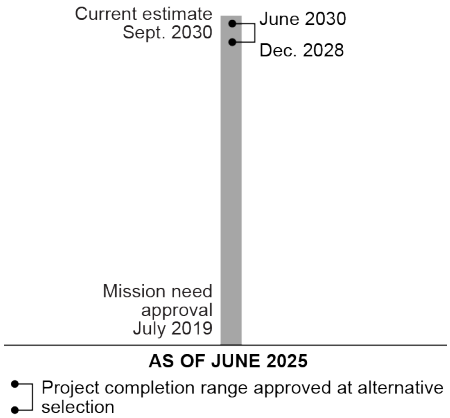
PRELIMINARY COST[a]

then-year dollars in millions



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate. In August 2025, NNSA approved cost and schedule baselines for the project with an estimated cost of $400 million and a completion date of July 2030.

Savannah River Site

Conducts tritium processing, research, and development.
Conducts tritium reservoir loading and surveillance testing in support of stockpile certification.
Future production of plutonium pits.

PRIME CONTRACTOR (MANAGEMENT AND OPERATING)

Savannah River Nuclear Solutions, LLC

PARTIES TO PRIME CONTRACT

Fluor Corporation

Newport News Nuclear, Inc.

PROJECTS IN DEFINITION PHASE

Savannah River Plutonium Processing Facility (SRPPF) High-Fidelity Training and Operations Center

SRPPF Main Process Building

Tritium Finishing Facility Process Buildings

PROJECTS IN EXECUTION PHASE

Surplus Plutonium Disposition

Source: Savannah River Nuclear Solutions, LLC. | GAO-26-107777

Savannah River Plutonium Processing Facility High-Fidelity Training and Operations Center

The High-Fidelity Training and Operations Center (HFTOC) project plans to convert a warehouse building into a training facility for both classroom and hands-on equipment training. The project targets multi-year acceleration of pit production at the Savannah River Plutonium Processing Facility (SRPPF) after the related Main Process Building (MPB) project reaches completion. The training facility will include process gloveboxes (sealed, protectively lined compartment having holes to which gloves are attached for use in handling nonnuclear material inside the compartment) and equipment lines for key processes that are nearly identical to those planned to be installed in the SRPPF MPB.

INITIATION

- **NOV. 2015** Mission need approval
- **JUNE 2021** Conceptual design review
- **JUNE 2021** Alternative selection

DEFINITION

- **DEC. 2024** Preliminary design review
- **JUNE 2025** GAO review
- **TBD** Baseline approval and construction start

EXECUTION

- **SEPT. 2026** Final design review
- **TBD** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Savannah River Site, Aiken, SC

Site Contractor: Savannah River Nuclear Solutions, LLC (SRNS)

Design Contractor: SRNS with subcontract to Enercon

NNSA Program Office: Plutonium

Critical Technologies: None

Related Projects: SRPPF Main Process Building

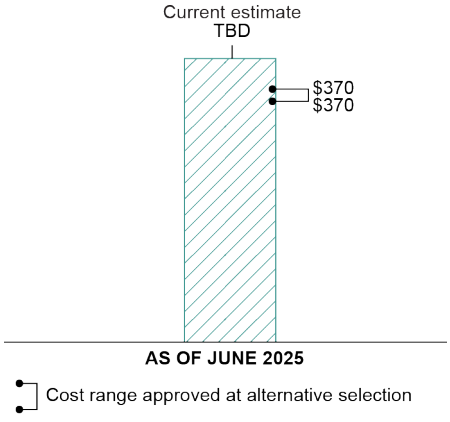
PROJECT SUMMARY

As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. Specifically, the overall SRPPF project is undergoing a revised alternative selection process, which is required for projects whose cost estimate grows by more than 50 percent of the top end of the preliminary cost range. As part of the revision, NNSA officials said they expect the HFTOC project's cost to increase significantly (to more than $2 billion) and its schedule to be delayed due to the additional scope associated with upgrading the facility's equipment to be nearly identical to that planned for the SRPPF Main Process Building.

NNSA officials said that the project submitted revised cost and schedule estimates for review by NNSA program officials in May 2025, and the project underwent an independent DOE cost estimate in fall 2025. In addition, NNSA officials said that due to performance issues with the previous design subcontractor, the project has transferred the remaining design work to a new subcontractor, Enercon. Officials told us the project completed final design in December 2025.

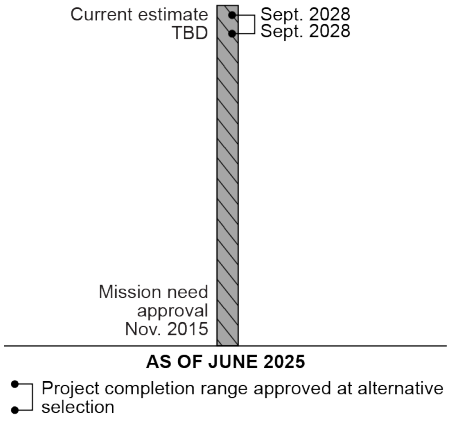
PRELIMINARY COST

then-year dollars in millions



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Savannah River Nuclear Solutions, LLC. | GAO-26-107777

Savannah River Plutonium Processing Facility Main Process Building

The Savannah River Plutonium Processing Facility (SRPPF) Main Process Building project plans to establish the capacity to produce at least 50 plutonium pits (the fissile core of a nuclear weapon) per year, starting in 2036. The project will modify an existing, partially constructed 400,000 square foot nuclear facility into the project's main process building. In addition, the project will collocate plutonium analysis capabilities, production support capabilities, security infrastructure, and other support facilities like waste handling.

INITIATION

- **NOV. 2015** Mission need approval
- **JUNE 2021** Conceptual design review
- **JUNE 2021** Alternative selection

DEFINITION

- **DEC. 2024** Preliminary design review
- **JUNE 2025** GAO review

EXECUTION

- **TBD** Baseline approval and construction start
- **SEPT. 2026** Final design review
- **TBD** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Savannah River Site, Aiken, SC

Site Contractor: Savannah River Nuclear Solutions, LLC (SRNS)

Design Contractor: SRNS with subcontracts to Fluor Federal Services (one of two member companies that comprise SRNS) and Merrick & Company

NNSA Program Office: Plutonium

Critical Technologies: 33

Related Projects: SRPPF High-Fidelity Training and Operations Center (HFTOC)

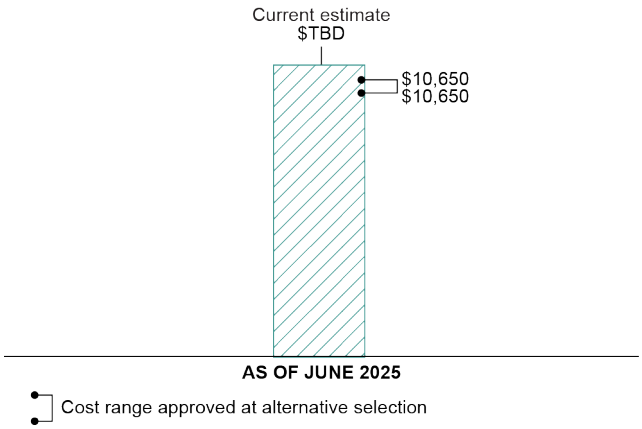
PROJECT SUMMARY

As of June 2025, NNSA officials were reviewing the project's cost and schedule estimates due to replanning efforts. Specifically, the overall SRPPF project is undergoing a revised alternative selection process due to concerns with potential cost increases and delays. According to NNSA's fiscal year 2026 budget justification, the MPB project is expected to cost over $22 billion and be completed by September 2035. NNSA officials said they plan to submit revised cost and schedule estimates for approval by September 2026.

In October 2024, NNSA approved a new tailoring strategy intended to streamline processes for the overall SRPPF project. The tailoring strategy allows NNSA to baseline the cost and schedule using a preliminary design instead of a final design. However, officials said that they expect the project to complete most of the work on the final design before NNSA approves the start of construction.

PRELIMINARY COST

then-year dollars in millions



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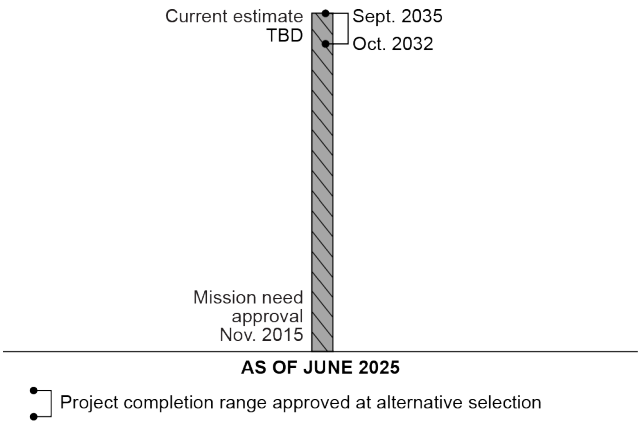
PRELIMINARY SCHEDULE



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

COST AND SCHEDULE STATUS

As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. Specifically, the overall SRPPF project is undergoing a revised alternative selection process due to concerns with potential cost increases and delays. According to DOE's project management order, a project must reassess its alternative selection decision if its cost estimate grows by more than 50 percent of the top end of the original cost range. The MPB project is also establishing cost and schedule baselines, and officials said they plan to submit revised baselines for review by October 2025.

NNSA originally approved the alternative selection for the overall SRPPF project in June 2021 with a cost range of $6.9 billion to $11.1 billion and a completion date range of October 2031 to September 2035. NNSA divided the overall SRPPF project into six projects in January 2023. However, in October 2024, the DOE Deputy Secretary approved the restructuring of the overall project from six projects to three projects–the MPB, HFTOC, and an administrative building.

According to NNSA's fiscal year 2026 budget justification, the estimated cost of the project is expected to be over $22 billion with a completion date of September 2035. According to NNSA documentation, contributing factors include scope changes, difficulty hiring qualified design engineers, and the inability of SRNS to meet its performance targets. For example, the project revised its scope to address single points of failure and include additional space for future capabilities.

Over the past 3 years, NNSA officials told us that the agency has approved 10 early procurement or site preparation packages that have a combined cost of approximately $3.1 billion. These work packages cover a range of activities, such as the installation of temporary utilities, demolition of wall sections and removing old equipment, and procuring gloveboxes and bulk materials. NNSA officials said the use of these work packages allowed the project to start construction earlier on lower risk activities and spread the work out over time. The project expects to complete these work packages by early 2031. However, NNSA was not able to fully implement the revised tailoring strategy related to the early procurement and site preparation work because of delays receiving design packages. Officials stated that finalizing the design and predictable schedule execution are NNSA's primary focus for stabilizing cost growth and schedule delays.

In addition, DOE approved a new tailoring strategy in October 2024 that allows the project to obtain approval of its cost and schedule baselines at an earlier time. DOE's project management order requires projects like the SRPPF to complete 90 percent of their final design before obtaining baseline approval (and the start of construction). However, according to NNSA officials, it can take approximately 1 year to go through the review process for reaching final design and obtaining baseline approval. To streamline this process, officials said that they will begin the baseline approval process based on the results of the preliminary design review, which is based on a lower degree of completion (60 percent instead of 90 percent for final design) and is typically less mature.

NNSA officials noted several issues that were affecting the project's cost and schedule. For example, officials said that vendor bids for gloveboxes were about 40 percent more expensive than planned. Further, SRNS did not place the project's fabrication subcontracts with glovebox vendors in a timely manner, according to officials. In addition, they said that the fabrication schedule for the gloveboxes had been delayed from February 2025 to April 2025. However, NNSA expects Fluor, which took over as the construction contractor, to issue most of the project's fabrication subcontracts by July 2025. As of June 2025, Fluor had issued 243 of 320 glovebox contracts and was tracking to the latest schedule.

DESIGN

According to NNSA officials, the project held its preliminary design review in December 2024. In addition, they said that the project will complete most of the work on the final design before NNSA approves the project's cost and schedule baselines. The expected date of the final design review is September 2027.

The project is using different subcontractors to design specific parts of the project, and these designs are at various levels of maturity. For example, one subcontractor (Merrick) is designing the gloveboxes and process equipment, while another subcontractor (Fluor) is designing the main process building and associated supporting infrastructure and facilities. NNSA officials told us that they are prioritizing the glovebox and process equipment design because it is a key input into the remaining building and infrastructure design.

TECHNOLOGY

The project has identified 33 critical technologies that will be used mostly in processing operations, such as metal preparation, machining, and assembly. DOE's project management order requires that more costly projects (like the Main Process Building) mature all critical technologies to TRL 4 prior to the alternative selection milestone and TRL 7 prior to the baseline approval milestone. At the alternative selection milestone in June 2021, SRNS assessed all technologies at TRL 4 or above. In August 2022, an external review assessed all technologies at TRL 7 or above.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Savannah River Nuclear Solutions, LLC. | GAO-26-107777

Tritium Finishing Facility Process Buildings

The Tritium Finishing Facility (TFF) Process Buildings project plans to construct two new buildings to relocate and replace existing tritium operations currently housed in a 1950s-era building. One building is to contain equipment for processing tritium-filled reservoirs, and another building is to contain equipment for needed processing steps, such as inspection and storage activities. Tritium is a radioactive isotope of hydrogen used to enhance the power of nuclear weapons.

PROJECT INFORMATION

Type: Line-item construction

Location: Savannah River Site, Aiken, SC

Site Contractor: Savannah River Nuclear Solutions, LLC (SRNS)

Design Contractor: SRNS

NNSA Program Office: Tritium Modernization

Critical Technologies: None

Related Projects: TFF Site Preparation and Warehouse

PROJECT SUMMARY

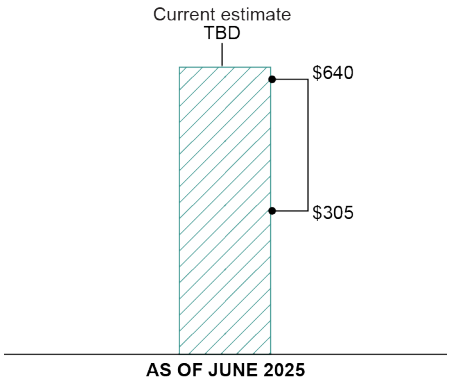
As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. In May 2023, the project paused some design work, while NNSA directed remaining funds to advance portions of the project's design and complete the related Site Preparation and Warehouse project in March 2025, according NNSA officials.

According to its fiscal year 2026 budget justification, NNSA requested $50 million for fiscal year 2026 to hire a design firm to advance the project's overall facility design for preliminary design review. Officials told us that NNSA is also revalidating program requirements and updating cost and schedule estimates for the project.

NNSA officials said that they are assessing cost control measures for the project, such as scope changes, as the project advances the design and develops updated cost and schedule estimates.

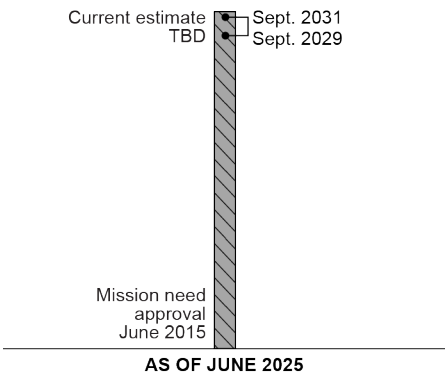
PRELIMINARY COST

then-year dollars in millions



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: National Nuclear Security Administration. | GAO-26-107777

Surplus Plutonium Disposition

The Surplus Plutonium Disposition (SPD) project plans to increase NNSA's plutonium dilution capability by (1) installing additional processing equipment into an existing nuclear facility; and (2) constructing a new building that will contain needed processing support systems, such as electrical distribution equipment. The United States has nuclear weapons-usable plutonium that it declared surplus to our national security needs. This plutonium requires disposal to meet the legal obligations to the state of South Carolina. NNSA intends for the SPD project to dilute surplus plutonium oxide, a powder-like substance, with inert material and then temporarily store the diluted plutonium until it is shipped to the Waste Isolation Pilot Plant in New Mexico.

INITIATION

- **OCT. 1997** Mission need approval
- **DEC. 2019** Alternative selection

DEFINITION

- **DEC. 2023** Final design review
- **OCT. 2024** Baseline approval and construction start

EXECUTION

- **JUNE 2025** GAO review
- **APR. 2031** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Savannah River Site, Aiken, SC

Site Contractor: Savannah River Nuclear Solutions, LLC (SRNS)

Construction Contractor: SRNS with subcontracts to Merrick & Company and Enercon

NNSA Program Office: Material Management and Minimization

Critical Technologies: 1

Related Projects: None

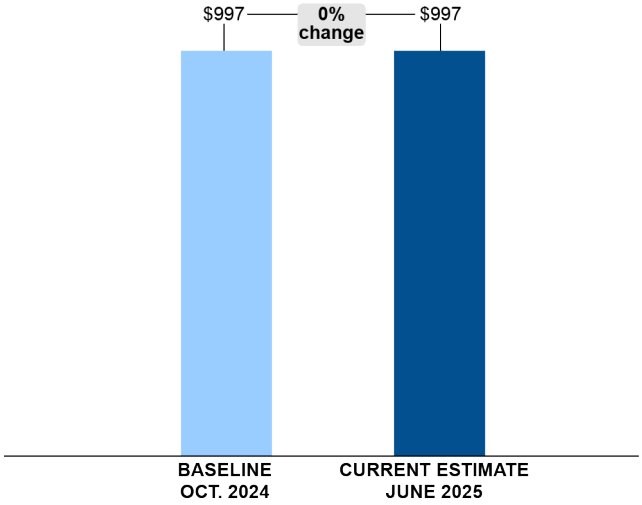
PROJECT SUMMARY

NNSA approved the project's cost and schedule baselines in October 2024. These baselines reflect an almost $400 million increase and 3-year delay in completion compared to the preliminary cost and schedule ranges approved in December 2019. Officials attributed the changes to the cost and schedule estimates to several issues, such as inaccurate preliminary estimates that did not fully incorporate the anticipated costs of completing the remaining work.

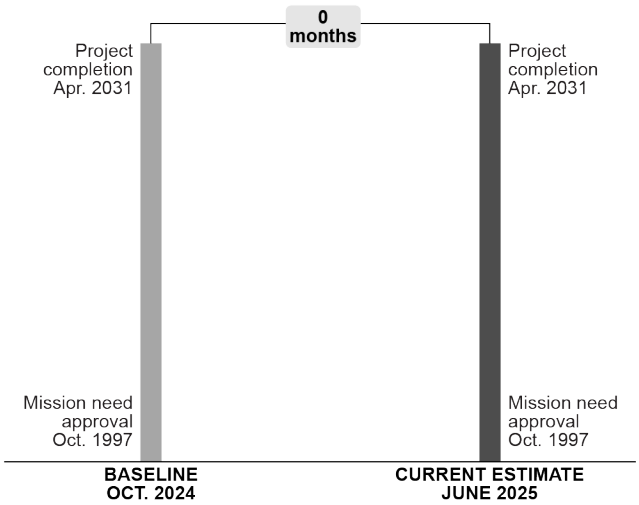
NNSA officials said that the project has experienced two issues that may affect cost and schedule but will not change the project's overall baselines. For example, the project will need to redesign its heating, ventilation, and air conditioning (HVAC) system because of a phaseout of hydrofluorocarbons.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



COST AND SCHEDULE STATUS

NNSA approved the project's cost and schedule baselines in October 2024. These baselines reflect an almost $400 million increase and 3-year delay in completion compared to the preliminary cost and schedule ranges approved at alternative selection in December 2019.

NNSA officials attributed the changes to the cost and schedule estimates to several issues. First, as we previously reported, the prior estimates did not fully incorporate the anticipated costs of completing the remaining work. Instead, they reflected an increase to the anticipated costs of addressing project risk (i.e., management reserve and contingency).

In addition, the approved baselines reflect cost and schedule adjustments the project team made to address findings from an external independent review. For example, the review found the project's schedule unreliable for identifying the critical path (the longest continuous sequence of activities in a schedule that defines the project's earliest completion date) and inconsistent with GAO best practices for high-quality schedules. Officials made numerous changes to address the findings, including incorporating risk mitigation activities and increasing the duration of operational readiness activities.

NNSA originally approved the mission need for the project in 1997 as part of the Pit Disassembly and Conversion Facility project. However, NNSA cancelled that project in January 2012 due to high costs and after spending $730 million on its design.

NNSA officials said that the project has not experienced any issues or challenges that will affect the project's cost and schedule baselines moving forward. However, officials identified two issues that may impact cost and schedule without affecting the project's baselines.

First, NNSA officials said that the project will need a new design for its HVAC system because the American Innovation and Manufacturing Act requires the phaseout of hydrofluorocarbons. Once manufacturers incorporate a new refrigerant into their systems and processes, NNSA and the contractors will be able to develop the new HVAC design. NNSA officials said that while this issue is an added risk and may have a cost impact, the project has enough contingency to accommodate it.

Second, in the early months of construction, the project team identified issues related to the installation of rebar—specifically, it was not installed per the design requirements. NNSA officials said that this was primarily caused by a combination of human error and imprecise design requirements. The contractors performing the installation were confused by the design requirements but, in agreement with the quality inspector, moved forward with the installation. However, officials said the contractors did not go through the normal process for requesting engineering assistance to ensure they were meeting design requirements. NNSA has stopped all construction work until the contractor completes a root cause analysis and identifies corrective actions. Officials said that, as of June 2025, this issue has affected the near-term schedule, but not the performance baseline. Prior to this issue, the project was ahead of schedule and had created some margin in the schedule, but that margin has been eroded due to this issue. However, the issue has not affected the planned project completion date, according to NNSA officials.

TECHNOLOGY

The project plans to use one critical technology related to plutonium processing operations. DOE's project management order requires that more costly projects (like SPD) mature all critical technologies to TRL 7 prior to the baseline approval milestone. In December 2022, SRNS determined and NNSA concurred that this critical technology achieved TRL 7.

Previously, NNSA's Office of Material Management and Minimization was managing the maturation of two other critical technologies related to measurement and packaging. According to officials, because the project can achieve its planned annual processing rate without the use of these two technologies, the project's success is not dependent on them. As a result, NNSA removed these two technologies from the project's scope.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Y-12 National Security Complex

Manufactures, evaluates, and tests uranium and special materials components for nuclear weapons.
Supplies enriched uranium for use in naval reactors.

PRIME CONTRACTOR (MANAGEMENT AND OPERATING)

Consolidated Nuclear Security, LLC

PARTIES TO PRIME CONTRACT

Bechtel National Inc.

Leidos Innovations Corp.

ATK Launch Systems Inc.

SOC, LLC

PROJECTS IN DEFINITION PHASE

Lithium Processing Facility (LPF) East End Substation

LPF Main Processing Facility

Direct Chip Melt Bottom Loading Furnace (DCM-BLF) Chip Compaction

DCM-BLF Compacted Chip Processing

PROJECTS IN EXECUTION PHASE

Calciner Project

Electrorefining Project

Uranium Processing Facility (UPF) Main Process Building

UPF Process Support Facilities

UPF Salvage and Accountability Building

West End Protected Area Reduction Project

Source: National Nuclear Security Administration. | GAO-26-107777

Lithium Processing Facility East End Substation

The Lithium Processing Facility (LPF) East End Substation (EES) project plans to provide sufficient electrical power to meet the power requirements for the LPF Main Processing Facility, as well as for other infrastructure at the Y-12 site. The project will also conduct site preparation.

PROJECT INFORMATION

Type: Line-item construction

Location Y-12 National Security Complex (Y-12), Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Design Contractor: Tennessee Valley Authority (TVA) for substation. CNS for telecommunications connection.

NNSA Program Office: Lithium Modernization

Critical Technologies: None

Related Projects: LPF Main Processing Facility

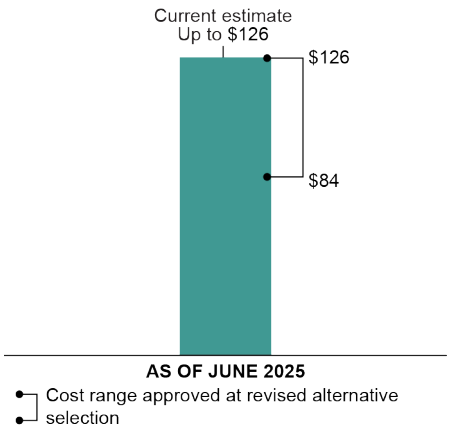
PROJECT SUMMARY

As of June 2025, NNSA estimated that it will complete the project within the cost range approved at the revised alternative selection milestone. According to NNSA officials, DOE conducted an independent cost review in May 2025, and the project expects to obtain approval of its cost and schedule baselines in September 2025.

In late 2022, during a review of anticipated power loads, the site contractor identified the need for a new substation to meet the electrical demand for the LPF Main Processing Facility and the Y-12 site in general, according to NNSA officials. The project's scope of work will be executed via an interagency agreement with TVA. According to NNSA officials, the project is using a "design-build" contract with TVA, which will complete the final design after NNSA approves the project's cost and schedule baselines.

PRELIMINARY COST

then-year dollars in millions



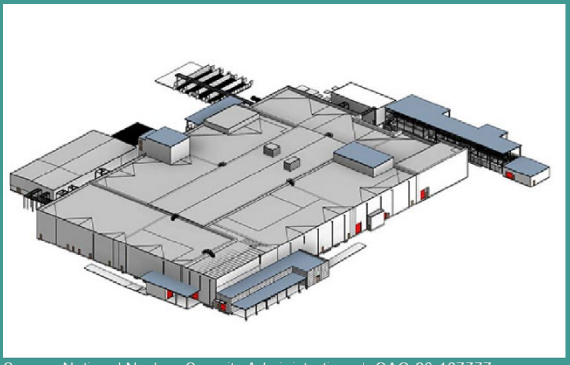
[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE

[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate. In October 2025, NNSA approved cost and schedule baselines for the project with an estimated cost of $130 million and a completion date of April 2031.



Source: National Nuclear Security Administration. | GAO-26-107777

Lithium Processing Facility Main Processing Facility

The Lithium Processing Facility (LPF) Main Processing Facility (MPF) project plans to construct a nonnuclear facility totaling about 236,000 square feet that includes lithium purification and processing equipment, shipping and storage areas, administrative office space, and exterior storage for bulk chemicals. A specific form of lithium is a key material used in some nuclear weapon components. The facility will relocate existing lithium operations currently conducted in a building that is almost 80 years old.

INITIATION

- **JUNE 2015** Mission need approval
- **DEC. 2022** Conceptual design review

DEFINITION

- **SEPT. 2023** Preliminary design review
- **MAY 2024** Final design review
- **JULY 2024** Revised alternative selection
- **JUNE 2025** GAO review
- **TBD** Baseline approval and construction start

EXECUTION

- **TBD** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Y-12 National Security Complex (Y-12), Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Design Contractor: Amentum

Construction Contractor: TBD

NNSA Program Office: Lithium Modernization

Critical Technologies: 1

Related Projects: LPF East End Substation

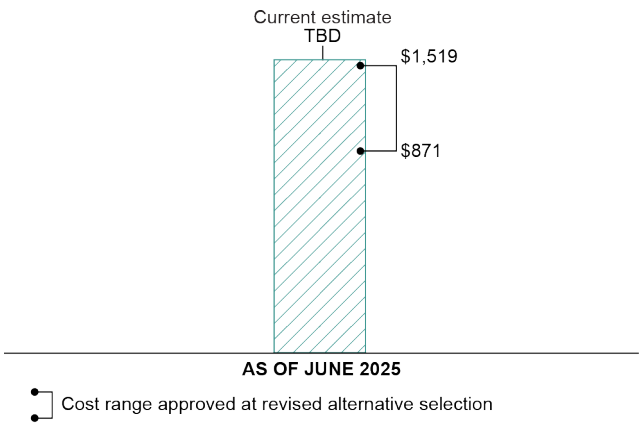
PROJECT SUMMARY

As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. Specifically, NNSA was evaluating CNS recommendations for an updated construction execution strategy based on a constrained funding profile and plans to approve the new strategy and revised alternative selection in summer 2026. According to NNSA officials, the project is likely to incur a significant cost increase and schedule delay—resulting in a total cost of more than $6 billion and a delay of about 6 years—due to a variety of factors, including an inadequate conceptual design and flawed initial planning assumptions.

Officials told us that due to the magnitude of the potential cost increase, the project is undergoing a revised alternative selection process. NNSA officials said that they plan to reduce the scope of the project and expect NNSA to approve cost and schedule baselines no earlier than late in fiscal year 2026.

PRELIMINARY COST

then-year dollars in millions



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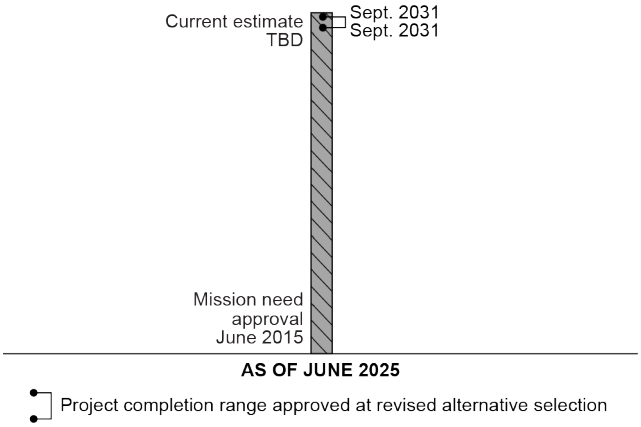
PRELIMINARY SCHEDULE



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

COST AND SCHEDULE STATUS

As of June 2025, NNSA was reviewing the project's cost and schedule estimates due to replanning efforts. According to NNSA officials, the project is likely to incur a significant cost increase and schedule delay. According to DOE's project management order, a project must reassess its alternative selection decision if its cost estimate grows by more than 50 percent of the top end of the original cost range. As a result, the project is revising its alternative selection decision.

In January 2025, CNS submitted recommendations for an updated construction execution strategy based on a constrained funding profile, which NNSA is evaluating. According to officials, the project has experienced a significant cost increase and schedule delay due to several factors, including issues with the early design of the facility. In particular, the project significantly underestimated the cost range (approved at alternative selection) due to an inadequate conceptual design and flawed initial planning assumptions that did not fully account for both the hazards of the material being processed or the utilities available at the site. In addition, officials told us the conceptual design did not account for additional building code requirements, including facility fire protection measures and egress requirements associated with personnel safety.

NNSA officials also said that the expected cost increase and schedule delay were exacerbated by market conditions for purchasing electrical equipment and multiple replanning efforts to address funding constraints. According to officials, the original project plan prioritized schedule over cost, but the new constrained budget environment does not support the original schedule. As a result, officials estimated that the project may be completed at a cost of more than $6 billion in 2036.

NNSA officials stated that they are reviewing the updated construction execution strategy and expect to obtain more accurate cost and schedule estimates based on the new strategy. The project is also developing cost and schedule baselines, which were delayed due to the construction funding profile and the revised alternative selection process. Officials said that they expect the Deputy Secretary of Energy to approve the new strategy by August 2025, at which time NNSA will approve revised cost and schedule estimates for the project. In addition, they said that they expect NNSA to approve cost and schedule baselines for the project no earlier than late in fiscal year 2026.

Since 2023, NNSA officials told us the agency has approved two early procurement or site preparation packages that have a combined cost of $666 million. These work packages cover a range of activities, such as demolition of remaining foundations and underground utilities from a previous facility on the site, removal of unsuitable soils and backfill, and procuring specialized complex equipment and construction materials. The project expects to complete these work packages by December 2029.

DESIGN

CNS divided the design effort into two areas: process design (lithium purification, production and salvage) and facility design (building structure and various support systems). The project completed its final design review for both areas and issued an assessment report in May 2024.

According to the report, the design review identified several key issues, including incomplete or late vendor design submittals for CNS-purchased equipment (such as machining lathes and mills); incomplete design data for interfacing plant utilities (such as water, natural gas, and steam interfaces); and inadequate clearances for some underground commodities (such as utility lines). As of June 2025, the contractor has resolved these issues and incorporated the solutions into the final design, according to officials.

TECHNOLOGY

The project has a single critical technology—homogenization—that will use a standard furnace technology but apply it in a novel way to heat and purify a specific form of lithium. Homogenization may make certain processing activities safer and more efficient. However, the facility design includes all space and equipment needed for the current chemical purification process, as some processing steps require such chemical purification. As a result, the facility may be operated with or without the homogenization technology.

DOE's project management order requires that more costly projects (like MPF) mature all critical technologies to TRL 7 prior to the baseline approval milestone. According to NNSA officials, the project's homogenization system achieved TRL 7 in May 2025, and the project has not identified any recent issues or challenges associated with the technology.

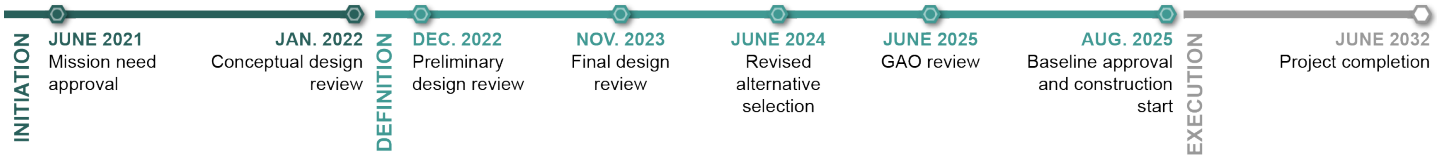
PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: Department of Energy/National Nuclear Security Administration. | GAO-26-107777

Direct Chip Melt Bottom Loading Furnace Chip Compaction

The Chip Compaction project is one of two projects supporting the overall Direct Chip Melt Bottom Loading Furnace (DCM-BLF) project. DCM-BLF technology is used to melt enriched uranium material (or "chips"), resulting in a product of consolidated bulk uranium metal. The overall project will design, fabricate, and install a new chip compacting process for material recycling and reconsolidation. The Chip Compaction project plans to (1) develop and install the capability for compacting uranium chips, and (2) refurbish an exhaust stack in Building 9215 to provide the required exhaust needs.



PROJECT INFORMATION

Type: Major item of equipment

Location: Y-12 National Security Complex (Y-12), Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Other Contractor: Not applicable

NNSA Program Office: Enriched Uranium Modernization Program

Critical Technologies: None

Related Projects: DCM-BLF Compacted Chip Processing

PROJECT SUMMARY

As of June 2025, NNSA estimated that the project will cost $162 million and be completed by June 2032, which are higher than the cost and schedule ranges approved at the revised alternative selection milestone in June 2024. According to NNSA officials, the agency is reviewing these estimates and expects to approve the project's cost and schedule baselines by August 2025.

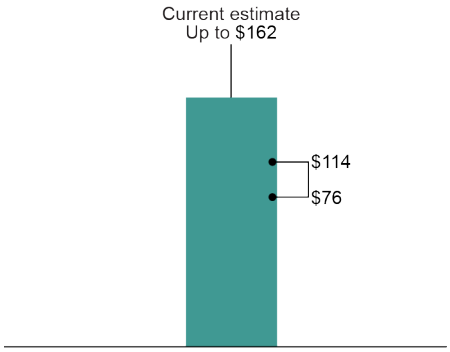
In February 2023, NNSA officials told us they directed CNS to restructure the overall DCM-BLF project—which then had an estimated cost range of $176 million to $219 million—into two related projects (Chip Compaction and Compacted Chip Processing), in part, to ensure that NNSA could establish a chip compaction capability more quickly.

Officials told us that the project initiated a long-lead procurement of three items of equipment in April 2024 at an estimated cost of $16 million. Officials said two of the procurements are complete, and the third (a glovebox) is expected to be delivered in July 2026.

The NNSA program office notified the project of a funding gap for fiscal years 2026 and 2027 due to cost overruns at other projects at the site. NNSA revised its alternative selection for the project in June 2024 with revised preliminary cost and schedule ranges.

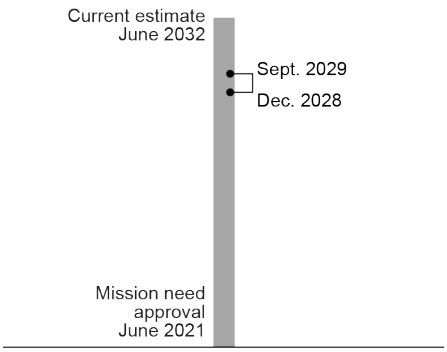
PRELIMINARY COST

then-year dollars in millions



[a]These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.

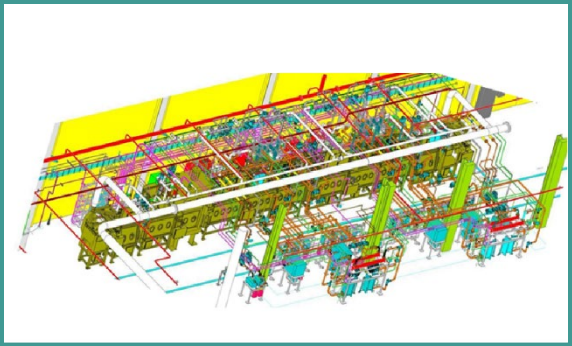
PRELIMINARY SCHEDULE



[a]These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate. In August 2025, NNSA approved cost and schedule baselines for the project with an estimated cost of $170 million and a completion date of June 2032.



Source: Department of Energy/National Nuclear Security Administration. | GAO-26-107777

Direct Chip Melt Bottom Loading Furnace Compacted Chip Processing

The Compacted Chip Processing project is one of two projects supporting the overall Direct Chip Melt Bottom Loading Furnace (DCM-BLM) project. DCM-BLF technology is used to melt enriched uranium material (or "chips"), resulting in a product of consolidated bulk uranium metal. The overall project will design, construct, and install a new chip melting process for material recycling and reconsolidation. The Compacted Chip Processing project plans to design, construct, and install four bottom loading furnaces to support the recovery and reuse of uranium chips.

PROJECT INFORMATION

Type: Major item of equipment

Location: Y-12 National Security Complex (Y-12), Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Other Contractor: Not applicable

NNSA Program Office: Enriched Uranium Modernization Program

Critical Technologies: None

Related Projects: DCM-BLM Chip Compaction

PROJECT SUMMARY

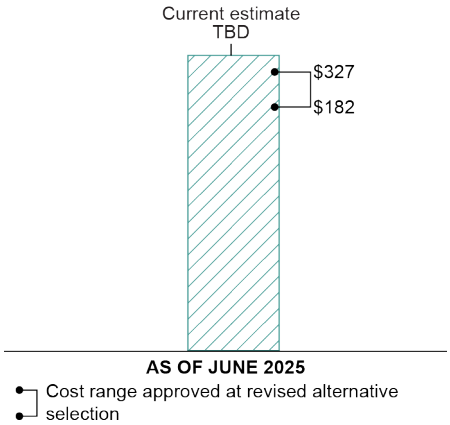
As of June 2025, the project was on hold. According to NNSA officials, the agency placed the project on hold in May 2025 due to budget concerns, including competing priorities and cost increases for other major projects.

In February 2023, NNSA officials told us they directed CNS to restructure the overall DCM-BLF project—which then had an estimated cost range of $176 million to $219 million—into two projects (Compacted Chip Processing and Chip Compaction). According to NNSA documentation, part of the rationale for the restructuring was to ensure that NNSA could establish a chip compaction capability sooner compared to the original strategy.

In April 2024, the NNSA program office notified the project of a funding gap for fiscal years 2026 and 2027 due to cost overruns at other projects at the site. NNSA revised its alternative selection for the project in June 2024 with revised preliminary cost and schedule ranges. According to NNSA documentation and officials, the cost of the project may increase to $327 million and be completed by September 2036 due in part to the delay. Officials said they plan to resume the project and establish cost and schedule baselines in fiscal year 2028.

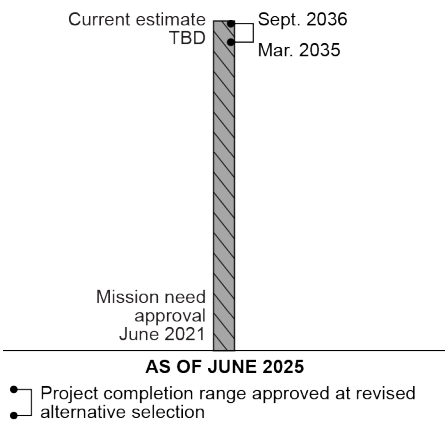
PRELIMINARY COST

then-year dollars in millions



[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PRELIMINARY SCHEDULE

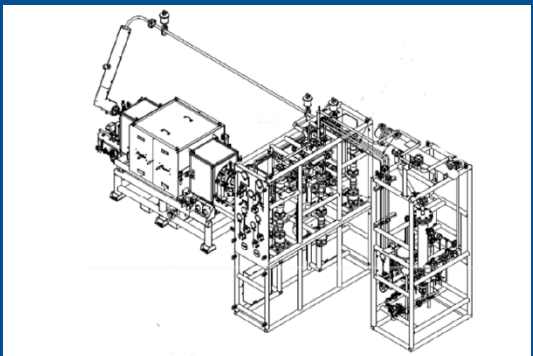


[a]*These estimates are preliminary as the project is in the definition phase and its design is not complete. NNSA uses these estimates for planning purposes.*

PROJECT OFFICE COMMENTS

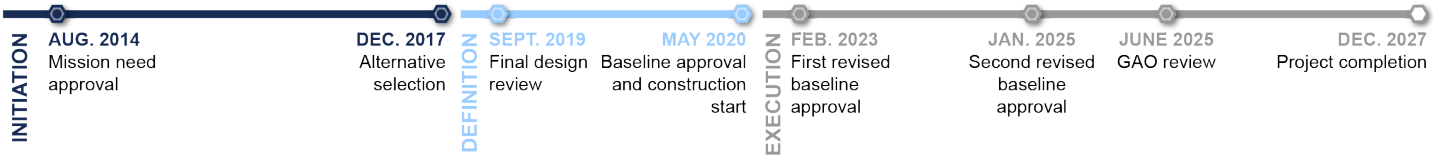
Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Calciner Project



Source: Consolidated Nuclear Security, LLC. | GAO-26-107777

The Calciner project plans to procure and install a calciner system in Building 9212, which currently poses the highest nuclear safety risk at the Y-12 National Security Complex because of its age and condition. The calciner system is designed to support the decontamination and shutdown of Building 9212 by processing certain uranium-bearing solutions (e.g., solutions resulting from cleaning out the building's pipes and vessels) into a dry solid oxide that can be stored pending further processing. The project includes new equipment (i.e., furnace and gloveboxes) and new support systems (e.g., storage tanks, pipes, and high-efficiency particulate air filters) that will be integrated into the building's existing processing system.



PROJECT INFORMATION

Type: Major item of equipment

Location: Y-12 National Security Complex (Y-12), Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Other Contractor: Not applicable

NNSA Program Office: Office of Strategic Materials Production Modernization

Critical Technologies: None

Related Projects: None

PROJECT SUMMARY

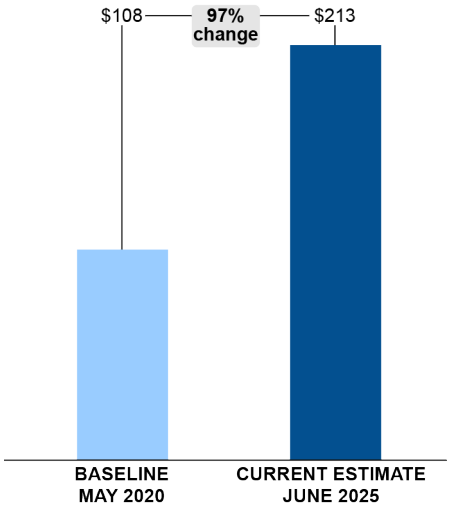
In January 2025, the Deputy Secretary of Energy approved a second revision to the project's cost and schedule baselines that reflects a 97 percent cost increase and 51-month delay compared with the original May 2020 baselines. NNSA approved the first revision to the project's baselines in February 2023.

According to NNSA documentation, this most recent cost increase and schedule delay are due to a variety of factors, including inadequate planning, estimating, and scheduling; deficiencies in engineering technical and design performance; and poor vendor performance. For example, officials told us a 30-month delay in delivery of key equipment delayed completion of planned installation activities because the total number of equipment calibrations required increased due to some completed calibrations expiring during the delivery delay.

According to NNSA documentation, the project is scheduled for completion by December 2027.

COST PERFORMANCE

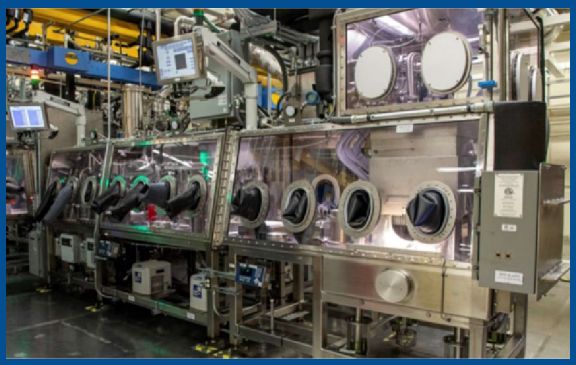
then-year dollars in millions



SCHEDULE PERFORMANCE

PROJECT OFFICE COMMENTS

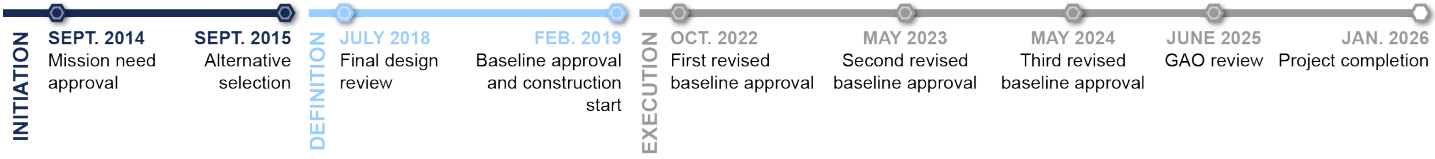
Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.



Source: Department of Energy/National Nuclear Security Administration. | GAO-26-107777

Electrorefining Project

The Electrorefining project plans to design and install equipment for a new electrochemical refining process to salvage and purify uranium metal from the by-products of manufacturing activities at the Y-12 National Security Complex. Located in Building 9998, which is part of the Building 9215 production facility complex, the project intends to produce uranium of high purity that can be further processed for a variety of purposes, replace current operations that use hazardous chemicals, and reduce operating costs. The project also includes the design and installation of utility support systems.



PROJECT INFORMATION

Type: Major item of equipment

Location: Y-12 National Security Complex (Y-12), Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Other Contractor: Not applicable

NNSA Program Office: Secondary Stage Production Modernization

Critical Technologies: None

Related Projects: None

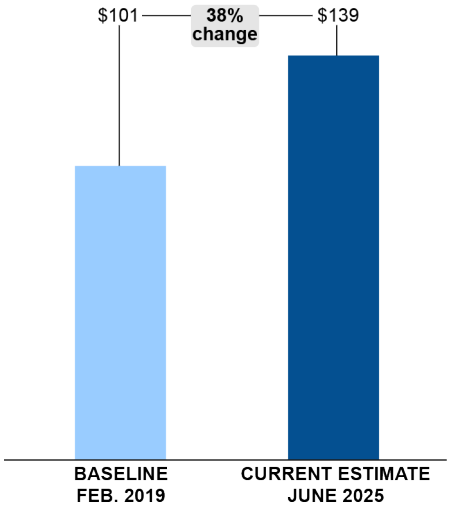
PROJECT SUMMARY

As of June 2025, NNSA estimated that it will complete the project at a cost of $139 million (original baseline is $101 million) in January 2026 (original baseline is February 2023). NNSA approved these estimates in May 2024 as part of the agency's third revised baseline approval for the project.

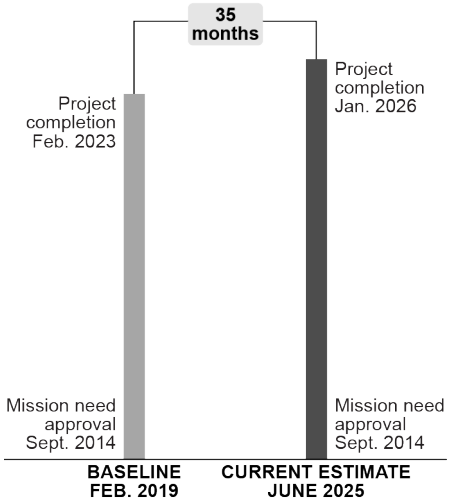
NNSA documentation and officials attributed the most recent cost increase and schedule delay to several issues. For example, due to equipment delivery delays in 2020 and 2021, CNS adjusted its installation schedule, according to a root cause analysis. However, the analysis also found that the revised schedule was overly optimistic, assigned significant overlap between tasks, and did not include all required tasks, according to officials. In addition, an inadvertent release of argon during preoperational testing activities required a shutdown of the entire system and caused delays, according to officials. Officials said the experience provided lessons learned that have improved the planning process on other Y-12 projects.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: National Nuclear Security Administration. | GAO-26-107777

Uranium Processing Facility Main Process Building

The Uranium Processing Facility (UPF) Main Process Building (MPB) project plans to construct a nuclear facility to house processes for casting enriched uranium into various shapes and producing special uranium oxides. This project is part of the overall UPF project that previously completed construction on the UPF Mechanical Electrical Building and also intends to construct and equip the UPF Process Support Facilities and the UPF Salvage and Accountability Building to meet the enriched uranium needs for the nation's nuclear weapons stockpile and the U.S. Navy.

INITIATION

- **DEC. 2004** Mission need approval
- **AUG. 2007** Alternative selection

DEFINITION

- **JUNE 2012** Revised alternative selection
- **AUG. 2017** Final design review
- **MAR. 2018** Baseline approval and construction start

EXECUTION

- **DEC. 2024** Revised baseline approval
- **JUNE 2025** GAO review
- **JAN. 2032** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Y-12 National Security Complex (Y-12), Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Construction Contractor: Bechtel National, Inc. (BNI)

NNSA Program Office: Strategic Materials Production Modernization

Critical Technologies: 3

Related Projects: UPF Process Support Facilities (PSF) and UPF Salvage and Accountability Building (SAB)

PROJECT SUMMARY

In December 2024, NNSA approved revised cost and schedule baselines that reflect a 57 percent cost increase and 73-month schedule delay compared to the original March 2018 baselines.

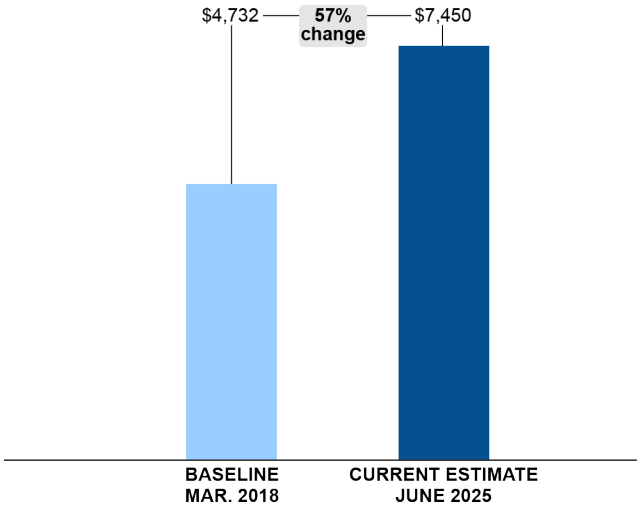
According to NNSA documentation, the cost increase and schedule delay are due to poor contractor performance, labor availability, increased procurement and subcontractor costs, additional costs associated with COVID-19 control measures, and performance-induced budget shortfalls.

For example, CNS failed to notify NNSA of cost overruns and schedule delays in time to include them in an annual budget request, which resulted in funding shortfalls.

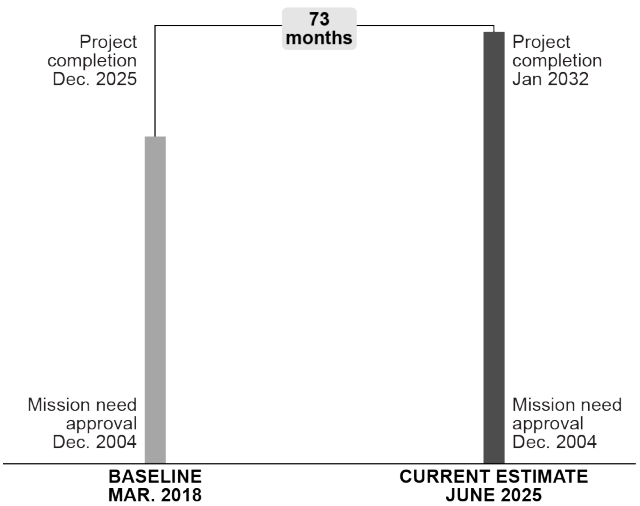
DOE approved a root cause analysis and corrective action plan to address these issues in December 2024 as part of the project's revised baseline approval process. As of June 2025, officials said they expect to complete the project within the revised performance baselines.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



COST AND SCHEDULE STATUS

In December 2024, NNSA approved revised cost and schedule baselines for the project that reflect a 57 percent cost increase and 73-month delay compared with the original March 2018 baselines. The new cost baseline is $7.45 billion (original baseline $4.732 billion), and the new schedule baseline for project completion is January 2032 (original baseline December 2025).

According to NNSA documentation, this significant cost increase and schedule delay are due to poor contractor performance, labor availability, increased procurement and subcontractor costs, additional costs associated with COVID-19 control measures, and performance-induced budget shortfalls.

For example, as we reported in 2025, the Deputy Secretary of Energy formally approved NNSA's root cause analysis and corrective action plan in December 2024. The analysis identified several problems with CNS's management of the project. For example, CNS failed to notify NNSA of cost overruns and schedule delays in time to include them in an annual budget request, which resulted in funding shortfalls. The analysis cited several reasons that hindered CNS's ability to identify the overruns and delays earlier, such as inadequate cost and schedule forecasting, frequent replanning that masked performance, and not including incentives or penalties for key subcontracted work, resulting in late deliveries of services, materials, and equipment. Further, activities to confirm the design of vendor-provided equipment cost more and took longer than planned, which resulted in delays to equipment deliveries and quantity growth. As of July 2025, NNSA had implemented 19 of 20 corrective actions.

Further, procurement challenges, including supply chain challenges, resulted in significant cost increases and schedule delays. For example, the performance of the vendor base supporting nuclear quality requirements declined, resulting in delivery delays for gloveboxes (a sealed, protectively lined compartment with holes to which are attached gloves for handling material inside the compartment), furnaces, and other equipment.

In addition, control measures to prevent the spread of COVID-19 resulted in increased costs. These measures include additional busses and drivers to support social distancing requirements, staggered reporting and lunch times, and increased absenteeism associated with illness, quarantine, and contact tracing.

According to project documentation, the project is currently evaluating multiple performance trends related to heating, ventilation, and air conditioning; fire protection; and professional services. As of June 2025, officials said they expect to complete the project within the revised cost and schedule baselines.

TECHNOLOGY

The project has identified three critical technologies—microwave casting, bulk metal oxidation, and a production calciner. These technologies are intended to enhance the facility's ability to cast, recover, and recycle uranium.

DOE's project management order requires that more costly projects (like the UPF MPB project) mature all critical technologies to TRL 7 prior to the baseline approval milestone. When the project achieved its baseline approval milestone in March 2018, CNS had assessed all three technologies at TRL 7.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: National Nuclear Security Administration. | GAO-26-107777

Uranium Processing Facility Process Support Facilities

The Uranium Processing Facility (UPF) Process Support Facilities (PSF) project plans to construct a building to provide demineralized water and nitric acid for processing activities in the UPF Main Process Building (MPB) and UPF Salvage and Accountability Building (SAB), as well as providing a storage location for chemical and gas supplies. This project is part of the overall UPF project, which has completed construction on the UPF Mechanical Electrical Building and intends to construct and equip the aforementioned three additional facilities to meet the enriched uranium needs of the nation's nuclear weapons stockpile and the U. S. Navy.

INITIATION

- **DEC. 2004** Mission need approval
- **AUG. 2007** Alternative selection

DEFINITION

- **JUNE 2012** Revised alternative selection
- **AUG. 2017** Final design review
- **MAR. 2018** Baseline approval and construction start

EXECUTION

- **FEB. 2023** Revised baseline approval
- **JUNE 2025** GAO review
- **OCT. 2025** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Y-12 National Security Complex, Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Construction Contractor: Bechtel National, Inc. (BNI)

NNSA Program Office: Strategic Materials Production Modernization

Critical Technologies: None

Related Projects: UPF MPB and UPF SAB

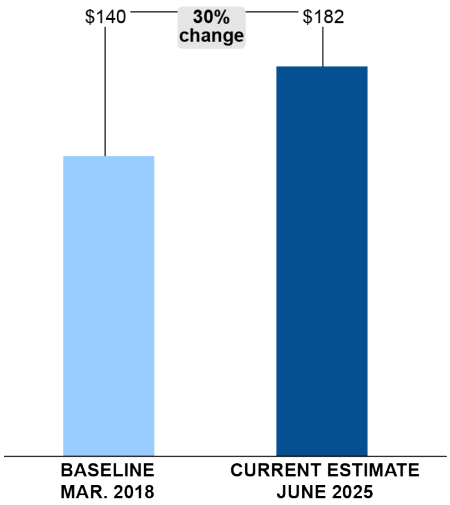
PROJECT SUMMARY

As of June 2025, NNSA estimated that it will complete the project at a cost of $182 million compared to the original baseline of $140 million. This cost estimate reflects the revised baseline that NNSA approved in February 2023 to address construction and supply chain challenges.

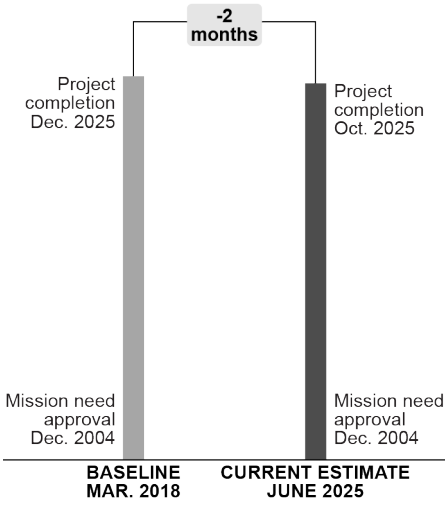
However, NNSA officials estimated that they will complete the project by October 2025, which is 14 months earlier than the revised baseline and 2 months earlier than the original baseline. According to officials, the project has recovered time associated with reduced and retired risks. For example, the project achieved positive results during testing of building components and systems since December 2024, which saved time. According to officials, the project expects to complete all remaining construction activities in June 2025.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate. In September 2025, the project reached completion at an estimated cost of $176 million.

Source: National Nuclear Security Administration. | GAO-26-107777

Uranium Processing Facility Salvage and Accountability Building

The Uranium Processing Facility (UPF) Salvage and Accountability Building (SAB) project plans to construct two facilities totaling over 160,000 square feet. One will be a nuclear facility used to decontaminate waste and recover chemicals associated with uranium processing. The other will include support buildings for personnel access. This project is part of the overall UPF project that previously completed construction on the UPF Mechanical Electrical Building and also intends to construct and equip the UPF Main Process Building and UPF Process Support Facilities.

INITIATION

- **DEC. 2004** Mission need approval
- **AUG. 2007** Alternative selection

DEFINITION

- **JUNE 2012** Revised alternative selection
- **AUG. 2017** Final design review
- **MAR. 2018** Baseline approval and construction start

EXECUTION

- **DEC. 2024** Revised baseline approval
- **JUNE 2025** GAO review
- **JAN. 2032** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Y-12 National Security Complex (Y-12), Oak Ridge TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Construction Contractor: Bechtel National, Inc.

NNSA Program Office: Strategic Materials Production Modernization

Critical Technologies: One

Related Projects: UPF Main Process Building (MPB) and UPF Process Support Facilities (PSF)

PROJECT SUMMARY

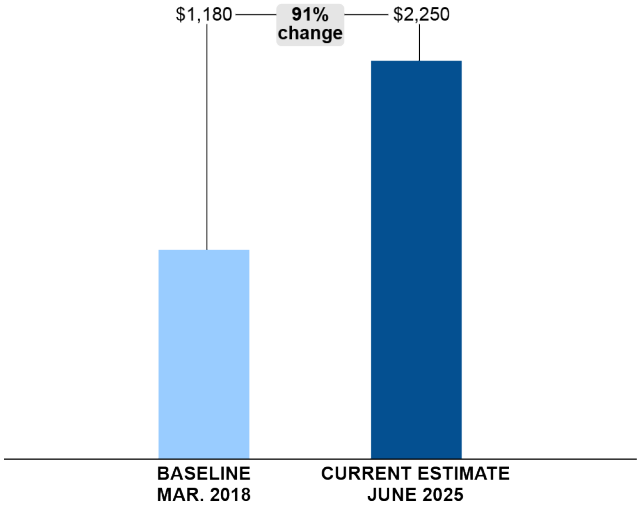
In December 2024, NNSA approved revised cost and schedule baselines that reflect a 91 percent cost increase and 73-month schedule delay compared to the original March 2018 baselines.

According to NNSA documentation, the cost increase and schedule delay are due to several factors, including poor contractor performance, labor availability, and performance induced budget shortfalls. For example, CNS failed to notify NNSA of cost overruns and schedule delays in time to include them in an annual budget request, which resulted in funding shortfalls.

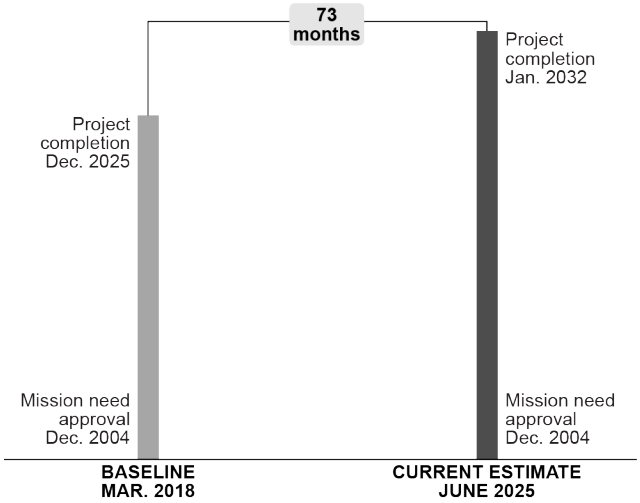
DOE approved a root cause analysis and corrective action plan to address these issues in December 2024 as part of the project's revised baseline approval process. As of June 2025, officials said they expect to complete the project within the revised cost and schedule baselines.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



COST AND SCHEDULE STATUS

In December 2024, NNSA approved revised cost and schedule baselines that reflect a 91 percent cost increase and a 73-month schedule delay compared to the original March 2018 baselines. The new cost baseline is $2.25 billion (original baseline $1.18 billion), and the new schedule baseline for project completion is January 2032 (original baseline December 2025).

According to NNSA officials, this significant cost increase and schedule delay are due to poor contractor performance, labor availability, increased procurement and subcontractor costs, additional costs associated with COVID-19 control measures, and performance-induced budget shortfalls.

For example, as we reported in 2025, the Deputy Secretary of Energy formally approved NNSA's root cause analysis and corrective action plan in December 2024. The analysis identified several problems with CNS's management of the project. For example, CNS failed to notify NNSA of cost overruns and schedule delays in time to include them in an annual budget request, which resulted in funding shortfalls. The analysis cited several reasons that hindered the CNS's ability to identify the overruns and delays earlier, such as inadequate cost and schedule forecasting, frequent replanning that masked performance, and not including incentives or penalties for key subcontracted work, resulting in late deliveries of services, materials, and equipment. Further, activities to confirm the design of vendor-provided equipment cost more and took longer than planned, which resulted in delays to equipment deliveries and quantity growth. As of July 2025, NNSA had implemented 19 of 20 corrective actions.

Further, procurement challenges, including supply chain challenges, resulted in significant cost increases and schedule delays. For example, the performance of the vendor base supporting nuclear quality requirements declined, resulting in delivery delays for gloveboxes (a sealed, protectively lined compartment with holes to which are attached gloves for handling material inside the compartment), furnaces, and other equipment.

In addition, control measures to prevent the spread of COVID-19 resulted in increased costs. These measures included additional busses and drivers to support social distancing requirements, staggered reporting and lunch times, and increased absenteeism associated with illness, quarantine, and contact tracing.

According to project documentation, the critical path (the longest continuous sequence of activities in a schedule and that defines the project's earliest completion date) remains unchanged. As of June 2025, officials said they expect to complete the project within the revised cost and schedule baselines.

TECHNOLOGY

The project has identified a single critical technology—a chemical recovery calciner—that will recover enriched uranium with higher levels of impurities than in prior recovery operations. DOE's project management order requires that more costly projects (like the UPF SAB project) mature all critical technologies to TRL 7 prior to the baseline approval milestone. When the project achieved its baseline approval milestone in March 2018, CNS had assessed the technology at TRL 7.

PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Source: National Nuclear Security Administration. | GAO-26-107777

West End Protected Area Reduction

The West End Protected Area Reduction (WEPAR) project plans to complete multiple security efforts to improve the Y-12 National Security Complex's protective system while reducing its overall security footprint. The project will construct a new Perimeter Intrusion Detection Assessment System (PIDAS) section and demolish existing, obsolete PIDAS sections to reduce the site's protected security area by approximately 50 percent. The project also plans to construct a new entry control facility (with vehicle access) and complete certain security upgrades (e.g., installing new vaults) for multiple buildings outside of the protected area.

INITIATION

- **SEPT. 2017** Mission need approval
- **DEC. 2018** Alternative selection

DEFINITION

- **JULY 2020** Final design review
- **JAN. 2021** Baseline approval and construction start

EXECUTION

- **FEB. 2024** Revised baseline approval
- **JUNE 2025** GAO review
- **APR. 2028** Project completion

PROJECT INFORMATION

Type: Line-item construction

Location: Y-12 National Security Complex (Y-12), Oak Ridge, TN

Site Contractor: Consolidated Nuclear Security, LLC (CNS)

Construction Contractor: National Technology and Engineering Solutions of Sandia

NNSA Program Office: Defense Nuclear Security

Critical Technologies: None

Related Projects: None

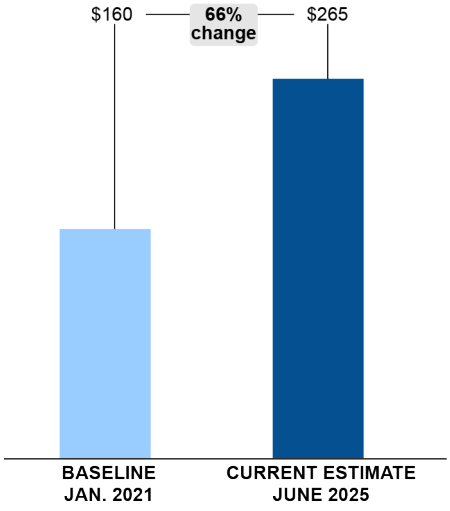
PROJECT SUMMARY

As of June 2025, NNSA estimated that it will complete the project at a cost of $265 million (original baseline is $160 million) in April 2028 (original baseline is July 2025). These estimates reflect the revised baselines that NNSA approved in February 2024 to address (1) schedule delays on separate utility projects that delayed worksite turnover to the WEPAR project; (2) higher cost related to replacing a subcontractor, who officials said defaulted on the contract; and (3) site conditions that were not as expected and inadequate initial planning that resulted in significant design changes. According to NNSA officials, CNS did not formally alert NNSA when it first became apparent that the project could not meet its original cost and schedule baselines.

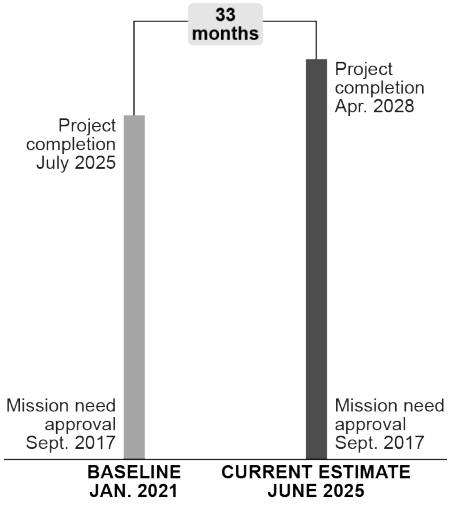
After NNSA approved the baseline change, the construction contractor discovered mercury during digging on site. In addition, a fire water main broke and washed away a portion of the site preparation work, according to officials. As a result of these events, the project may have to revise its cost and schedule baselines again, according to officials.

COST PERFORMANCE

then-year dollars in millions



SCHEDULE PERFORMANCE



PROJECT OFFICE COMMENTS

Project officials provided technical comments on a draft of this assessment, which we incorporated as appropriate.

Appendix II: Objectives, Scope, and Methodology

This is our second biennial report assessing selected National Nuclear Security Administration (NNSA) major projects,[1] which we define as a capital asset project with an estimated cost of $100 million or more.[2] We included the 28 NNSA major projects that had reached the alternative selection milestone by January 2025. These projects included both 21 line-item construction projects and seven major items of equipment.

We excluded nine major projects in the initiation phase from our scope because NNSA has not selected a preferred alternative or approved preliminary cost and schedule estimates for these projects at the time of our review. We also excluded several other types of projects, including projects managed by NNSA's Office of Naval Reactors and information technology acquisition projects, because they are not subject to the requirements of the Department of Energy's (DOE) project management order and do not report detailed project information into DOE's Project Assessment and Reporting System (PARS) database.[3]

We developed individual project summaries for the 28 major projects. We divided these projects into those with approved cost and schedule baselines (execution phase) and those without (definition phase) because we consider them to be in different acquisition phases. Specifically, projects with cost and schedule baselines have completed the design process, have a defined scope, are conducting construction activities, and report performance data to PARS. In contrast, projects without cost and schedule baselines are still in the design process, have a preliminary scope, may conduct limited site preparation or procurement activities, and report more limited data to PARS.

[1]Our prior report is GAO, *National Nuclear Security Administration: Assessments of Major Projects*, GAO-23-104402 (Washington, D.C.: Aug. 17, 2023).

[2]For purposes of this report and consistent with the congressional reporting provision under which we conducted our review, we define a major project as a capital asset project with an estimated total project cost of $100 million or more. In contrast, DOE's order on project management for capital asset acquisitions defines a "major system" project to be any project with an estimated cost of over $750 million. Department of Energy, *Program and Project Management for the Acquisition of Capital Assets*, DOE Order 413.3B (Washington, D.C.: June 21, 2023). However, DOE's order generally applies to projects estimated to cost $50 million or more.

[3]DOE's project management order requires that projects with a total project cost of greater than $50 million report progress and provide documentation in PARS starting after a project receives mission need approval (critical decision 0). See Department of Energy, *Program and Project Management for the Acquisition of Capital Assets*, DOE Order 413.3B.

For each summary, we included a description and image of the project; information concerning the NNSA site, contractors, related projects, and program office involved in the project; the project's cost and schedule performance, when available; key project milestones; and a brief narrative describing the status of the project. We also provided a detailed discussion of project challenges for selected projects.

To obtain this information, we reviewed project information from PARS along with standard project documents, such as project execution plans and monthly status reports. Using this information, we developed a questionnaire for each project and submitted it to NNSA's project offices. In the questionnaire, we requested each project office to corroborate, update, or provide information on the basic project characteristics; cost estimates; key milestones; schedule estimates; status and specific challenges regarding contractor performance as well as construction, supply chain and procurement activities; status of design maturity and results of design reviews; and maturity of critical technologies.

We also interviewed officials for each project to discuss the information on the questionnaire and the project's status. We then reviewed project documentation—such as updated versions of a project's execution plan, design management plan, or technology maturation plan—as well as project reviews and NNSA congressional budget justifications to corroborate any testimonial evidence we received in the interviews.

To obtain information on and assess the cost and schedule performance of projects with performance baselines, we collected cost and schedule information that the project office reports in PARS. According to officials, the project office's current cost and schedule estimates are calculated by adding the actual cost of work completed to date to the estimated costs and schedule for completing the remaining work. To assess the reliability of the data, we reviewed related documentation and interviewed knowledgeable agency officials, among other things. We determined that the data were reliable for the purpose of reporting a project's cost and schedule status as of June 2025.

We compared this June 2025 information with the original cost and schedule baselines NNSA approved for these projects at the baseline approval and construction start milestone, which represents NNSA's formal commitment on the project's cost and schedule. In addition, we compared this June 2025 information with the estimates we reported in March 2023. We used the original baseline data when calculating individual project and portfolio performance for purposes of our analyses.

In addition, to assess schedule performance, we tracked the number of months between the start of a project's execution phase (i.e., the date of the baseline approval milestone) and both the estimated completion date approved at the baseline approval milestone and the current estimate of project completion. All cost information in this report is presented in nominal then-year dollars.

To assess the development and maturity of project designs for projects that do not yet have cost and schedule baselines, we reviewed relevant project documentation, including projects' design management plans and their most recently completed design reviews. We compared the documentation and findings from the design reviews with DOE and NNSA requirements, such as those found in DOE's project management order. In addition, we reviewed monthly status reports to see if the project office identified any design issues that occurred between design reviews. We also reviewed documents and interviewed NNSA project officials to determine if any design issues have had, or could have, any effects on project costs and schedules.

To assess the development and maturity of critical technologies for projects that do not yet have cost and schedule baselines, we relied on information about the number of critical technologies for each project and their associated technology readiness levels (TRL) provided by the NNSA project offices. We then reviewed relevant documentation, such as technology readiness assessments and technology maturation plans. For projects that identified critical technologies and completed an assessment of TRLs, we compared the reported TRLs with the technology maturity milestones outlined in DOE's project management order. We did not verify the independence of the assessment team (a requirement in DOE's project management order) or the resulting assessments of TRLs. However, we took steps to assess the reliability of the project office-supplied data by, for example, reviewing relevant documentation, and determined the data were sufficiently reliable for the purpose of reporting the status of a project's development and maturity of its critical technologies.

We conducted this performance audit from August 2024 to February 2026 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix III: Estimated Costs and Schedules for the National Nuclear Security Administration's Projects Assessed by GAO

Table 6 shows the preliminary cost and schedule estimates approved at the alternative selection milestone for the National Nuclear Security Administration's (NNSA) portfolio of 12 projects in the definition phase, as of June 2025.[1]

Table 6: Preliminary Cost and Schedule Estimates for NNSA's 12 Major Projects in the Definition Phase, as of June 2025

Project (site)	Cost estimate at alternative selection (dollars in millions)	Current cost estimate (dollars in millions)	Completion date at alternative selection	Current completion date
Los Alamos National Laboratory				
Electrical Power Capacity Upgrade[a]	261–349	349	June 2030	December 2031
Los Alamos Plutonium Pit Production Project (LAP4) 30 Reliable Equipment Installation	500–760	To be determined	October 2026–May 2028	To be determined
LAP4 Training/Development Center	350–450	450	October 2026–September 2028	To be determined
Pantex Plant				
High Explosives Synthesis, Formulation, and Production Capability	505–699	721	July 2030–September 2030	December 2034
Sandia National Laboratories				
Power Sources Capability[a]	344–400	400	December 2028–June 2030	September 2030
Savannah River Site				
Savannah River Plutonium Processing Facility (SRPPF) High-Fidelity Training and Operations Center	370	To be determined	September 2028	To be determined
SRPPF Main Process Building	10,650	To be determined	October 2032–September 2035	To be determined
Tritium Finishing Facility Process Buildings	305-640	To be determined	September 2029–September 2031	To be determined
Y-12 National Security Complex				
Direct Chip Melt Bottom Loading Furnace (DCM BLF) Chip Compaction[a, b]	76-114	162	December 2028–September 2029	June 2032
DCM BLF Compacted Chip Processing[b]	182-327	To be determined	March 2035–September 2036	To be determined
Lithium Processing Facility (LPF) East End Substation[a]	84–126	126	January 2030–April 2031	April 2031
LPF Main Processing Facility[b]	871-1,519	To be determined	September 2031	To be determined

[1]For the purposes of this report, the definition phase begins when NNSA approves the alternative selection milestone (critical decision 1) and ends when NNSA approves the baseline approval and construction start milestone (critical decisions 2 and 3).

Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

Notes: GAO defines major projects as those with a total estimated cost greater than $100 million.

To be determined refers to estimates that are currently under development by NNSA.

[a]According to NNSA officials, the agency approved a performance baseline for this project after June 2025, and the project has transitioned to the execution phase.

[b]These estimates are from the project's revised alternative selection because they are the first estimates developed for the specific projects. The alternative selection cost and schedules are for their respective parent projects before the projects were established.

Table 7 shows the cost and schedule baselines for NNSA's portfolio of 16 projects in the execution phase.[2]

Table 7: Cost and Schedule Estimates for NNSA's 16 Major Projects in the Execution Phase, as of June 2025

Project (site)	Baseline cost estimate (dollars in millions)	Current cost estimate (dollars in millions)	Baseline completion date	Current completion date
Los Alamos National Laboratory				
Chemistry and Metallurgy Research Replacement Plutonium Facility-4 Equipment Installation, Phase 2	1,188	1,188	June 2034	June 2034
Los Alamos Plutonium Pit Production Project (LAP4) 30 Base Equipment Installation	1,864	1,864[a]	August 2030	August 2030[a]
LAP4 Decontamination and Decommissioning	529	529[a]	March 2027	March 2027[a]
LAP4 West Entry Control Facility	209	209	September 2029	September 2029
Technical Area-55 Reinvestment Project, Phase III	236	251[a]	June 2027	November 2028a
Transuranic Liquid Waste Facility	215	215[a]	August 2027	August 2027[a]
Nevada National Security Site				
Enhanced Capabilities for Subcritical Experiments (ECSE) Advanced Sources and Detectors	1,800	2,191[a]	May 2030	January 2033[a]
ECSE Laboratory and Support Infrastructure	560	830	December 2026	November 2029
Pantex Plant				
High Explosives Science & Engineering Facility	228	300	November 2027	November 2028
Savannah River Site				

[2]For the purposes of this report, the execution phase begins when NNSA approves the baseline approval and construction start milestone (critical decisions 2 and 3) and ends when NNSA approves the project completion milestone (critical decision 4).

Project (site)	Baseline cost estimate (dollars in millions)	Current cost estimate (dollars in millions)	Baseline completion date	Current completion date
Surplus Plutonium Disposition	997	997	April 2031	April 2031
Y-12 National Security Complex				
Calciner Project	108	213	September 2023	December 2027
Electrorefining Project[b]	101	139	February 2023	January 2026
Uranium Processing Facility (UPF) Main Process Building	4,732	7,450	December 2025	January 2032
UPF Process Support Facilities[b]	140	182	December 2025	October 2025
UPF Salvage and Accountability Building	1,180	2,250	December 2025	January 2032
West End Protected Area Reduction	160	265	July 2025	April 2028

Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

Note: GAO defines major projects as those with a total estimated cost greater than $100 million. The baseline cost estimate and baseline completion date estimates refer to the original baseline estimates that NNSA approved at a project's baseline approval and construction start milestone.

[a]These estimates are under review by NNSA management and are subject to revision under NNSA's baseline change approval process.

[b]According to NNSA officials, the agency approved project completion (critical decision 4) for this project after June 2025, and the project has transitioned to the closeout phase.

Appendix IV: Estimated Costs and Schedules for Major Projects in the Initiation Phase

Table 8 shows the initial cost and schedule estimates for the National Nuclear Security Administration's portfolio of nine projects in the initiation phase.[1]

Table 8: Initial Cost and Schedule Estimates for NNSA's Nine Major Projects in the Initiation Phase, as of June 2025

Project	Site	Cost estimate at mission approval (dollars in millions)	Completion date at mission approval
Combined Radiation Environments for Survivability Testing	Sandia National Laboratories	380–1,250	December 2029–December 2033
Energetic Materials Characterization Facility	Los Alamos National Laboratory	99–395	March 2026
Enhanced Yield Capability	Lawrence Livermore National Laboratory	470–1,000	December 2030–September 2035
Los Alamos Neutron Science Center Modernization Project	Los Alamos National Laboratory	456–1,007	September 2029–June 2036
Material Staging Facility	Pantex Plant	179–714	September 2024
National Security Innovation Center	Lawrence Livermore National Laboratory	347–560	March 2030–December 2030
Pit Disassembly and Processing	Los Alamos National Laboratory	1,000–3,400	September 2031–September 2035
Principal Underground Laboratory for Subcritical Experimentation New Access Project	Nevada National Security Site	85–303	September 2028–September 2034
Radiography/Assembly Capabilities Replacement	Los Alamos National Laboratory	153–574	December 2029–December 2034

Source: GAO analysis of National Nuclear Security Administration (NNSA) data. | GAO-26-107777

Note: GAO defines major projects as those with a total estimated cost greater than $100 million.

[1]For the purposes of this report, the initiation phase begins when NNSA approves the mission need milestone (critical decision 0) and ends when NNSA approves the alternative selection milestone (critical decision 1).

Appendix V: Estimated Costs and Schedules for the Major Projects Managed by the Office of Naval Reactors

Table 9 shows the preliminary cost and schedule estimates for the one project managed by the Office of Naval Reactors that is in the definition phase.[1] The Office of Naval Reactors is jointly managed by the U.S. Navy and the National Nuclear Security Administration. The Office of Naval Reactors is not directly subject to the requirements contained in DOE Order 413.3B but implements similar procedures.

Table 9: Preliminary Cost and Schedule Estimates for the National Nuclear Security Administration Office of Naval Reactor's Major Projects in the Definition Phase, as of June 2025

Project	Cost estimate at alternative selection (dollars in millions)	Current cost estimate (dollars in millions)	Completion date at alternative selection	Current completion date
Naval Examination Acquisition Project	1,630–5,000	3,229	September 2036	September 2036

Source: GAO analysis of Department of Energy data. | GAO-26-107777

Note: GAO defines major projects as those with a total estimated cost greater than $100 million.

Table 10 shows the cost and schedule baselines for the one project managed by NNSA's Office of Naval Reactor's that is in the execution phase.[2]

Table 10: Cost and Schedule Estimates for the National Nuclear Security Administration Office of Naval Reactor's Major Projects in the Execution Phase, as of June 2025

Project	Baseline cost estimate (dollars in millions)	Current cost estimate (dollars in millions)	Baseline completion date	Current completion date
Spent Fuel Handling Recapitalization Project	1,687	4,533	June 2025	September 2031

Source: GAO analysis of Department of Energy data. | GAO-26-107777

Note: GAO defines major projects as those with a total estimated cost greater than $100 million. The baseline cost estimate and baseline completion date estimates refer to the original baseline estimates approved at a project's baseline approval and construction start milestone.

[1]For purposes of this report, the definition phase begins when the alternative selection milestone (critical decision 1) is approved and ends when the baseline approval and construction start milestone (critical decisions 2 and 3) is approved.

[2]For purposes of this report, the execution phase begins when the baseline approval and construction start milestone (critical decisions 2 and 3) is approved and ends when the project completion milestone (critical decision 4) is approved.

Appendix VI: Design Costs and Schedules for the National Nuclear Security Administration's Projects Assessed by GAO

Table 11 shows estimates of the time to complete design activities and the associated costs for the National Nuclear Security Administration's (NNSA) portfolio of 12 projects in the definition phase.[1]

Table 11: Estimates of Time to Complete Design Activities and Associated Costs for NNSA's 12 Major Projects in the Definition Phase, as of June 2025

Project	Time to complete design (in years)[a]	Design cost estimate (dollars in millions)	Design cost as percentage of project cost
Los Alamos National Laboratory			
Electrical Power Capacity Upgrade[b]	7	62	18
Los Alamos Plutonium Pit Production Project (LAP4) 30 Reliable Equipment Installation	To be determined	To be determined	To be determined
LAP4 Training/Development Center	To be determined	To be determined	To be determined
Pantex Plant			
High Explosives Synthesis, Formulation, and Production Capability	4	48	7
Sandia National Laboratories			
Power Sources Capability[b]	5	22	6
Savannah River Site			
Savannah River Plutonium Processing Facility (SRPPF) High-Fidelity Training and Operations Center	11	165	To be determined
SRPPF Main Process Building	12	2,650	To be determined
Tritium Finishing Facility Process Buildings	To be determined	To be determined	To be determined
Y-12 National Security Complex			
Direct Chip Melt Bottom Loading Furnace (DCM BLF) Chip Compaction[b]	3	18	11
DCM BLF Compacted Chip Processing	4	31	To be determined
Lithium Processing Facility (LPF) East End Substation[b]	To be determined	To be determined	To be determined
LPF Main Processing Facility	9	To be determined	To be determined

Source: GAO analysis of National Nuclear Security Administration (NNSA) documentation and budget data. | GAO-26-107777

Notes: GAO defines major projects as those with a total estimated cost greater than $100 million.

To be determined refers to estimates that are currently under development by NNSA.

[a]The time to complete design is based on the duration between the mission need milestone (critical decision 0) and completion of the final design.

[b]According to NNSA officials, the agency approved a performance baseline for this project after June 2025, and the project has transitioned to the execution phase.

[1]For purposes of this report, the definition phase begins when NNSA approves the alternative selection milestone (critical decision 1) and ends when NNSA approves the baseline approval and construction start milestone (critical decisions 2 and 3).

Table 12 shows the time to complete design activities and the associated costs for NNSA's portfolio of 16 projects in the execution phase.[2]

Table 12: Time to Complete Design Activities and Associated Costs for NNSA's 16 Major Projects in the Execution Phase, as of June 2025

Project	Time to complete design (in years)[a]	Design cost (dollars in millions)	Design cost as percentage of project cost
Los Alamos National Laboratory			
Chemistry and Metallurgy Research Replacement (CMRR) Plutonium Facility-4 (PF-4) Equipment Installation, Phase 2	22[b]	171	14
Los Alamos Plutonium Pit Production Project (LAP4) 30 Base Equipment Installation[c]	9	120	To be determined
LAP4 Decontamination and Decommission[c]	7	23	To be determined
LAP4 West Entry Control Facility	9	23	11
Technical Area-55 Reinvestment Project, Phase III	16	19	8
Transuranic Liquid Waste Facility	17	45	21
Nevada National Security Site			
Enhanced Capabilities for Subcritical Experiments (ECSE) Advanced Sources and Detectors[d]	8	Data not available	Data not available
ECSE Laboratory and Support Infrastructure	8	102	12
Pantex Plant			
High Explosives Science & Engineering Facility	7	19	6
Savannah River Site			
Surplus Plutonium Disposition	26[e]	218	22
Y-12 National Security Complex			
Calciner Project	5	13	6
Electrorefining Project[f]	4	7	5
Uranium Processing Facility (UPF) Main Process Building	13	1,838	25
UPF Process Support Facilities[f]	13	Data not available[g]	Data not available[g]
UPF Salvage and Accountability Building	13	Data not available[g]	Data not available[g]
West End Protected Area Reduction Project	3	13	5

Source: GAO analysis of National Nuclear Security Administration (NNSA) documentation and budget data. | GAO-26-107777

Note: GAO defines major projects as those with a total estimated cost greater than $100 million.

[2]For purposes of this report, the execution phase begins when NNSA approves the baseline approval and construction start milestone (critical decisions 2 and 3) and ends when NNSA approves the project completion milestone (critical decision 4).

[a]The time to complete design is based on the duration between the mission need milestone (critical decision 0) and completion of the final design.

[b]The CMRR portfolio was established in 2004 but has evolved significantly over its history. NNSA first defined the scope of the CMRR Plutonium Facility-4 Equipment Installation, Phase 2 project in its fiscal year 2017 budget justification and completed a significant replan for the project in February 2022.

[c]The LAP4 portfolio was established in 2015, but NNSA identified the current alternative that established the LAP4 projects in May 2018.

[d]According to NNSA officials, design cost data are not available for this project because NNSA did not track design costs separately.

[e]The Surplus Plutonium Disposition project started in 1997, but NNSA identified the current alternative, called dilute and dispose, in 2014. NNSA approved the alternative selection for this project in December 2019.

[f]According to NNSA officials, the agency approved project completion (critical decision 4) for this project after June 2025, and the project has transitioned to the closeout phase.

[g]NNSA accounted for the design costs for all UPF-related projects under the UPF Main Process Building project.

Appendix VII: Technology Readiness Levels

Table 13: Department of Energy Technology Readiness Levels (TRL)

TRL	Definition	Description
1	Basic principles observed and reported	Scientific research begins to be translated into applied research and development (R&D). Examples might include paper studies of a technology's basic properties or experimental work that consists mainly of observations of the physical world. Supporting information includes published research or other references that identify the principles that underlie the technology.
2	Technology concept or application formulated	Once basic principles are observed, practical applications can be invented. Applications are speculative, and there may be no proof or detailed analysis to support the assumptions. Examples are still limited to analytic studies. Supporting information includes publications or other references that outline the application being considered and that provide analysis to support the concept. The step up from TRL 1 to TRL 2 moves the ideas from pure to applied research. Most of the work is analytical or paper studies, with the emphasis on understanding the science better. Experimental work is designed to corroborate the basic scientific observations made during TRL 1 work.
3	Analytical and experimental critical function or characteristic proof of concept	Active R&D is initiated, including analytical studies and laboratory-scale studies to physically validate the analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative tested with simulants. Supporting information includes results of laboratory tests performed to measure parameters of interest and comparison with analytical predictions for critical subsystems. At TRL 3, the work has moved beyond the paper phase to experimental work that verifies that the concept works as expected on simulants. Components of the technology are validated, but there is no attempt to integrate the components into a complete system. Modeling and simulation may be used to complement physical experiments.
4	Component or system validation in laboratory environment	The basic technological components are integrated to establish that the pieces will work together. This is relatively "low fidelity" compared with the eventual system. Examples include integration of ad hoc hardware in a laboratory and testing with a range of simulants and small-scale tests on actual waste. Supporting information includes the results of the integrated experiments and estimates of how the experimental components and experimental test results differ from the expected system performance goals. TRLs 4–6 represent the bridge from scientific research to engineering. TRL 4 is the first step in determining whether the individual components will work together as a system. The laboratory system will probably be a mix of on-hand equipment and a few special purpose components that may require special handling, calibration, or alignment to get them to function.
5	Laboratory-scale, similar system validation in relevant environment	The basic technological components are integrated so that the system configuration is similar to (or matches) the final application in almost all respects. Examples include testing a high-fidelity, laboratory-scale system in a simulated environment with a range of simulants and actual waste. Supporting information includes results from the laboratory-scale testing, analysis of the differences between the laboratory and eventual operating system/environment, and analysis of what the experimental results mean for the eventual operating system/environment. The major difference between TRL 4 and 5 is the increase in the fidelity of the system and environment to the actual application. The system tested is almost prototypical.

TRL	Definition	Description
6	Engineering/pilot-scale, similar (prototypical) system validation in relevant environment	Engineering-scale models or prototypes are tested in a relevant environment. This represents a major step up in a technology's demonstrated readiness. Examples include testing an engineering-scale prototypical system with a range of simulants. Supporting information includes results from the engineering-scale testing and analysis of the differences between the engineering-scale, prototypical system/environment, and analysis of what the experimental results mean for the eventual operating system/environment. TRL 6 begins true engineering development of the technology as an operational system. The major difference between TRLs 5 and 6 is the step up from laboratory scale to engineering scale and the determination of scaling factors that will enable design of the operating system. The prototype should be capable of performing all the functions that will be required of the operational system. The operating environment for the testing should closely represent the actual operating environment.
7	Full-scale, similar (prototypical) system demonstrated in relevant environment	This represents a major step up from TRL 6, requiring demonstration of an actual system prototype in a relevant environment. Examples include testing full-scale prototype in the field with a range of simulants in cold commissioning. Supporting information includes results from the full-scale testing and analysis of the differences between the test environment, and analysis of what the experimental results mean for the eventual operating system/environment. Final design is virtually complete.
8	Actual system completed and qualified through test and demonstration	The technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental testing and evaluation of the system with actual waste in hot commissioning. Supporting information includes operational procedures that are virtually complete. An operational readiness review has been successfully completed prior to the start of hot testing.
9	Actual system operated over the full range of expected mission conditions	The technology is in its final form and operated under the full range of operating mission conditions. Examples include using the actual system with the full range of wastes in hot operations.

Source: Department of Energy. | GAO-26-107777

Appendix VIII: GAO Contact and Staff Acknowledgments

GAO Contact

Allison Bawden, BawdenA@gao.gov

Staff Acknowledgments

In addition to the contact named above, Jason Holliday (Assistant Director), Drew Moore (Analyst in Charge), Antoinette Capaccio, Rebecca Conway, Pamela Davidson, Matthew McLaughlin, Geovana Mendoza, and Sara Sullivan made key contributions to this report. Also contributing to this report were Monica Alvarez-Scott, Alisa Carrigan, Katherine Earle, Kathryn Fledderman, Lily Folkerts, Jessica Lewis, Elizabeth Luke, Elizabeth Morris, Wesley Sholtes, and Sara Younes.

Appendix IX: Additional Source Information for Images and Figures

This appendix contains credit, copyright, and other source information for images, tables, or figures in this product when that information was not listed adjacent to the image, table, or figure.

Appendix I:

Department of Energy/National Nuclear Security Administration (logos for Los Alamos National Laboratory, Nevada National Security Site, Pantex Plant, Sandia National Laboratory, Savannah River Site, and Y-12 National Security Complex).

GAO analysis of NNSA documents (all timeline figures).

GAO analysis of NNSA data (all preliminary cost figures and cost performance figures).

GAO analysis of NNSA data (all preliminary schedule figures and schedule performance figures).

Related GAO Products

Modernizing the Nuclear Security Enterprise: Opportunities Exist to Better Prepare for Delay in the New Uranium Processing Facility. GAO-25-107330. Washington, D.C.: September 19, 2025.

National Nuclear Security Administration: Explosives Program Is Mitigating Some Supply Chain Risks but Should Take Additional Actions to Enhance Resiliency. GAO-25-107016. Washington, D.C.: March 12, 2025.

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