NUCLEAR WASTE CLEANUP

More Effective Oversight Is Needed to Help Ensure Better Project Outcomes

Report to the Committee on Armed Services, House of Representatives

July 2024
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GAO Highlights

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Highlights of GAO-24-106716, a report to the Committee on Armed Services, House of Representatives
July 2024

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Why GAO Did This Study

EM is responsible for treatment and disposal of radioactive and hazardous waste generated in nuclear weapons production and energy research. One way EM fulfills its mission is through capital asset projects, which are generally executed by contractors. These projects include construction of new facilities to treat radioactive waste and demolition of old facilities. In the last decade, DOE's Office of Inspector General and GAO have reported on quality assurance issues on capital asset projects that have also had cost and schedule issues.

House Report 117-397 includes a provision for GAO to review EM's current quality assurance functions for capital asset projects. This report (1) describes how DOE and EM oversee quality assurance on these projects, (2) examines how use of oversight processes may have affected the performance of five selected EM projects, and (3) assesses DOE's actions to ensure quality assurance issues on EM capital asset projects do not recur. GAO reviewed DOE and EM oversight policies and project documentation for five capital asset projects ranging from $160 million to $18.5 billion in total estimated costs and interviewed DOE officials.

What GAO Recommends

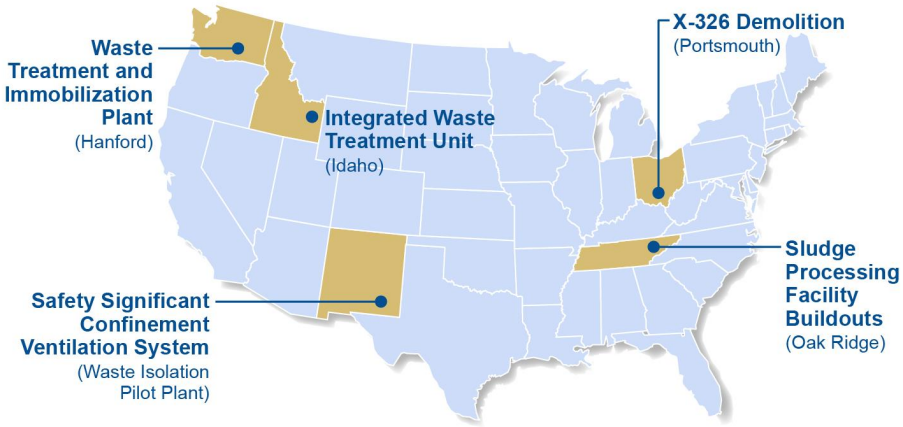
GAO is making four recommendations, including that (1) EM develop project review guidance for analyzing federal management performance and oversight effectiveness, and (2) DOE evaluate options to hold contractors accountable for maintaining compliant Earned Value Management Systems. DOE concurred with GAO's recommendations.

What GAO Found

The Department of Energy (DOE) has a range of policies that seek to ensure it produces quality products and services, including capital asset projects. Further, DOE's Office of Environmental Management (EM) uses several tools to oversee quality assurance on its capital asset projects. These include sharing lessons learned and using contractor data to monitor project performance.

GAO reviewed five selected EM capital asset projects and found that for three projects with cost overruns and schedule delays, officials did not use certain quality assurance oversight processes as intended. For example, two projects did not have consistently compliant Earned Value Management Systems. These systems help measure cost and schedule performance and can alert officials to problems. Conversely, GAO found that one project that was performing ahead of schedule and under budget had a consistently compliant system.

Names and Locations of Selected Office of Environmental Management Capital Asset Projects



Sources: GAO analysis of Department of Energy information; Map Resources (map). | GAO-24-106716

Accessible Text for Names and Locations of Selected Office of Environmental Management Capital Asset Projects

- Waste Treatment and Immobilization Plant (Hanford)
- Integrated Waste Treatment Unit (Idaho)
- Safety Significant Confinement Ventilation System (Waste Isolation Pilot Plant)
- X-326 Demolition (Portsmouth)
- Sludge Processing Buildouts (Oak Ridge)

Sources: GAO analysis of Department of Energy information; Map Resources (map). I GA0-24-106716

DOE has not always demonstrated a commitment to addressing the underlying causes of quality assurance issues to prevent recurrence. GAO found that EM does not consistently assess the effectiveness of its contractor oversight or identify root causes of project deficiencies related to EM's management. For example, in a 2021 root cause analysis, EM did not acknowledge its role in hiring an inexperienced contractor and not providing sufficient oversight. GAO also found that EM does not have guidance for assessing federal management performance or oversight effectiveness. By providing project review guidance for identifying management's role in project deficiencies and analyzing the effectiveness of federal oversight, DOE can help prevent recurring problems.

Further, many of EM's project reviews rely on contractors' Earned Value Management Systems data. However, DOE has allowed some contractors to operate their systems with deficiencies for years, which may result in undependable data. By holding contractors accountable for maintaining quality earned value management data, DOE will be better positioned to oversee contractor performance and ensure quality capital asset projects.

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Abbreviations

CD	critical decision
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
EM	Office of Environmental Management
ESAAB	Energy Systems Acquisition Advisory Board
EVM	earned value management
EVMS	Earned Value Management System
IWTU	Integrated Waste Treatment Unit
OIG	Office of Inspector General
SL-PFB	Sludge Processing Facility Buildouts
SSCVS	Safety Significant Confinement Ventilation System
WIPP	Waste Isolation Pilot Plant
WTP	Waste Treatment and Immobilization Plant
X-326	X-326 Process Building Demolition

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U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

July 31, 2024

The Honorable Mike Rogers
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

The Department of Energy (DOE) is responsible for one of the world's largest environmental cleanup programs—cleaning up radioactive and hazardous waste created as a by-product of nuclear weapons production and nuclear energy research that started during World War II. DOE's Office of Environmental Management (EM) undertakes capital asset projects as one means of fulfilling its responsibility for cleaning up contaminated sites across the country.[1] EM awards contracts to carry out these capital asset projects, which include the construction of new facilities for treating radioactive waste as well as the demolition of contaminated buildings.[2] The projects can be technically complex, with some relying on first-of-a-kind technology. As of January 2024, EM had 26 active capital asset projects—located at eight of EM's 15 cleanup sites—estimated to cost over $40 billion in total.[3]

To ensure, among other things, that its products and services—which include capital asset projects—meet the agency's requirements and expectations, DOE and EM have instituted a range of quality assurance requirements. These requirements include those aimed at ensuring that potential quality problems, such as those related to a capital asset project, are identified and addressed so that they do not recur. However, over the last decade, DOE's Office of Inspector General (OIG) and we have reported on quality assurance issues identified on EM capital asset projects that have also had cost and schedule issues. Notably, DOE's management and oversight of contractors and projects has been on our High-Risk List since 1990 because DOE's record of project management and contractor oversight has left the agency vulnerable to fraud, waste, abuse, and mismanagement.[4] In our April 2023 High-Risk Report, we noted that EM's leadership has demonstrated a commitment to improving oversight of acquisitions and better managing projects. We also

[1]The Office of Management and Budget defines capital assets as land, structures, equipment, and intellectual property that are used by the federal government and have an estimated useful life of 2 years or more. Capital assets may be acquired in different ways: through purchase, construction, or manufacture; through a lease-purchase or other capital lease, regardless of whether title has passed to the federal government; or through exchange. Office of Management and Budget, *Circular No. A-11: Preparation, Submission, and Execution of the Budget* (Washington, D.C.: August 2023).

[2]In addition to capital asset projects, EM also undertakes operations activities in support of its cleanup mission. Operations activities include reoccurring facility and environmental operations, as well as activities that are project-like, with defined start and end dates, such as soil and groundwater remediation.

[3]EM's headquarters office and its field sites are collectively known as the EM complex.

[4]Our High-Risk List identifies federal programs and operations that are vulnerable to fraud, waste, abuse, and mismanagement, or in need of transformation. The referenced high-risk area has had several titles since its establishment in 1990, when it was called "Department of Energy Contractor Oversight." GAO, *High Risk: Letter to Congressional Committees Identifying GAO's Original High Risk Areas* (Washington, D.C.: Jan. 23, 1990). In 2023, we changed the title to "Acquisition and Program Management for DOE's National Nuclear Security Administration and Office of Environmental Management." GAO, *High-Risk Series: Efforts Made to Achieve Progress Need to Be Maintained and Expanded to Fully Address All Areas*, GAO-23-106203 (Washington, D.C.: Apr. 20, 2023).

noted, however, that EM continues to experience difficulties in monitoring the effectiveness of its efforts to address acquisition and management challenges.

House Report 117-397 includes a provision for GAO to evaluate EM's current quality assurance functions for capital asset projects, lessons learned from quality assurance issues across the EM complex, and DOE's efforts to ensure such issues do not recur. This report (1) describes how DOE and EM oversee quality assurance for EM's capital asset projects, (2) examines how EM's use of its quality assurance oversight processes may have affected the performance of selected projects, and (3) assesses the extent to which DOE has taken actions to ensure that identified quality assurance issues on EM projects do not recur.

To describe how DOE and EM oversee quality assurance for EM's capital asset projects, we reviewed DOE and EM documents that describe oversight requirements and practices, including DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*.[5] In addition, we interviewed DOE officials in two headquarters offices—the Office of Project Management and the Office of Environment, Health, Safety, and Security. We also interviewed EM officials in headquarters and at the six EM sites with ongoing capital asset projects that, according to a list provided by EM, (1) had reached at least the alternative selection milestone in the project lifecycle, (2) had estimated total project costs of $100 million or more, and (3) were subject to 10 C.F.R. Part 830, *Nuclear Safety Management*. Findings from the six selected sites are nongeneralizable.

To examine how EM's use of its quality assurance oversight processes may have affected the performance of selected projects, we selected four ongoing projects and one completed project. We chose the ongoing projects from the list provided by EM mentioned above of projects that met certain criteria. We chose the completed project from a list of projects on which the DOE OIG and we had previously reported and that had begun operations within the past 5 years. We selected the projects by considering their size (i.e., a range of total estimated project cost), stage in the project lifecycle (i.e., different critical decision (CD) points), complexity (i.e., using new or proven technology), and location (i.e., a range of sites across the EM complex). We then reviewed our prior reports and DOE OIG reports on these projects as well as project documentation, such as project peer reviews, to determine what quality assurance issues or issues with EM oversight had been identified, if any. We also interviewed project officials—including the federal project directors of the four ongoing projects—to learn more about the oversight processes used by EM on the project and any issues that had arisen.[6]

To assess the extent to which DOE and EM have taken actions to ensure that identified quality assurance issues on EM projects do not recur, we reviewed DOE policies intended, in part, to help prevent recurrence, such as DOE Order 226.1B, *Implementation of DOE Oversight Policy*.[7] We also reviewed our prior reports as well as previous DOE and DOE OIG reports that reviewed the effectiveness of DOE's oversight. In addition, we reviewed a Defense Nuclear Facilities Safety Board (DNFSB) report on DOE's safety oversight and

[5]Department of Energy, *Program and Project Management for the Acquisition of Capital Assets*, DOE Order 413.3B (Change 7) (Washington, D.C.: June 21, 2023).

[6]Federal project directors oversee capital asset projects. After a project moves into operations, it is overseen by other site officials. Therefore, there was no federal project director for us to interview on the one selected completed project.

[7]Department of Energy, *Implementation of Department of Energy Oversight Policy*, DOE Order 226.1 (Change 1) (Washington, D.C.: May 3, 2022).

interviewed DNFSB officials who worked on the report.[8] We also requested and reviewed the most recent project peer reviews—which were conducted between 2018 and 2023—for nine projects located at the six selected sites where EM has ongoing capital asset projects that meet certain criteria, to understand how EM oversight effectiveness is assessed.[9] Further, we interviewed DOE and EM officials to learn more about the practices DOE and EM use to prevent recurring issues, such as documenting and leveraging lessons learned. Finally, we compared DOE and EM's practices to prevent issue recurrence with relevant criteria, such as the Project Management Institute's *Governance of Portfolios, Programs, and Projects: A Practice Guide*.[10] A more detailed description of our scope and methodology is included in appendix I.

We conducted this performance audit from March 2023 to July 2024 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

EM's Cleanup Complex

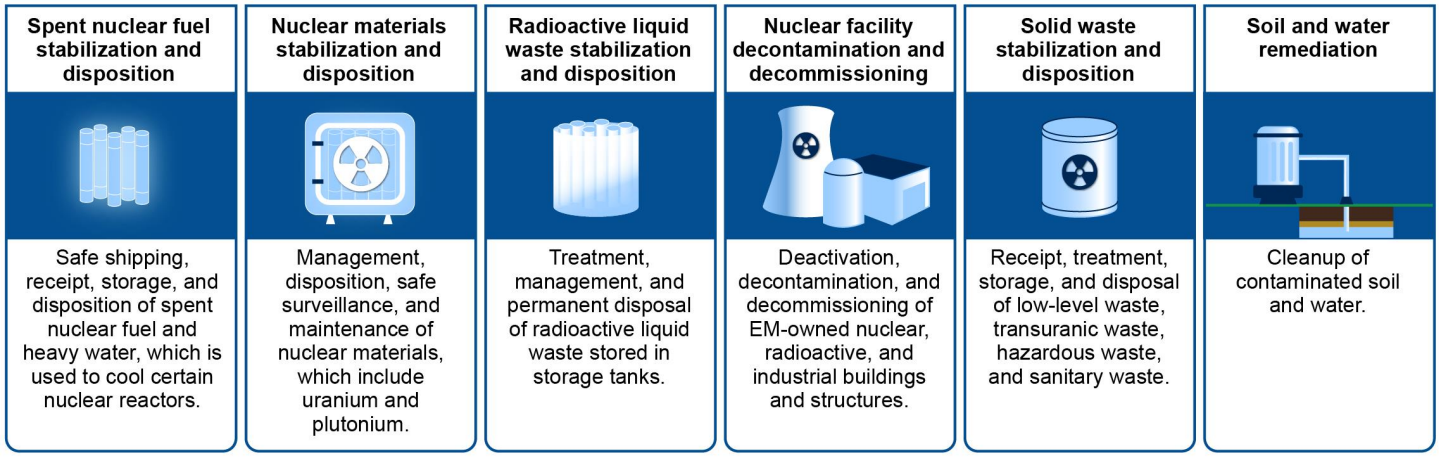
EM was created in 1989 to address environmental contamination at sites that were involved in nuclear weapons production and research, some of which date back to the Manhattan Project in the 1940s. Since its creation, EM has shifted its mission from identifying and characterizing the waste at these sites to active site cleanup. EM's cleanup mission includes the construction and operation of facilities to stabilize several waste forms; disposition of several waste types, such as through shipment to a disposal facility; deactivating and decommissioning contaminated facilities; and addressing contaminated soil and groundwater. EM divides its cleanup work into six work areas, as outlined in figure 1 below.

[8]The DNFSB was established by statute in 1988 to provide independent analysis, advice, and recommendations to the Secretary of Energy regarding the adequate protection of public health and safety from DOE's activities conducted at defense nuclear facilities.

[9]Under DOE Order 413.3B, project peer reviews are in-depth reviews conducted by federal or contractor experts that are independent of the project to evaluate technical, managerial, cost, scope, and other aspects of the project. The frequency at which they are conducted changes depending on where the project is in its lifecycle.

[10]Project Management Institute, Inc., *Governance of Portfolios, Programs, and Projects: A Practice Guide* (2016). The Project Management Institute is a not-for-profit association that, among other things, provides standards for managing various aspects of projects, programs, and portfolios.

Figure 1: Department of Energy Office of Environmental Management (EM) Six Areas of Cleanup Work



Source: GAO analysis of Department of Energy information. | GAO-24-106716

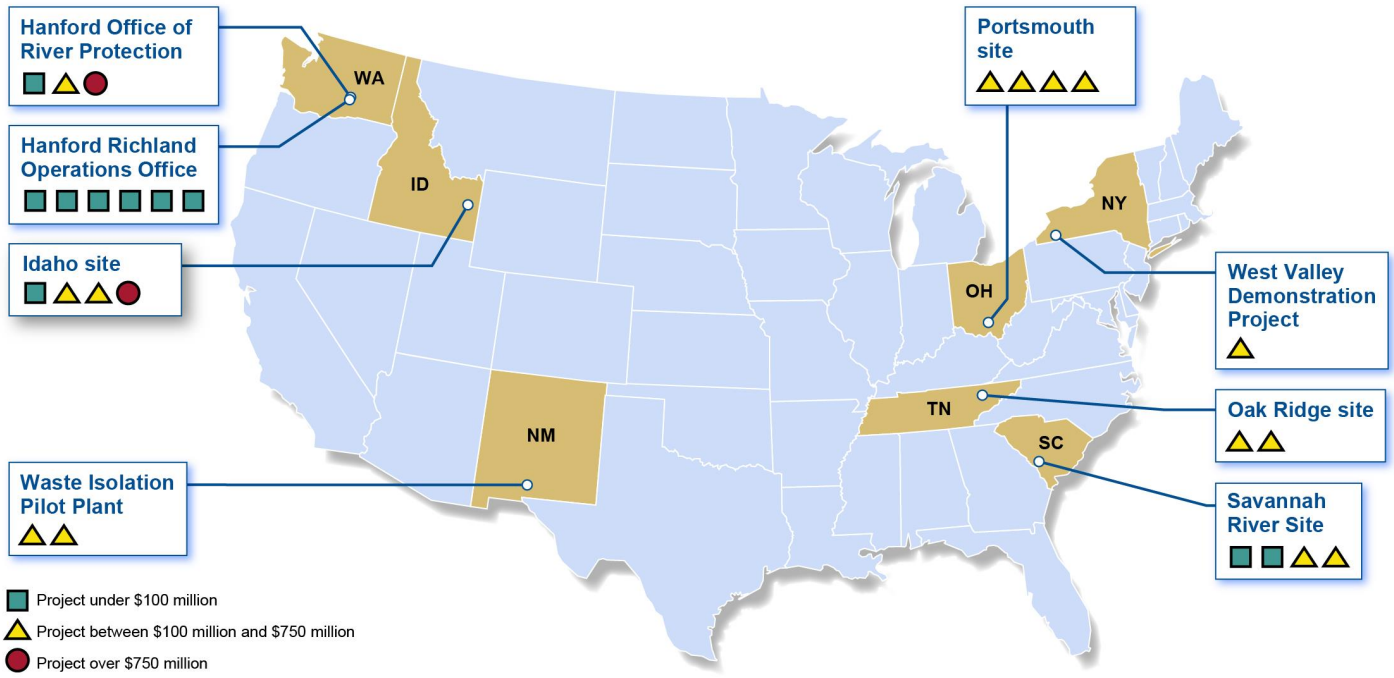
Accessible Text for Figure 1: Department of Energy Office of Environmental Management (EM) Six Areas of Cleanup Work

- Spent nuclear fuel stabilization and disposition: Safe shipping, receipt, storage, and disposition of spent nuclear fuel and heavy water, which is used to cool certain nuclear reactors.
- Nuclear materials stabilization and disposition: Management, disposition, safe surveillance, and maintenance of nuclear materials, which include uranium and plutonium.
- Radioactive liquid waste stabilization and disposition: Treatment, management, and permanent disposal of radioactive liquid waste stored in storage tanks.
- Nuclear facility decontamination and decommissioning: Deactivation, decontamination, and decommissioning of EM-owned nuclear, radioactive, and industrial buildings and structures.
- Solid waste stabilization and disposition: Receipt, treatment, storage, and disposal of low-level waste, transuranic waste, hazardous waste, and sanitary waste.
- Soil and water remediation: Cleanup of contaminated soil and water.

Source: GAO analysis of Department of Energy information. I GA0-24-106716

EM is composed of headquarters offices and field sites (collectively referred to as the EM complex) that work together to advance EM's cleanup mission. By 2022, EM had reduced the number of contaminated sites from 107 sites in 31 states as of 1989 to 15 sites in 11 states. As of January 2024, eight of those sites had 26 ongoing capital asset projects of varying sizes (see fig. 2).

Figure 2: Map of DOE Office of Environmental Management Capital Asset Projects



Sources: GAO analysis of Department of Energy (DOE) documentation; Map Resources (map). | GAO-24-106716

Accessible Text for Figure 2: Map of DOE Office of Environmental Management Capital Asset Projects

Hanford Office of River Protection

- One project over $750 million
- One project between $100-$750 million
- One project under $100 million

Hanford Richland Operations Office

Six projects under $100 million

Oak Ridge site

Two projects between $100-$750 million

Waste Isolation Pilot Plant

Two projects between $100-$750 million

West Valley Demonstration Project

One project between $100-$750 million

Savannah River Site

- Two projects under $100 million
- Two projects between $100-$750 million

Portsmouth site

Four projects between $100-$750 million

Idaho site

- One project over $750 million
- Two projects between $100-$750 million
- One project under $100M

Sources: GAO analysis of Department of Energy (DOE) documentation; Map Resources (map). I GAO-24-106716

Note: While the Office of River Protection and the Richland Operations Office are separate sites, they are collectively referred to as the Hanford site.

EM's cleanup mission at some of the remaining 15 sites is a long-term endeavor, with some cleanup activities expected to continue until at least 2070. In its fiscal year 2023 financial report, DOE estimated the probable future cost of cleaning up EM's 15 sites to be $416 billion.[11] This estimated cost—known as EM's environmental liability—represents most of the U.S. government's overall environmental liability.[12]

The regulatory landscape at each of EM's 15 sites is unique and may involve several regulatory entities. Overall, EM's cleanup work must be conducted in accordance with various federal and state laws, DOE orders, and agreements negotiated with regulators at each site (e.g., state agencies and/or the U.S. Environmental Protection Agency). These agreements often specify cleanup milestones that EM is required to achieve, as well as legal ramifications (e.g., fines) if EM misses those milestones.[13]

DOE Capital Asset Projects

In accordance with the Office of Management and Budget Circular No. A-11, DOE Order 413.3B defines capital assets as land, structures, equipment, and intellectual property that are used by the federal government and have an estimated useful life of 2 years or more. Under this definition, capital assets include the

[11]Department of Energy, *Agency Financial Report: Fiscal Year 2023*, DOE/CF-0201 (Washington, D.C.: Nov. 15, 2023).

[12]Federal accounting standards require agencies responsible for cleaning up contamination to estimate future cleanup and waste disposal costs and to report such costs as environmental liabilities in their annual financial statements. In 2017, we added the U.S. government's environmental liability to our list of areas that are at high risk for fraud, waste, abuse, and mismanagement or in need of transformation. GAO, *High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, GAO-17-317 (Washington, D.C.: Feb. 15, 2017).

[13]These agreements include federal facility agreements generally negotiated between DOE, state regulators, and the U.S. Environmental Protection Agency, as well as additional compliance agreements, compliance orders, consent orders, and consent decrees. Federal facility agreements, also known as tri-party agreements, generally set out a sequence for accomplishing cleanup work, tend to cover a relatively large number of cleanup activities, and can include milestones that DOE must meet. Compliance agreements, consent orders, and consent decrees can vary significantly but include agreements negotiated at a site subsequent to the initial federal facility agreement or other agreements with states. These agreements may impose penalties for missing milestones and may amend or modify earlier agreements, including extending or eliminating milestone dates. Compliance orders are issued by regulators and require DOE to take specific actions to correct violations of laws, regulations, permits, or agreements.

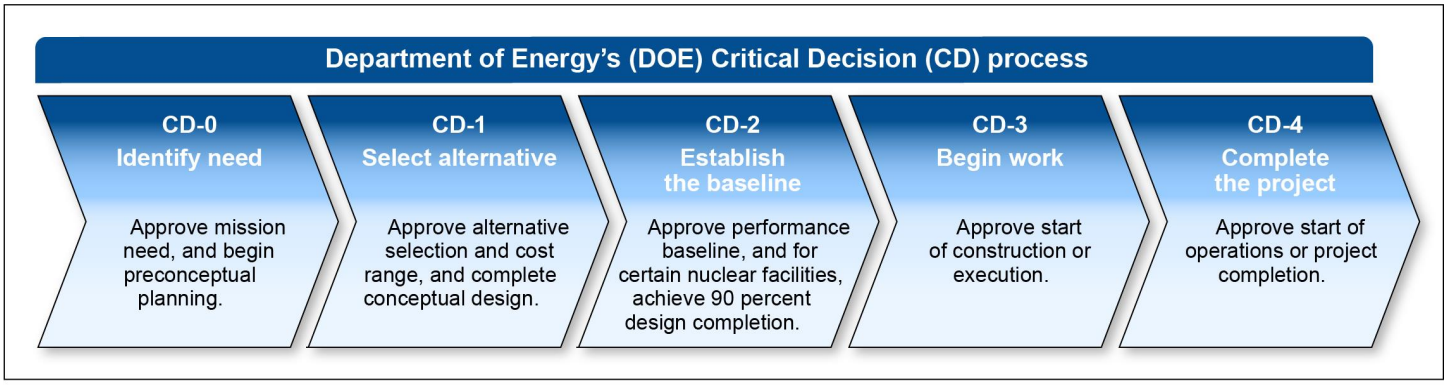
construction of new facilities and environmental remediation of land. Further, under Office of Management and Budget Circular No. A-11, capital assets include not only the assets as initially acquired but also additions, improvements, modifications, replacements, rearrangements and reinstallations, and major improvements.

DOE Order 413.3B further clarifies that a capital asset project is a project with defined start and end points. The order's definition of a capital asset project excludes operating expense activities such as repair, maintenance, or alterations that are part of routine operations and maintenance functions.

DOE requires program offices—such as EM—to manage capital asset projects with an estimated total cost greater than or equal to $50 million, in accordance with DOE Order 413.3B. The goal of DOE Order 413.3B is to deliver projects within their original cost and schedule baselines and that meet mission performance and other requirements. Order 413.3B establishes five critical decision (CD) processes over the life of a project, each of which is marked by a major approval milestone—or CD point—at the end of the process (see fig. 3). These CD points include the following:

- CD-0: approve mission need.
- CD-1: approve alternative selection and cost range.[14]
- CD-2: approve project performance baseline (e.g., scope, cost, and schedule estimates).
- CD-3: approve start of construction or execution.
- CD-4: approve start of operations or project completion.

Figure 3: Department of Energy's Critical Decision Process for the Acquisition of Capital Assets



Source: GAO analysis of DOE Order 413.3B. | GAO-24-106716

Accessible Text for Figure 3: Department of Energy's Critical Decision Process for the Acquisition of Capital Assets

Department of Energy's (DOE) Critical Decision (CD) process

- CD-0 Identify need: Approve mission need, and begin preconceptual planning.

[14]According to DOE Order 413.3B, reaching approval of CD-1 is an iterative process to define, analyze, and refine project concepts and alternatives. This process is intended to evolve a cost-effective, preferred solution to meet the mission need. The alternative recommended at CD-1 should provide the essential functions and capabilities at an optimum life-cycle cost, consistent with required cost, scope, schedule, performance, and risk considerations.

- CD-1 Select alternative: Approve alternative selection and cost range, and complete conceptual design.
- CD-2 Establish the baseline: Approve performance baseline and, for certain nuclear facilities, achieve 90 percent design completion.
- CD-3 Begin work: Approve start of construction or execution.
- CD-4 Complete the project: Approve start of operations or project completion.

Source: GAO analysis of DOE Order 413.3B. I GAO-24-106716

Quality Assurance and Quality Assurance Oversight

Quality assurance can mean different things in different contexts. For EM's capital asset projects, relevant quality assurance requirements can be found in a number of sources, including 10 C.F.R. Part 830, Subpart A; DOE Order 413.3B; and DOE Order 414.1D, *Quality Assurance*.[15] For example, under DOE Order 414.1D, DOE program offices, their associated field offices, and the contractors working at DOE's field sites must all develop and implement a quality assurance program that uses quality assurance criteria spelled out in DOE Order 414.1D. These criteria include procuring items that meet established requirements and perform as specified and inspecting and testing specified items using established acceptance and performance criteria.

For the purposes of this report, we consider quality assurance to encompass all aspects of a capital asset project and the actions taken to achieve the project's purpose (e.g., operating as intended) within the estimated cost and schedule baselines. This definition is based on the following quality assurance definitions and descriptions found in both federal regulations and DOE orders:

- According to 10 C.F.R. Part 830, quality assurance means all those actions that provide confidence that quality is achieved, and quality means the condition achieved when an item, service, or process meets or exceeds the user's requirements and expectations.[16]
- DOE Order 414.1D states that management support for planning, organization, resources, direction, and control is essential to quality assurance. In addition, all personnel are responsible for achieving and maintaining quality.
- According to DOE Order 413.3B, quality assurance begins at a project's inception and continues through all phases of a project.
- EM-QA-001, *EM Quality Assurance Program*, states that performing work in a quality manner using approved procedures, qualified personnel, and proper tools is a necessary element for achieving EM's mission of safe and efficient cleanup of its sites.

For the purposes of this report, quality assurance oversight refers to the actions that DOE takes to ensure that its capital asset projects are of high quality, including identifying and preventing potential problems with nuclear safety or quality. Specifically, quality assurance oversight refers to the actions that DOE and EM take to (1) ensure that the contractors hired to carry out capital asset projects meet EM's mission needs and contractual

[15]Department of Energy, *Quality Assurance*, DOE Order 414.1D (Change 2) (Washington, D.C.: Sept. 15, 2020).

[16]10 C.F.R. Part 830 governs the conduct of DOE contractors, DOE personnel, and other persons conducting activities that affect, or may affect, the safety of DOE nuclear facilities. Subpart A establishes quality assurance requirements for contractors conducting activities that affect, or may affect, nuclear safety of DOE nuclear facilities.

requirements, and (2) evaluate their own performance in conducting contractor oversight and the effectiveness of their oversight in ensuring quality projects.

DOE and EM Have Several Policies and Tools to Help Ensure Quality on EM Capital Asset Projects

DOE has several policies for conducting oversight of EM capital asset projects that seek to ensure that its contractors deliver projects that meet the agency's needs and requirements. These policies require EM to conduct various reviews and report project performance data to DOE headquarters and line management officials. EM also uses several tools to help carry out these policies and conduct quality assurance oversight, including tools that help with sharing lessons learned throughout the agency and leveraging contractor data to monitor cost and schedule performance.

DOE and EM Have Specific Policies to Help Ensure Quality of EM Capital Asset Projects

Several DOE and EM policies establish requirements for EM's oversight of capital asset projects, which are intended, in part, to facilitate assessments of contractors' performance and help ensure that contractors will deliver a quality project—specifically, a project that meets or exceeds EM's needs or expectations, including those related to nuclear safety. These documents outline requirements for how EM is to conduct oversight and often identify when a specific EM office is responsible for carrying out the requirements.

Some of the policies that include requirements for EM's oversight of capital asset projects include the following:

- **DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*.** This order outlines project management requirements governing all DOE capital asset projects that have an estimated total project cost of greater than $50 million.[17] The goal of this order is for projects to stay within their original cost and schedule baseline and be fully capable of meeting mission performance and other requirements. The order notes that line managers are responsible for successfully developing, executing, and managing projects within the approved baseline, and provides examples of certain line manager roles and responsibilities. For example, the order states that one responsibility for a project management executive is to ensure that the contractor has a competent manager supported by a qualified project team. Some of the order's requirements apply specifically to project management support offices, including EM's Office of Project Management. Per the order, EM's Office of Project Management is responsible for providing independent oversight, coordinating quarterly project reports, and performing various project reviews, among other things.
- **DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*.** This order establishes requirements and provides direction for implementing DOE's Policy 226.2, *Policy for Federal Oversight and Contractor Assurance Systems*, and applies to oversight processes implemented by DOE headquarters and field offices that manage or operate onsite oversight programs as well as DOE's independent oversight organizations. The order establishes requirements for DOE organizations—such as

[17]According to the order, Under Secretaries may lower this threshold to $10 million during the project development phase for nuclear projects or complex first-of-a-kind projects.

EM—to develop and implement an oversight program that evaluates the effectiveness of field offices' oversight of contractors, among other things.

- **EM-QA-001, *EM Quality Assurance Program*.** This document describes both EM's corporate quality policy and EM's quality assurance program. EM's quality assurance program describes how EM implements its policy to ensure quality across the EM complex in accordance with both 10 C.F.R. Part 830 Subpart A and DOE Order 414.1D. In EM-QA-001, EM notes that performing quality work is necessary to achieve EM's mission of conducting safe and efficient cleanup operations at sites across the EM complex. The document includes expectations for EM headquarters, EM field offices, and contractors. For example, one of the expectations includes that the field offices will evaluate all contractor and DOE programs and management systems for effectiveness of performance in accordance with DOE Order 226.1B. In addition, EM-QA-001 states that the ultimate responsibility for implementation, assessment, and improvement of EM's quality assurance program rests with senior management, which includes the Assistant Secretary for EM.

DOE policies also describe the DOE offices and other entities responsible for helping ensure the quality of EM projects. For example:

- **DOE's Office of Project Management.** According to DOE Order 413.3B, DOE's Office of Project Management is responsible for leading certain project efforts, including independent cost reviews and cost estimates. For example, prior to CD-1 for projects estimated to cost $100 million or more, DOE's Office of Project Management is responsible for either developing an independent cost estimate or conducting an independent cost review, based on what the office deems necessary. Cost reviews at this stage are intended to validate the basis of the project's preliminary cost range for reasonableness and executability.

  Some DOE Office of Project Management responsibilities are specific to major system projects (i.e., all projects estimated to cost $750 million or more). For example, before major system projects can advance to CD-3, this office must conduct an independent, external review to determine if the project is ready to begin construction or execution.

- **DOE's Office of Enterprise Assessments.** Under DOE Order 227.1A, DOE's Office of Enterprise Assessments, an independent office that has no line management or policy-making authorities, is responsible for implementing DOE's Independent Oversight Program.[18] Under this program, DOE's Office of Enterprise Assessments is responsible for conducting independent evaluations of nuclear construction projects to evaluate the effectiveness of DOE and contractor line management performance in implementing and overseeing safety and security programs.

- **Energy Systems Acquisition Advisory Board.** According to DOE Order 413.3B, the purpose of the Energy Systems Acquisition Advisory Board (ESAAB) is to support DOE's objective of achieving and maintaining excellence in project management.[19] Specifically, one of the ESAAB's responsibilities is to review, on a quarterly basis, all capital asset projects with an estimated total project cost of $100 million or greater, with particular focus on projects at risk of not meeting their performance baseline. For major system projects, the ESAAB has the additional responsibility of providing support for the chief executive for

[18]Department of Energy, *Independent Oversight Program*, DOE Order 227.1A (Change 1) (Washington, D.C.: Jan. 21, 2020).

[19]ESAAB membership includes, for example, the Deputy Secretary, the General Counsel, the Chief Financial Officer, the Director of the Office of Project Management, three Under Secretaries, and other functional staff as needed.

project management at project CD milestones, for example, by recommending if a project should be approved as having met the requirements for the next CD.

- **Project Management Risk Committee.** According to DOE Order 413.3B, the purpose of the Project Management Risk Committee is to support DOE's objective of excellence in project management.[20] More specifically, the Committee seeks to leverage existing capabilities within DOE to provide advice to senior project officials and the ESAAB on cost, schedule, and technical issues for capital asset projects with an estimated cost of $100 million or more. One of the Committee's responsibilities is to provide ongoing monitoring and assessments of projects throughout the CD process. The Committee is also expected to conduct frequent and detailed assessments of higher risk projects and provide advice and assistance to senior project officials and DOE's ESAAB on a regular basis.

EM Uses Several Tools to Conduct Quality Assurance Oversight and Help Ensure Quality

EM uses several tools to conduct quality assurance oversight and help ensure quality on capital asset projects. These tools include DOE databases used to collect and share information on capital asset projects, contractor systems used to collect and report project data, and project reviews.

DOE databases include the following:

- **OPEXShare Lessons Learned database.** DOE's OPEXShare Lessons Learned database is a centralized, web-based collection point for lessons learned and best practices from across the DOE complex. OPEXShare is available to both DOE staff and contractors. According to a DOE website, sharing lessons learned and best practices from work operations and project management could help OPEXShare users prevent adverse events and improve processes and performance. Additionally, the OPEXShare website states that the database allows users to subscribe to email updates on topic-specific content and benefit from each other's experience by developing connections with peers through the member directory.

  OPEXShare became the official DOE database for lessons learned in December 2020, replacing a previously used DOE corporate lessons learned database. According to DOE officials, OPEXShare was previously used by a contractor at the Hanford site. A DOE Office of Project Management document notes that the department adopted OPEXShare because of its user friendliness and ease of access. As of May 7, 2024, the database contained 3,084 lessons learned. The lessons learned in the database were posted as recently as May 6, 2024, and went as far back as January 5, 1995.

- **Occurrence Reporting and Processing System.** The Occurrence Reporting and Processing System is DOE's centralized database of unclassified reports of events that could adversely affect public or DOE worker health and safety, the environment, or the functioning of DOE facilities. According to DOE Order 232.2A, DOE's Office of Environment, Health, Safety, and Security is responsible for operating and maintaining the database in conjunction with the Chief Information Officer. The order requires contractors to submit reportable occurrences (e.g., those that have or could adversely affect DOE or contractor

[20]The committee includes nine senior DOE officials from across the department, including top project management officials from the National Nuclear Security Administration, the Office of Science, and EM.

personnel, the public, property, the environment, or the DOE mission).[21] DOE uses the data submitted to the Occurrence Reporting and Processing System to (1) analyze aggregate information about occurrences for agency-wide implications and areas where operations could be improved, and (2) develop a summary of daily occurrence reports posted in OPEXShare.

- **Project Assessment and Reporting System.** DOE uses the Project Assessment and Reporting System to develop project-wide performance metrics and generate project management reports. In accordance with DOE Order 413.3B, DOE contractors are required to submit monthly performance data—including cost and schedule data—to the Project Assessment and Reporting System for all projects estimated to cost $50 million or more after they achieve CD-2 approval.

  Project officials can use the data in the Project Assessment and Reporting System to both assess project performance and identify potential issues that are arising. For example, according to a DOE document, project officials can view several dashboards in the system, including one on variance analysis.[22] Variance analysis refers to comparing the status of the project to the approved baseline plan. This information allows project officials to identify the primary drivers of cost and schedule differences, including emerging trends that may signal concerns around quality.

DOE may also require contractors to use systems that can assist with oversight.[23] Such systems include the following:

- **Earned Value Management Systems.** Earned value management (EVM) is a widely accepted best practice for program and project management that is used to plan for, manage, and assess the cost and schedule performance of major acquisitions. An Earned Value Management System (EVMS) is generally required for all EM capital asset projects estimated to cost more than $50 million, except a contractor EVMS is not required for firm-fixed price contracts.[24] EVMS are designed to integrate data on a project's scope of work, schedule, and costs and facilitate detailed assessments of a project's overall performance during the lifespan of the project. EVM data analysis can provide an early warning of problems that could negatively affect a project's performance, including issues that may affect quality.

  DOE contractors that are required to develop and implement an EVMS must do so prior to a project achieving CD-2. For projects estimated to cost $100 million or more, a contractor's EVMS must be certified

[21]There are three reporting levels that reflect the impact associated with the event. Specifically, events can be categorized as high, low, or informational. High- and low-level reports are required to be submitted to the Occurrence Reporting and Processing System, whereas program offices have the authority to determine which informational level reports will be submitted. Department of Energy, *Occurrence Reporting and Processing of Operations Information*, DOE Order 232.2A (Change 1) (Washington, D.C.: Oct. 4, 2019).

[22]Department of Energy, Office of Project Management, *Earned Value Management System (EVMS) and Project Analysis Standard Operating Procedure (EPASOP)*, DOE-PM-SOP-05-2020 (Washington, D.C.: Jan. 14, 2020).

[23]Whether or not a contractor is required to use a particular system depends, in part, on the type of contract DOE uses and the terms of the contracts themselves. For example, several requirements do not apply to firm fixed-price contracts, which are a type of contract under which the contractor delivers their services at a specified price, fixed at the time of the contract award and not subject to any adjustment.

[24]Under Office of Management and Budget Circular No. A-11, all major acquisitions with development effort must include a requirement for the contractor to use an EVMS that meets the guidelines in Electronic Industries Alliance Standard 748, Earned Value Management Systems (EIA-748). Likewise, the Federal Acquisition Regulation states that an EVMS is required for major acquisitions for development, in accordance with Circular No. A-11. 48 C.F.R. § 34.201.

by DOE's Office of Project Management as complying with the industry standard established by the Electronic Industries Alliance before the project achieves CD-3.[25]

- **Contractor Assurance Systems.** Contractors design and use assurance systems to manage and assess their performance and help ensure their work is consistent with contract requirements. These systems are also intended to allow the contractor to provide data for its management decision-making process and more effectively manage work processes, resources, and outcomes. When effectively implemented, contractor assurance systems should provide both the contractor and the federal oversight staff the data necessary to manage and oversee contractor performance. DOE Order 226.1B states that DOE entities can tailor their oversight processes based on their assessments of the effectiveness of contractor assurance systems.[26]

To conduct quality assurance oversight, EM also collects data through various project reviews conducted by EM officials. Examples of such reviews include the following:

- **Project peer reviews.** EM begins conducting annual peer reviews of projects estimated to cost $100 million or more after they reach CD-1. According to DOE documentation, project peer reviews are performed by DOE officials that have relevant experience and expertise but maintain independence from the project. These reviews evaluate certain aspects of a project, such as how technical components are progressing, how well the project is being managed, and the status of the project's cost and scope. Our analysis of nine selected project peer reviews that were conducted between 2018 and 2023 found that they generally focused on contractor performance, such as how the contractor managed project costs, schedules, and risks. Some of the reviews we analyzed included an evaluation of EM oversight of the project but provided few details to support the evaluation.
- **Quarterly project reviews.** These reviews provide a snapshot of a project's performance, including scope, cost, schedule, and risk. Project officials gather the data and submit these reviews to the project management executive. The reviews are intended to help ensure continued support from DOE senior executives.[27] Quarterly project reviews are based in part on information from the Project Assessment and Reporting System—which includes information from the contractor's EVMS—and include a presentation developed by the federal project director.
- **Design reviews.** According to DOE Order 413.3B, EM officials are required to conduct a design review at several points during a project's lifecycle. For example, reviewers external to the project are to conduct a design review of the conceptual design prior to CD-1 and a design review of the preliminary and final

[25]According to DOE's Earned Value Management System Compliance Assessment Governance, the Electronic Industries Alliance Standard 748, Earned Value Management Systems (EIA-748), describes how to implement an effective EVMS and generate current, accurate, complete, repeatable, and auditable (i.e., compliant) performance data and information. A compliant EVMS provides for the generation of valid and verifiable performance data, facilitates the evaluation of project progress, and allows for calculating the probability of meeting programmatic and contractual requirements. Department of Energy, *Compliance Assessment Governance (CAG) (2.0)* (Washington, D.C.: June 2022).

[26]In 2022, DNFSB found that, while DOE and its contractors have some "good tools" to evaluate the effectiveness of contractor assurance systems—such as an effectiveness validation tool and a maturity evaluation tool—not all field offices were incorporating them. In addition, these tools do not quantify thresholds for what should be deemed effective, and instead that decision is left up to the field office to determine. Defense Nuclear Facilities Safety Board, *Review of DOE Safety Oversight Effectiveness* (Washington, D.C.: Apr. 10, 2022).

[27]For EM projects, the project management executive is usually the Assistant Secretary for Environmental Management (i.e., EM's top official). However, per DOE Order 413.3B, the project management executive could also be an Under Secretary or a field office manager depending on the size of the project.

designs prior to CD-2. These reviews are considered a vital component of the project development process. The purpose of these reviews is to ensure the quality of design, that operational and functional objectives are met, and that the design is sufficient for the stage of the project, among other things. Verifying or validating work before approval and implementation of the design is also one of DOE's quality assurance criteria in DOE Order 414.1D.

- **Operational readiness reviews.** Operational readiness reviews are defined, in part, as disciplined, systematic, documented, and performance-based examination of facilities, equipment, personnel, procedures, and management control systems for ensuring that a facility can be operated safely. These reviews provide the basis for starting or restarting a facility, activity, or operation. These reviews are required prior to CD-4 for Hazard Category 1, 2, and 3 nuclear facilities.[28]

In addition to the specific tools listed above, EM officials are also expected to use established best practices. For example, according to DOE Order 413.3B, cost estimates for projects should be developed, maintained, and documented in a manner consistent with the methods and best practices identified in documents such as our *Cost Estimating and Assessment Guide* and, as applicable, the Federal Acquisition Regulation. Further, DOE Order 413.3B notes that successful project execution includes effective communication among all project stakeholders.

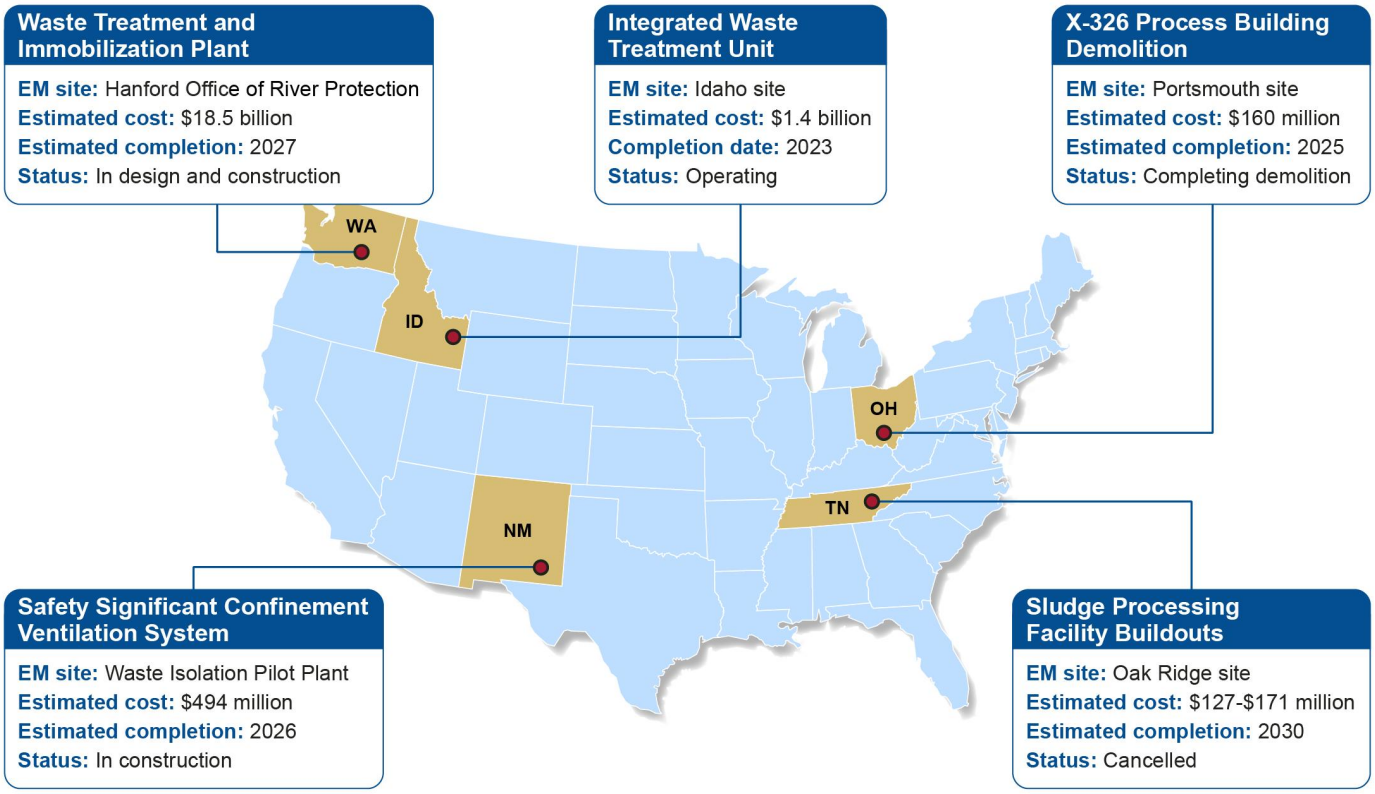
Use of Oversight Tools May Have Benefited Two Selected Projects, While Not Using Certain Tools May Have Hindered Three Selected Projects

We reviewed the oversight tools used on five selected EM capital asset projects.[29] We found that those projects that used oversight tools as intended reported better outcomes, while those that did not use certain tools as intended reported performance issues. Specifically, one project with positive performance had strong oversight practices, including the use of a compliant EVMS, and another project modified its oversight review process in a way that may be beneficial for other projects. Conversely, three projects that had performance issues did not use certain oversight tools as intended—for instance, by not maintaining a compliant EVMS and not conducting sufficient design oversight. See figure 4 below for the location and status of the five selected projects and see appendix II for more detailed information about each project.

[28]Hazard categories are designations for DOE nuclear facilities that are based on radioactive material inventories and the potential consequences to the public, workers, and the environment. Hazard Category 1 represents the highest potential consequence, and Hazard Category 3 represents the lowest potential consequence of the facilities required to establish safety bases.

[29]We selected four ongoing projects and one completed project. The four ongoing projects were selected based on their cost, phase in the project lifecycle, complexity, and location. The completed project was selected based on a list of projects on which the DOE OIG and we had previously reported and that had begun operations within the past 5 years.

Figure 4: Status of Five Selected Office of Environmental Management (EM) Capital Asset Projects



Sources: GAO analysis of Department of Energy information; Map Resources (map). | GAO-24-106716

Accessible Text for Figure 4: Status of Five Selected Office of Environmental Management (EM) Capital Asset Projects

Sludge Processing Facility Buildouts

- EM site: Oak Ridge site
- Estimated cost: $127-$171 million
- Estimated completion: 2030
- Status: Cancelled

Waste Treatment and Immobilization Plant

- EM site: Hanford Office of River Protection
- Estimated cost: $18.5 billion
- Estimated completion: 2027
- Status: In design and construction

X-326 Process Building Demolition

- EM site: Portsmouth site

- Estimated cost: $160 million
- Estimated completion: 2025
- Status: Completing demolition

Safety Significant Confinement Ventilation System

- EM site: Waste Isolation Pilot Plant
- Estimated cost: $494 million
- Estimated completion: 2026
- Status: In construction

Integrated Waste Treatment Unit

- EM site: Idaho site
- Cost: $1.4 billion
- Completion date: 2023
- Status: Operating

Sources: GAO analysis of Department of Energy information; Map Resources (map). I GAO-24-106716

Note: Estimated completion refers to EM's planned date for transitioning from a capital asset project to an operations activity.

Using Oversight Tools as Intended May Have Helped Improve the Performance of Two Selected Projects

Two of the five selected projects we reviewed used oversight tools in ways that may have benefited the projects. According to DOE documentation, as of January 2024, the X-326 demolition project at the Portsmouth site was both ahead of schedule and under budget. In addition, the Sludge Processing Facility Buildouts (SL-PFB) project at the Oak Ridge site used cost and schedule oversight processes as intended and with modifications in ways that may have been beneficial.[30]

X-326 Demolition Project

- **Compliant EVMS.** We found that X-326 project officials have been able to use the project's certified EVMS to maintain oversight of the project's cost, schedule, and risks. After the contractor spent 3 years bringing the EVMS into compliance, DOE's Office of Project Management officially certified the system in January 2020.[31] According to a contractor representative on the X-326 project, the key to getting the contractor's EVMS certified and maintaining EVMS compliance is what the contractor calls a 360-degree data-driven approach. Namely, the contractor ensures all data files are integrated, which helps prevent data inconsistencies. The contractor representative also told us that the contractor's EVM team uses

[30]EM cancelled the SL-PFB project in November 2023. According to a project official, the cancellation was due to lack of funding. The project was early in its lifecycle, making it impossible to evaluate how well the project was performing.

[31]Except for firm fixed-price contracts, DOE generally requires projects with a total project cost greater than $50 million to use an EVMS compliant with the Electronic Industries Alliance Standard 748, Earned Value Management Systems (EIA-748), by the time the projects reach CD-2. The X-326 project reached CD-2 in February 2021.

DOE's EVMS certification process requirements as part of their regular audits. Specifically, each month, after the contractor uploads data into the Project Assessment and Reporting System, the system runs an audit that determines if the data meet DOE's EVMS certification process requirements or if there are any issues to investigate. Further, the EVM team works closely with teams in DOE's Office of Project Management to ensure the contractor's EVM team stays up-to-date on best practices. According to the federal project director for the X-326 project, having a certified EVMS provides an additional level of confidence that the system is capturing information correctly and providing reliable data needed to make decisions.

- **Use of lessons learned.** According to a project peer review conducted by EM's Office of Project Management, the X-326 project used lessons learned from four other EM sites' demolition projects.[32] X-326 project officials told us about several lessons learned that they used from these projects to ensure the X-326 project would not face similar quality assurance issues. For example, officials learned that the Oak Ridge site experienced issues with water run-off during demolition, causing technetium to migrate into a privately owned sewage treatment plant. In response, X-326 project officials developed water detention and treatment systems to capture and treat potentially contaminated rainwater and water used for dust suppression. Officials we interviewed told us that developing these systems was expensive but worthwhile, as they have been able to avoid water contamination at the site.

  X-326 project officials also told us they used a lesson learned about an airborne contaminant from a demolition project at the Separations Process Research Unit located at the Knolls Atomic Power Laboratory in New York State. According to officials, that project experienced the release of an airborne contaminant that went undetected for a long time. X-326 project officials used a couple of different methods to prevent something similar from happening during the X-326 demolition. First, officials told us they used an erosion control and dust suppression fixative that they said has been effective at preventing airborne contaminants. Second, project officials noted that they installed an air monitoring system surrounding the X-326 facility that DOE uses to publicly report contaminant levels each month to address public concerns and build trust with nearby communities.[33] Lastly, X-326 officials told us that they are careful to tailor the timing of their work, such as curtailing activities during times of high winds.

Sludge Processing Facility Buildouts Project (SL-PFB)

- **Cost oversight.** We found that that SL-PFB project officials maintained oversight of project cost as intended—including through communication with the project's contractor—which allowed them to reevaluate the original project plan when necessary. The SL-PFB project was originally designed to be added to an existing facility. Project officials told us that after the project had already attained CD-1—the milestone at which officials approve the project's conceptual design and cost range—the contractor determined the design would not work as planned, and a new facility would have to be built, changing the cost and scope significantly. For projects that have not yet reached CD-2, DOE Order 413.3B requires officials to reassess the alternative selection process if the top end of the original approved CD-1 cost range grows by more than 50 percent. According to project officials, they returned to the CD-1 milestone to revise the cost range before moving forward. Using this oversight process as intended helped ensure that

[32]The sites the review specifically mentioned are the Separations Process Research Unit (New York), Richland (Washington), West Valley (New York), and Oak Ridge (Tennessee).

[33]In coordination with DOE, the Ohio Environmental Protection Agency also set up five of their own monitoring stations, and the Ohio Department of Health set up 18 stations.

project officials had more accurate cost and schedule estimates against which to measure performance and conduct oversight.

- **Project peer reviews.** SL-PFB project officials modified the project's review schedule based on the risk level of activities at the time. The SL-PFB project had been conducting technology maturation activities since 2012. DOE Order 413.3B requires all projects that have reached CD-1 and are estimated to cost $100 million or more to conduct an annual project peer review. However, due to the low-risk nature of the technology maturation activities, in 2020, project officials applied for an exemption from the annual project peer review requirement. The application stated that the federal project director would continue to input project information into the Project Assessment and Reporting System, and EM officials would continue their monthly and quarterly reviews of the project.[34] DOE's Under Secretary for Science granted the exemption in August 2020. Notably, a Project Management Institute best practice states that governance processes should be tailored to project complexity, risks, and other factors.[35] By modifying the peer review schedule, SL-PFB project officials may have freed up oversight resources that could be better used for more complex and high-risk projects.

Not Using Certain Oversight Tools as Intended May Have Hindered the Performance of Three Selected Projects

During our review of selected projects, we found that EM officials did not use several oversight tools as intended for three projects that struggled to meet their cost, schedule, and performance baselines.

- We found that EM officials did not use EVMS and oversight of cost estimates and project design as intended for the Waste Treatment and Immobilization Plant (WTP) project at the Hanford site in Washington State. The WTP has been under construction since 2000. According to DOE documentation, the WTP was originally estimated to be complete in 2011 for a cost of $5.8 billion. The estimate as of August 2023 is to complete design and partial construction in 2027 for a cost of $18.5 billion. However, the documentation also notes that until the plan for treating high-level waste is complete, the true CD-4 completion date and total project cost cannot be determined.[36]
- We found that EM officials did not use EVMS and oversight of contractor qualifications as intended for the Safety Significant Confinement Ventilation System (SSCVS) project at the Waste Isolation Pilot Plant in New Mexico. SSCVS has been under construction since 2018 and is currently estimated to be completed in June 2026 for $494 million—almost 4 years late and $206 million over the baseline plan.
- We found that EM officials did not use design and operational readiness oversight as intended for the Integrated Waste Treatment Unit (IWTU) project at the Idaho site. The IWTU was declared complete in 2012 at a cost of $571 million. However, the facility did not begin operating until April 2023 (see appendix II

[34]DOE Order 413.3B allows officials to apply for projects to have exemptions from specific requirements within the order.

[35]Specifically, projects become more inefficient when there is an excess level of rigor in governance because resources and processes consume valuable time and effort. Conversely, when there is a lower level of rigor in governance processes or authority structures than required, risk is introduced. Project Management Institute, Inc., *Governance of Portfolios, Programs, and Projects: A Practice Guide* (2016).

[36]According to DOE documentation from August 2023, the current estimate for the WTP includes completion of 90 percent design for the High-Level Waste Facility and limited "low-risk" construction activities.

for more information). Project officials estimate that it cost an additional $808.1 million to bring the facility into working order over those 11 years, for a total cost of nearly $1.4 billion.[37]

Below we discuss the details of these findings for these three projects.

Waste Treatment and Immobilization Plant (WTP)

- **Non-compliant EVMS.** In 2022, we reported that DOE had not ensured that the WTP contractor's EVMS met DOE requirements, and, consequently, the system was not fully reliable.[38] This point was reflected by a November 2019 report in which DOE's Office of Project Management concluded that the WTP contractor lacked EVMS management discipline and was not consistently following or applying its existing EVMS processes.[39] Specifically, according to the report, the contractor did not meet the minimum requirements for 26 of 32 guidelines in the Electronic Industries Alliance Standard 748, Earned Value Management Systems (EIA-748). For example, DOE's Office of Project Management found that the contractor did not include all the work needed to complete the baseline plan in the forecast schedule.

  In April 2022, DOE's Office of Project Management concluded that progress had been made in resolving several of the top-priority EVMS corrective actions. However, the Office of Project Management's assessment also noted that 40 of 53 EVMS corrective actions had yet to be completed. In addition, DOE Office of Project Management officials told us that WTP project officials chose not to reset the project's performance baseline following the approval of a baseline change proposal in August 2023. As a result, the project is measuring its status against an outdated performance baseline, and therefore the data produced by the EVMS may not be dependable. Because of this, WTP officials have also been developing alternate project controls to measure performance, which may not provide the same level of reliable insight as a certified EVMS.[40] In March 2024, Office of Project Management officials told us that all corrective actions were complete, and the EVMS would undergo a new certification review in the future.[41]

- **Oversight of cost estimates.** In a September 2023 audit, the DOE OIG found that the contractor responsible for the WTP developed cost estimates that could not be adequately supported and were likely unreasonable.[42] The DOE OIG concluded that this happened because EM did not conduct sufficient oversight to identify whether the contractor had established policies or procedures for developing many of

[37]In addition to project costs, Idaho site officials told us that, since 2015, DOE had also accrued $12.1 million in penalties owed to the state of Idaho for failing to meet the compliance schedule for treatment of sodium-bearing waste.

[38]GAO, *Hanford Cleanup: DOE Has Opportunities to Better Ensure Effective Startup and Sustained Low-Activity Waste Operations*, GAO-22-104772 (Washington, D.C.: June 14, 2022).

[39]Department of Energy, Office of Project Management, *Report on the Earned Value Management System (EVMS) Surveillance Review for Bechtel National, Inc. (BNI) Richland Washington, for the Hanford Tank Waste Treatment and Immobilization Plant (WTP) Project* (Washington, D.C.: Nov. 22, 2019).

[40]According to officials in DOE's Office of Project Management, alternate data are considered reliable because local federal staff can monitor and determine the data's credibility through activities such as inspections.

[41]According to DOE Office of Project Management officials, the new certification review will happen after work on the high-level waste component of the WTP restarts.

[42]According to Hanford site officials, DOE did not endorse the DOE OIG's conclusions that the baseline and contract proposals were unreasonable. In their report, the DOE OIG stated that they continue to stand by their recommendations, which include that all Hanford site contractors have an adequate estimating system. Department of Energy, Office of Inspector General, *Bechtel National, Inc.'s Cost Proposal Estimates for Baseline Change Proposal 02 and Its Contract Modification 384 Counterpart for the Waste Treatment and Immobilization Plant*, DOE-OIG-23-24 (Washington, D.C.: Sept. 28, 2023).

its cost estimates. One of DOE's quality assurance criteria in DOE Order 414.1D is to perform work consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements using approved instructions, procedures, or other appropriate means. In addition, according to DOE Order 226.1B, EM officials are required to evaluate contractor programs and management systems for effectiveness of performance. According to the 2023 OIG audit, EM's lack of oversight of its contractor's administrative controls for developing cost estimates means that the contract was negotiated using unreasonable cost estimates, which may result in DOE facing increased project costs.

- **Design oversight.** We also reported in 2023 that EM had started ramping up design and construction work on the partially completed High-Level Waste Facility at the WTP, which is intended to treat high-activity waste at Hanford. This effort included requesting a $316 million increase in funding for fiscal year 2023 and an additional increase of over $200 million for fiscal year 2024 for the facility.[43] However, according to the fiscal year 2024 budget justification, EM had not chosen a preferred alternative for treating high-level waste, despite requesting funding for design and procurement. DOE's quality assurance criteria in DOE Order 414.1D include (1) incorporating applicable requirements and design bases in design work and design changes and (2) verifying or validating work before approval and implementation of the design. Without a preferred alternative, neither EM nor EM's contractor could have known applicable requirements for the design and therefore could not ensure that those requirements had been incorporated into the design.[44]

According to a 2023 WTP causal analysis and corrective action plan, a previous performance baseline deviation was due, in part, to design changes that resulted in procurement and construction rework. To ensure that DOE's facilities meet requirements and expectations, DOE's quality assurance criteria note the importance of having a verified or validated design before beginning construction, which in turn demonstrates the importance of incorporating applicable requirements into the design of a project.

Safety Significant Confinement Ventilation System (SSCVS)

- **Non-compliant EVMS.** DOE's Office of Project Management certified the contractor's EVMS in August 2018. However, an internal surveillance review completed by the contractor in April 2022 found multiple EVMS deficiencies, raising concerns about whether the EVMS was still compliant with requirements. A new contractor took over the SSCVS project in February 2023 and elected to take over the EVMS used by the previous contractor. To mitigate concerns about EVM data, the project began using alternate project controls.[45] However, as of March 2024—almost 2 years after the deficiencies were identified and 1 year after assuming responsibility for the project—the new contractor was unable to bring the system into

[43]GAO, *Hanford Cleanup: DOE Should Validate Its Analysis of High-Level Waste Treatment Alternatives*, GAO-23-106093 (Washington, D.C.: May 24, 2023). DOE was appropriated $392 million in fiscal year 2023 and $600 million in fiscal year 2024 for the High-Level Waste Facility. DOE's fiscal year 2024 budget request of $600 million for the High-Level Waste Facility called for a ramp-up of design, procurement, and construction activities. DOE has requested $608 million for the facility for fiscal year 2025.

[44]We have reported on and made numerous recommendations related to the need for DOE to wait until the WTP design is sufficiently complete before proceeding with construction. See GAO/RCED-93-99; GAO/RCED-99-13; GAO-03-593; GAO-04-611; GAO-06-602T; GAO-07-336; GAO-13-38; and GAO-15-354. In DOE's response to our draft report, officials noted that it is reasonable that some work could proceed that is not impacted by the selected alternative.

[45]As previously noted, officials in DOE's Office of Project Management told us that alternate data are considered reliable because local federal staff can monitor and determine the data's credibility through activities such as inspections.

compliance, and DOE's Office of Project Management revoked the EVMS certification.[46] According to the 2022 and 2023 project peer reviews, both contractor and EM personnel acknowledged that the project's EVMS is the authoritative source for planning and managing the SSCVS project. Without a certified EVMS, project officials are lacking one of their key oversight tools.

- **Oversight of contractor qualifications.** As EM reported in a 2021 analysis of SSCVS, one of the root causes of the issues faced by the project was the contractor's inexperience in managing capital asset projects.[47] We reported in 2022 that DOE awarded the contract for the SSCVS project to the existing management and operating contractor at the Waste Isolation Pilot Plant based in part on assurances that the contractor could rely on support from its parent company.[48] However, as we found in 2022, DOE did not get that assurance in writing, and according to EM's root cause analysis, support from the parent company was insufficient to prevent or mitigate the significant downturn in performance. As a result, according to the analysis, the contractor did not properly evaluate subcontractors or hire staff with the necessary experience to conduct adequate risk management. One of DOE's quality assurance criteria is to train and qualify personnel to be capable of performing their assigned work. Even though EM knew that the contractor was not qualified, EM did not provide sufficient oversight of that contractor to ensure the quality of the project.

Integrated Waste Treatment Unit (IWTU)

- **Design oversight.** IWTU officials did not exercise sufficient oversight of the project's design, which resulted in system failure when moving the facility into operations. After passing the CD-3 milestone—the start of construction—DOE officials decided to modify the facility. Specifically, DOE decided to add the capability to reuse the facility to treat another type of waste, called calcine waste, which required additional seismic protection due to higher levels of radioactivity.[49] At the same time, the design effort was transferred from one subcontractor to another.

  According to an IWTU lessons learned document, a formal design review should have been conducted when the design was transferred, which could have identified many of the issues that were found later. However, according to a 2016 DOE OIG report, EM elected to utilize its operational readiness reviews in place of a robust design review, as described below.[50] One of DOE's quality assurance criteria is to verify or validate the adequacy of design products using individuals or groups other than those who performed

[46]According to officials in DOE's Office of Project Management, the new contractor did not execute their contractual EVMS annual self-surveillance after taking over the SSCVS project in February 2023. In addition, officials noted that the issues with the contractor's EVMS contributed to delays in developing a new project baseline and impacted contractual project reporting for multiple months.

[47]Department of Energy, Office of Environmental Management Consolidated Business Center, *Forensic Root Cause Analysis of the Waste Isolation Pilot Plant (WIPP) Safety Significant Confinement Ventilation System (SSCVS) Capital Asset Project* (Apr. 9, 2021).

[48]GAO, *Waste Isolation Pilot Plant: Construction Challenges Highlight the Need for DOE to Address Root Causes*, GAO-22-105057 (Washington, D.C.: Mar. 15, 2022).

[49]We reported in 2019 that officials told us this decision to add calcine waste treatment abilities to the IWTU was due to reluctance within DOE to build another "first-of-a-kind" treatment facility. We also reported that EM had suspended further development of its plan to treat calcine waste for land disposal, according to EM documents and officials. GAO, *Nuclear Waste Cleanup: DOE Faces Project Management and Disposal Challenges with High-Level Waste at Idaho National Laboratory*, GAO-19-494 (Washington, D.C.: Sept. 9, 2019). Idaho site officials told us in December 2023 that DOE officials were restarting work to treat calcine waste and preparing to submit a revised CD-0 for approval. In May 2024, an official in EM's Office of Project Management told us that it was possible the future analysis of alternatives for treating the calcine waste would include options that would fit in a modified IWTU facility, but this has not been formally decided.

[50]Department of Energy, Office of Inspector General, *Audit Report: Management of the Startup of the Sodium-Bearing Waste Treatment Facility*, DOE-OIG-16-09 (Washington, D.C.: Mar. 30, 2016).

the work. However, EM did not ensure that the necessary formal design reviews were conducted, which contributed to an 11-year delay and almost $1 billion cost overrun.

- **Oversight of operational readiness.** DOE oversight officials did not ensure that the correct information was used when declaring the IWTU project to be complete. The DOE OIG reported in 2016 that DOE declared that the project was complete based on operational readiness reviews that were not sufficiently robust. Specifically, the operational readiness reviews were based on information obtained from smaller-scale demonstration projects and did not translate sufficiently to the IWTU. These reviews were used in place of proper testing. As the DOE OIG reported, DOE moved back the work associated with the comprehensive performance test, which would demonstrate that the facility would perform its mission as designed, from the construction phase of the project to the operations phase of the project. Therefore, DOE did not perform a rigorous test of the functionality of the facility before construction was declared complete. This deprived DOE of the opportunity to demonstrate with a high level of certainty that the plant would operate as required and expected, a key aspect of quality assurance oversight.

According to the OIG report, DOE concluded that the decision to shift the comprehensive performance testing from the construction phase to the operations phase was based on questionable information. Specifically, the decision was based on test data and operating experience at other facilities, even though there were significant differences between those facilities and the IWTU.

Further, the OIG report stated that multiple officials told the OIG that there was pressure to not exceed the congressionally approved line-item construction project amount of $571 million, and the comprehensive performance test approach would jeopardize these cost limitations. However, quality assurance oversight is meant to ensure that actions are taken to provide confidence that an acquisition will meet requirements and expectations. Moreover, testing is one of DOE's quality assurance criteria—inspect and test specified processes using established acceptance and performance criteria. By foregoing the necessary testing, oversight officials missed an opportunity to ensure that the project identified any potential issues and fixed them while the facility was still managed as a capital asset project.[51]

DOE and EM Have Implemented Measures to Prevent Recurring Quality Assurance Issues but Have Not Committed to Addressing Underlying Causes

DOE and EM use specific measures required by certain DOE orders in an effort to prevent quality assurance issues from recurring. However, issues continue to recur on EM capital asset projects—indicating that these measures may be insufficient, and that DOE and EM have not demonstrated full commitment to addressing the underlying causes of quality assurance issues.

[51]When a capital asset construction project is declared complete, it becomes an operations activity. We have found that operations activities have less stringent management requirements than capital asset projects. GAO, *Nuclear Waste Cleanup: DOE Could Improve Program and Project Management by Better Classifying Work and Following Leading Practices*, GAO-19-223 (Washington, D.C.: Feb. 19, 2019).

DOE and EM Use Specific Measures Required by Internal Orders to Prevent Recurring Issues

DOE and its offices use certain measures intended to prevent the recurrence of quality assurance issues that have contributed to delayed schedules and increased costs on EM capital asset projects. These measures are required by DOE orders and include sharing lessons learned, conducting root cause analyses, and implementing corrective action plans.

Lessons Learned

A lesson learned is defined by DOE policy as a good work practice or innovative approach that is documented and shared to promote repeat application. A lesson learned can also be an adverse work practice or experience that is documented and shared to prevent recurrence. Incorporating prior lessons can be an important tool to prevent recurring problems. DOE has several requirements regarding lessons learned, including the following:

- DOE Order 413.3B requires a project's federal project director to submit lessons learned regarding up-front project planning and design within 90 days of CD-3 approval for projects with a total project cost of $100 million or more.
- DOE Order 210.2A requires each organization to submit lessons learned from operating experience that are potentially useful DOE-wide.[52]

Additionally, DOE's Office of Environment, Health, Safety, and Security maintains a centralized database to store lessons learned called OPEXShare.[53] According to a DOE standard operating procedure, storing lessons learned in one department-wide database allows more employees to view and utilize those lessons. The standard operating procedure further explains that this lessons learned repository allows DOE to more easily analyze lessons learned and develop trends for project management related topics.

Root Cause Analysis

In a 2008 report, DOE described a root cause analysis as including a process where individuals knowledgeable of and directly responsible for managing DOE projects answer a series of questions to explain why a situation, event, or condition existed.[54] According to DOE Order 413.3B, root cause analyses can help officials identify the underlying cause for issues such as cost overruns or schedule delays. DOE Order 413.3B requires that the program office in charge of a project—such as EM—conduct a root cause analysis when there is a change in a performance baseline.[55] Specifically, the order states that an independent and objective

[52]Department of Energy, *Corporate Operating Experience Program,* DOE Order 210.2A (Washington, D.C.: Apr. 8, 2011).

[53]OPEXShare is a part of the larger Operating Experience Program outlined in DOE Order 210.2A. The purpose of this program is to prevent adverse operating incidents and facilitate the sharing of good work practices among DOE sites, while enabling tailored local operating experience programs based on the nature of work, hazards, and organizational complexities.

[54]Department of Energy, *Root Cause Analysis: Contract and Project Management* (Washington, D.C.: Apr. 7, 2008).

[55]A performance baseline change occurs when project officials determine that a project will not meet the approved total project cost or completion date, and so submit a baseline change proposal to modify the baseline.

root cause analysis should be conducted if DOE determines a performance baseline scope, schedule, or cost threshold will be breached.[56]

In 2022, we reported that addressing root causes and preventing their recurrence is critically important for ensuring that a project does not incur additional cost increases and schedule delays.[57] According to an EM official, as of April 2023, EM had conducted two root cause analyses across the EM complex.[58] Both of the analyses were at the Waste Isolation Pilot Plant in New Mexico—one for the SSCVS project and one for the Utility Shaft project.[59] According to the root cause analysis reports, EM conducted the analyses because both projects exceeded their cost and schedule estimates.

Corrective Action Plans

DOE defines corrective actions as measures taken to rectify conditions adverse to quality and, where necessary, to preclude repetition. DOE has several orders with requirements for corrective action plans, including the following:

- DOE Order 413.3B requires program offices—such as EM—to develop corrective action plans in specific cases. For example, the order specifies that the program office should develop a corrective action plan to address root causes resulting in a deviation from a project performance baseline.[60] During the process for making changes to a performance baseline, DOE's Office of Project Management is responsible for assessing and validating the approved corrective action plan's effectiveness in addressing and resolving the identified root causes.
- DOE Order 227.1A requires project officials to develop corrective action plans for any findings related to DOE's Office of Enterprise Assessments reviews. Specifically, the Office of Enterprise Assessments performs independent oversight appraisals to evaluate the effectiveness of line management performance, risk management, or the adequacy of DOE policies and requirements.[61] DOE managers approve the corrective actions and track them to completion, and the Office of Enterprise Assessments is required to create and implement a tailored approach to follow up on findings. According to the order, the follow-up approach should be based on the significance and complexity of the findings and should include verifying the effectiveness of the corrective actions.

[56]DOE added this requirement for conducting a root cause analysis in response to a GAO recommendation made in 2014. GAO, *Plutonium Disposition Program: DOE Needs to Analyze the Root Causes of Cost Increases and Develop Better Cost Estimates*, GAO-14-231 (Washington, D.C.: Feb. 13, 2014).

[57]GAO-22-105057.

[58]According to various EM project officials, several contractors have conducted their own root cause analyses for significant issues specific to their projects.

[59]The Utility Shaft project is to construct a vertical shaft—which will replace the existing air intake shaft—and two hallways to support a new underground ventilation system. This project began construction in 2020 and is currently estimated to be completed in November 2026 for $288 million—approximately 3 years late and $91 million over the previously approved plan.

[60]DOE added the requirement for developing a formal corrective action plan to address root causes in response to a GAO recommendation made in 2022. GAO-22-105057.

[61]As outlined in DOE 227.1A, line management is the unbroken chain of responsibility from the Secretary of Energy to the Deputy Secretary, to the secretarial officers who set program policy and plans and develop assigned programs, to the program and field element managers, and to the contractors and subcontractors that are responsible for execution of these programs.

- DOE Order 226.1B requires federal oversight to include an issues management process. For high significance findings, this process must include identifying and implementing corrective actions to address the cause of the finding and prevent recurrence. Additionally, once corrective actions are completed, a trained and qualified staff member must conduct an effectiveness review to ensure the corrective action was effectively implemented to prevent issue recurrence.

Quality Assurance Issues Have Recurred on EM Capital Asset Projects, Demonstrating a Lack of Commitment to Addressing Underlying Causes

Over the last decade, DOE has taken some steps to try to prevent recurrence of quality assurance issues, as described above. However, some issues continue to recur, indicating DOE's requirements may not be sufficient and a lack of commitment by EM to fully address the underlying causes.

In 2007, DOE's Office of Project Management conducted a root cause analysis of its management issues in an effort, in part, to be removed from our High-Risk List. In 2008, DOE issued a corrective action plan to address the deficiencies identified in the root cause analysis. However, in our 2015 High-Risk Update, we reported concerns that DOE did not adequately identify root causes of its contract and project management challenges. These concerns were due to the agency continuing to identify the need for additional corrective actions since it declared in 2011 that it had mitigated the root causes of its most significant contract and project management challenges.[62]

During the course of our review, we identified several areas where DOE's practices do not fully ensure oversight of project quality, and which may allow issues to recur: (1) project reviews do not always assess the effectiveness of EM oversight, (2) inconsistent adherence to EVMS requirements, (3) inconsistent development and review of lessons learned, and (4) a lack of proactive oversight for particularly high-risk or complex projects.

Project Reviews Do Not Always Assess EM's Oversight

EM is regularly required to conduct a range of project reviews, including project peer reviews and root cause analyses, as appropriate, on its capital asset projects based on requirements like those in DOE Order 413.3B. In addition, various DOE and EM orders and policies call on EM to review its management's performance and effectiveness. For example, Order 413.3B states that project management executives should monitor the effectiveness of federal project directors and their support staff.[63] However, both internal and external reviews have found that DOE and EM do not assess the effectiveness of the agency's management performance or oversight of contractors.[64] Further, in the course of our work, we found that project peer reviews for selected projects included limited analysis or discussion of EM management's oversight and effectiveness.

[62]GAO, *High Risk Series: An Update*, GAO-15-290 (Washington, D.C.: Feb. 11, 2015).

[63]In addition, DOE Order 226.1 provides that oversight processes implemented by DOE line management organizations—like EM—must evaluate management systems' effectiveness and review contractor activities (to the extent necessary) to assess the effectiveness of field elements' oversight of their contractors. Similarly, EM's Quality Assurance Program notes that field offices are expected to ensure oversight processes are implemented to evaluate field office programs and management systems for effectiveness.

[64]These reviews are not specific to EM capital asset projects, but rather are reviews of DOE-wide practices.

For example, in a 2008 root cause analysis report, DOE found that the department was not evaluating management performance. Specifically, the root cause analysis stated that DOE lacked an effective management feedback loop that allowed for identification and correction in real time.[65] This finding was echoed in a 2022 DNFSB report that found DOE reviews of management performance focus on compliance rather than effectiveness.[66]

In our analysis of nine selected EM project peer reviews, we found that all the reviews included a question related to the effectiveness of EM's oversight.[67] However, the reviews provided varying levels of support for whether or not oversight was deemed effective, ranging from no support to full support.[68] Five of the nine reviews contained some support, but lacked detail to fully explain the review's assessment of EM's oversight effectiveness. For example, the 2020 project peer review for a WTP subproject states "the management approach is effective; opportunities for further improvement are included in recommendations," but the review was silent on why the management's approach is deemed to be effective.[69]

Further, other reviews showed problems with EM's oversight of contractor performance on this project. As discussed above, EM did not conduct sufficient oversight to identify whether the WTP contractor had established policies or procedures for developing many of its cost estimates. This resulted in the contract being negotiated using unreliable cost estimates and may lead to DOE facing increased project costs.

In addition, we found that three of the nine project peer reviews provided little to no support for the assessment of EM's oversight effectiveness. For example, the 2023 project peer review for SSCVS stated that the project was being partially managed effectively, but the support cited was on the effectiveness of the contractor rather than the effectiveness of EM oversight.[70] Similarly, the 2018 project peer review for the SL-PFB stated that the project's organization, staffing, management systems, and controls are documented and well managed, but the support cited focused on compliance rather than the effectiveness of EM oversight.

We also found that DOE does not have specific guidance for assessing DOE's and EM's management performance and oversight effectiveness during project peer reviews or when issues with a capital asset

[65]Department of Energy, *Root Cause Analysis*.

[66]According to the DNFSB report, assessing effectiveness requires a performance-based assessment in addition to compliance assessments. It requires clear evaluation criteria used to measure effectiveness, acceptable qualitative or quantitative thresholds for those criteria, and a documented final analysis that validates the result. For example, a question on effectiveness could be "Does the plan give criteria for selecting the right mix and rigor of oversight activities and completing them on time?" and potential criteria for this question could be the number of postponed reviews and negative contractor performance trends in unreviewed areas. Defense Nuclear Facilities Safety Board, *Review of DOE Safety Oversight Effectiveness*.

[67]For example, four of the project peer reviews contained the question "is the project being managed effectively to complete [construction] as planned?"

[68]We scored each project peer review on a 4-point scale, from "no review of effectiveness" to "review of effectiveness with full support."

[69]There are additional details about how both EM and the contractor manage the project in the "Management, Acquisition, and Project Integration" section of the report. However, these details also either lack support for statements, are focused on the contractor, or have more to do with compliance than effectiveness. For example, the report states that communication between management teams is effective, without describing how it is effective. In addition, the report states that the field office routinely oversees construction activities in accordance with an oversight plan but does not provide an explanation of how that oversight is effective.

[70]Specifically, the review states that the contractor has not yet fully implemented appropriate management systems, and that the field office has enhanced the team. However, some key vacancies remain.

project's performance requires a root cause analysis.[71] According to one EM official we interviewed, EM has not found it necessary to develop guidance because off-the-shelf, commercial products to develop root cause analyses exist.[72] Further, we found that when EM conducts root cause analyses, they do not always identify all root causes, particularly those related to DOE and EM management. For example, the SSCVS project has experienced several cost and scheduling issues throughout its lifecycle. In a 2021 root cause analysis, EM reported that SSCVS experienced these issues because of an inexperienced contractor. According to this report, the contractor (1) hired an unqualified subcontractor for primary construction responsibilities; (2) neglected to thoroughly review more than 200 engineering changes, which affected overall risk and cost; and (3) neglected to have dedicated risk managers or experienced cost managers to effectively monitor and address cost and scheduling issues.

However, in its root cause analysis EM did not acknowledge its own role in hiring an inexperienced contractor and failing to ensure the contractor received sufficient support. If the team conducting the root cause analysis had guidance on what to evaluate, they may have identified that one of the root causes was EM hiring an inexperienced contractor. In turn, that could have led to a deeper dive into why EM hired an inexperienced contractor, which could be useful information for EM officials across the complex.

By providing clear guidance for evaluating management's performance and oversight effectiveness when conducting project reviews—including root cause analyses—EM can help prevent recurring issues in the future and have greater assurance that projects will be successful.

EVMS Are Not Always Compliant with Requirements

Many of EM's project reviews rely on data from contractors' EVMS, which may not always be reliable.[73] DOE's Order 413.3B requires certain projects estimated to cost $100 million or more to have an EVMS certified by DOE's Office of Project Management and to maintain compliance with certification requirements. According to a federal project director we interviewed, having a certified EVMS provides assurance that the data produced by the EVMS are high quality and reliable. However, as discussed earlier, two of the selected projects that we reviewed had known EVMS deficiencies for several years. Specifically, the SSCVS project identified multiple EVMS deficiencies during a self-surveillance review in April 2022. DOE's Office of Project Management officially revoked the EVMS certification in March 2024. In addition, DOE's Office of Project Management found issues with the WTP project's EVMS in November 2019. As of April 2022, 40 deficiencies remained, and as of March 2024, the WTP project's EVMS was still considered certified.

According to officials from DOE's Office of Project Management, DOE's primary mechanism for holding contractors accountable for maintaining a compliant EVMS is a contracting action. DOE officials noted that project management officials can determine if a system is compliant or not and either issue or retract certification. However, DOE Office of Project Management officials added that it is the contracting officer who

[71]We focused on these two types of reviews because an EM official told us that project peer reviews are how EM monitors the effectiveness of federal project directors and their support staff. Further, root cause analyses are a key method for determining the causes of issues that affect quality.

[72]Specifically, the EM official we interviewed told us that the project officials who conducted the root cause analyses for the SSCVS and Utility Shaft projects chose to use BlueDragon software to conduct their analyses.

[73]For example, EM uses data pulled from contractors' EVMS for quarterly project reviews. According to EM officials, quarterly project reviews are used to keep DOE senior leadership aware of project progress and for decision-making purposes.

has the authority to determine how to hold the contractor accountable. In addition, the same officials told us they give contractors time to address deficiencies based on the complexity of identified deficiencies and the proactiveness of the contractor to address them. For example, officials stated that the WTP contractor worked closely with the Office of Project Management to address deficiencies during COVID-19 shutdowns. Due to the contractor's efforts, Office of Project Management officials determined that their EVMS should remain certified while the contractor continued to address the deficiencies. However, this also meant that, during that time, the EVM data was not dependable, and project officials had to use alternate data for overseeing the project. If DOE and EM officials had used the mechanisms available to them—such as retracting EVMS certification—their contractors may have been more motivated to bring their systems into compliance sooner.

An official in DOE's Office of Project Management told us that alternate data are considered reliable because local federal staff can monitor and determine the data's credibility through activities such as inspections. This official also noted that using alternate project performance data may require additional effort on the part of EM field site officials to confirm the validity of the data reported or supplement and correct for inadequate data. For example, field site officials regularly conduct walkdowns to validate that work has been accomplished, and the use of alternate project performance data may require more frequent walkdowns. However, as we reported in July 2024, all of EM's field offices face staffing shortages.[74] This additional effort to approve the data reported by contractors may be difficult for such field offices, including the Carlsbad Field Office, which is responsible for overseeing the SSCVS project.[75]

According to DOE Order 413.3B, for projects with a total project cost greater than $50 million, contractors must generally demonstrate that their EVMS is compliant with requirements to be certified, employ a compliant EVMS prior to the project reaching CD-2, and maintain that compliance throughout their work on the project.[76] By leveraging existing mechanisms to hold contractors accountable for maintaining a compliant EVMS—or evaluating if additional mechanisms are needed—EM would be in a better position to provide oversight of its contractors and ensure it is reporting accurate project data to DOE management.[77]

[74]GAO, *Nuclear Waste Cleanup: Changes Needed to Address Current and Growing Shortages in Mission Critical Positions*, GAO-24-106479 (Washington, D.C.: July 18, 2024).

[75]We reported in 2024 that, as of the end of fiscal year 2023, the Carlsbad Field Office had 25 vacancies, for a vacancy rate of 34 percent. This was the highest vacancy rate of all EM offices. GAO-24-106479.

[76]As noted above, for firm-fixed price contracts, a contractor EVMS is not required. Further, specific contracts may include distinct requirements for maintaining a compliant EVMS.

[77]For example, we reported in 2019 that section 893 of the National Defense Authorization Act for Fiscal Year 2011 generally established that the Department of Defense be allowed to withhold payments under certain contracts when the department disapproves one or more of a covered contractor's business systems—which includes EVMS. Specifically, section 893 established that the Department of Defense's program to improve contractor business systems is to provide for the disapproval of a business system when it has a significant deficiency. Section 893 defined a significant deficiency as a shortcoming in a system that materially affects the ability of the Department of Defense and contractor officials to rely upon information produced by the system that is needed for management purposes. Department of Defense officials who we interviewed for that review noted that the withhold provision had led to contractors' increased responsiveness to deficiencies. In addition, some contractors who we interviewed at the time stated that because deficiencies will affect the company's cash flow, senior management and board members had become more engaged in matters of business system compliance. GAO, *Contractor Business Systems: DOD Needs Better Information to Monitor and Assess Review Process*, GAO-19-212 (Washington, D.C.: Feb. 7, 2019). EM could evaluate whether similar authority would better allow EM to hold contractors accountable for maintaining compliant EVMS.

Lessons Learned May Be Developed and Reviewed Inconsistently

According to DOE documentation, capturing lessons learned is integral to preventing issues from recurring. However, EM officials on capital asset projects may be developing and reviewing lessons learned inconsistently. As a result, it is unclear if lessons learned are being used to their greatest benefit throughout the EM complex.

First, EM does not have a widely known standard operating procedure or guidance for capital asset project officials to use when developing lessons learned reports. There is guidance on the OPEXShare website for developing and submitting lessons learned; however, the documents are not easily visible, as a user must search through several pages of OPEXShare resources to find them.[78] Additionally, we asked four federal project directors if they were aware of any standard operating procedure or guidance related to lessons learned.[79] One federal project director we interviewed referred to two policies, a site-specific document, and a 25-year-old standard operating procedure. Another federal project director to whom we spoke referred to a different, site-specific lessons learned document. None of the four federal project directors referred to guidance found on the OPEXShare website or a more recent, complex-wide standard operating procedure or guidance.[80]

In addition, capital asset project officials review lessons learned reports in different ways throughout the EM complex. Two of the four federal project directors we interviewed stated that they did not use OPEXShare for their project. One of these federal project directors stated that they did not use lessons learned because they felt their project was too far into the construction phase to benefit from lessons learned. The remaining two federal project directors told us they have their own methods for reviewing relevant lessons learned in OPEXShare. For example, one project director told us that they receive automatic email updates from OPEXShare that includes their preferences for what type of information they want to see from the database. The other project director we interviewed said that both federal and contractor personnel scan OPEXShare daily for lessons learned applicable to their project.

DOE Order 210.2A requires heads of field offices to ensure that operating experience is incorporated into applicable activities. In addition, DOE Order 413.3B includes requirements to elicit and submit lessons learned from a particular capital asset project at various stages throughout the CD process. However, DOE Order 413.3B does not include similar requirements for reviewing relevant lessons learned at different stages or points in a capital asset project. Likewise, we did not identify relevant guidance for DOE officials as to when and how to best review lessons learned in the context of a capital asset project. Inconsistencies in how and

[78]According to DOE Order 210.2A, DOE's Office of Environment, Health, Safety, and Security is responsible for developing, promulgating, and maintaining operating experience program guidance materials. As noted above, the operating experience program is intended in part to facilitate the sharing and use of good practices and lessons learned from operating experience.

[79]The four federal project directors we interviewed are the federal project directors for the four ongoing selected projects—specifically, X-326, SL-PFB, WTP, and SSCVS.

[80]An official in EM's Office of Project Management told us that DOE's Office of Project Management issued a standard operating procedure for developing and submitting lessons learned to OPEXShare in 2023. According to the same official, DOE's Office of Project Management presented the standard operating procedure and templates at the 2023 Project Management Workshop. In May 2024, an official in EM's Office of Project Management told us that, in response to our review, this official disseminated the standard operating procedure and related templates to all certified EM federal project directors.

when capital asset project officials review lessons learned reports could result in project officials missing recently submitted lessons learned that could be beneficial to their current project.

One of DOE's quality assurance criteria in DOE Order 414.1D is to ensure that managers assess their management processes and identify and correct problems that hinder the organization from achieving its objectives. Lessons learned are a management tool intended to prevent identified issues from recurring and, when used correctly, can help EM achieve its objectives. By ensuring that its lessons learned process results in the appropriate development, review, and use of lessons learned by all relevant project management officials, EM will be in a better position to prevent recurrence of quality assurance issues on its capital asset projects.

Lack of Proactive Oversight for Complex and High-Risk Projects

A key factor that drives oversight requirements for a project in DOE Order 413.3B is cost. Specifically, there are four levels of project oversight based on the estimated total cost of the project: up to $50 million; between $50 million and $100 million; between $100 million and $750 million; and over $750 million.[81] Projects over a certain cost threshold may receive additional oversight from the Project Management Risk Committee or the ESAAB if the project is later identified as being at risk of not meeting its performance baseline. In addition, the Office of Enterprise Assessments can perform targeted reviews of technical processes and products related to the design and construction of nuclear facilities as needed.[82]

However, DOE Order 413.3B does not establish methods for proactive, additional oversight from the beginning of a project's lifecycle if a project is deemed particularly complex or high risk.[83] For example, DOE knew when it awarded the contract for the SSCVS project that the contractor was inexperienced in managing capital asset projects. If EM had provided additional oversight of the project from the beginning of its lifecycle, officials may have been able to identify issues sooner. In addition, with that additional oversight officials may have been able to prevent some of the issues, such as hiring an unqualified subcontractor.

In a 2022 review of DOE's safety oversight, the DNFSB stated that insufficient proactive safety oversight reduces DOE's ability to identify emerging issues in a timely manner. In addition, the DOE OIG performed an audit on the WTP, which had experienced several cost increases and schedule delays. The DOE OIG

[81]The requirements in DOE Order 413.3B are mandatory for capital asset projects with a total project cost greater than $50 million. Projects with a total project cost less than $50 million can use a tailored approach for project management.

[82]According to officials in the Office of Enterprise Assessments, reviews are initiated based on the office's internal risk assessment—which includes time since last assessment and information from site officials—or direction from leadership. Officials also told us that they try to observe certain construction processes, such as putting in steel or concrete. For example, the Office of Enterprise Assessments conducted an independent assessment of construction quality at the WTP in March 2016 as part of an ongoing program of quarterly assessments of construction quality at the WTP to ensure contractors were meeting the quality assurance requirements in 10 C.F.R. Part 830, Subpart A. Office of Enterprise Assessments officials identified weaknesses in electrical construction; namely, that completed wiring installations did not match design drawings. Officials also determined that the construction quality at the WTP was satisfactory in the other areas reviewed—pressure testing of piping, structural concrete, and welding inspection activities.

[83]There is a method for providing additional oversight for certain projects below the general $50 million threshold in DOE Order 413.3B. Specifically, the order notes that, during the project development phase, Under Secretaries may make the project management requirements of the order applicable to nuclear or complex first-of-a-kind projects with a total project cost as low as $10 million. However, this only adds oversight to those specific projects under $50 million, and there is no similar mechanism to increase the baseline level of oversight for projects over $50 million. DOE officials noted that DOE Order 413.3B also allows the Deputy Secretary to assume authority over projects at any cost level and allows Under Secretaries to assume authority over any project with a total project cost less than $750 million. However, that only provides for more senior oversight, not an increased amount of oversight.

concluded that the issues identified during the audit stemmed from the department's need for additional oversight of the contractor. Specifically, the OIG concluded in its report that the department did not accurately monitor or coordinate with the project contractor about meeting its self-performance objectives.[84]

According to the Project Management Institute's *Governance Guide*, one best practice is that oversight should be altered depending on many factors, including cost, complexity, and risk.[85] The *Guide* also states that insufficient oversight introduces project risks. DOE may be missing opportunities to prevent cost and scheduling issues—such as those experienced by WTP, SSCVS, and IWTU—by not providing additional proactive oversight for projects recognized to be particularly complex or high risk.

Conclusions

EM is responsible for overseeing tens of billions of dollars in capital asset projects to clean up contaminated sites across the country. We placed DOE project management on our High-Risk List in 1990, and EM project management remains on the list to this day. To help resolve the root causes of issues that have kept the agency on the High-Risk List, DOE has developed several policies and tools that EM can use to conduct quality assurance oversight and help ensure that contractors deliver projects that meet the agency's needs and requirements. When EM uses these tools as intended, positive outcomes have ensued.

Some EM capital asset projects, however, continue to experience issues that result in increased costs and delayed schedules. We identified several areas where EM could improve its oversight practices, thereby helping to ensure capital asset projects meet the agency's needs.

- EM has not provided guidance to officials in how to assess federal management performance and oversight effectiveness during capital asset project reviews, including root cause analyses. Doing so could help ensure that EM identifies its own role in project issues, which could also help EM prevent those issues from recurring in the future.
- EM has not actively utilized mechanisms DOE already has for holding contractors accountable for maintaining a compliant EVMS or evaluated if additional mechanisms are needed. These systems are one of EM's primary data sources for oversight, and when project officials know that the systems are compliant, they have confidence that the data are high quality.
- EM may be missing opportunities to fully leverage lessons learned. Evaluating how project officials develop, review, and apply lessons learned could inform EM management if additional lessons learned guidance, policies, or practices are needed to ensure lessons learned are being utilized to their fullest extent. Doing so could also help prevent identified issues from recurring on other projects. For example, EM management could determine they need a standardized practice to evaluate if certain best practices that have resulted from analysis of lessons learned should be embedded in contract language to ensure that issues seen on previous projects do not recur.
- DOE and EM also have not established a process to identify particularly high-risk or complex projects that may need additional, proactive oversight. DOE's current policy focuses on providing additional

[84]Department of Energy, Office of Inspector General, *Bechtel National, Inc.'s Compliance with Contract Terms Relating to Self-Performed Work and Subcontracting for the Waste Treatment and Immobilization Plant*, OIG-24-13 (Washington, D.C.: March 2024).

[85]Project Management Institute, Inc., *Governance of Portfolios, Programs, and Projects: A Practice Guide* (2016).

oversight after issues have been identified. By establishing a method for proactive oversight at the outset of a capital asset project, EM could potentially avoid repeating some of the issues that it has experienced on recent projects.

Progress in addressing this high-risk area will require a steadfast commitment to using the institutional tools that already exist, as well as a refinement of other tools. Given the significant cost and complexity of many of EM's capital asset projects, it is essential for DOE and EM to commit to and establish quality assurance oversight practices that will help prevent issues. In addition, such practices could help ensure that issues that do arise do not recur on the same project or on other EM projects.

Recommendations for Executive Action

We are making the following four recommendations to DOE:

The Secretary of Energy should ensure that the Senior Advisor for the Office of Environmental Management develops or updates relevant guidance for conducting project reviews—including root cause analyses—for EM capital asset projects to include steps for analyzing federal management performance and oversight effectiveness. (Recommendation 1)

The Secretary of Energy should ensure that the Senior Advisor for the Office of Environmental Management works with the Director of the Office of Project Management to leverage existing mechanisms to hold applicable contractors accountable for maintaining a compliant EVMS, evaluate if additional mechanisms are needed to hold contractors accountable—such as withholding payment if an EVMS is not compliant—and, if necessary, request authority from Congress to use those mechanisms. (Recommendation 2)

The Secretary of Energy should ensure that the Senior Advisor for the Office of Environmental Management evaluates how EM capital asset project officials develop and use lessons learned to determine if new lessons learned are being adequately documented and existing lessons learned are being adequately reviewed, analyzed, and applied, or if further guidance is needed. (Recommendation 3)

The Senior Advisor for the Office of Environmental Management should ensure that the Director of EM's Office of Project Management develops a process to determine if EM capital asset projects that meet certain criteria—such as those that are particularly high risk or complex—need additional proactive federal oversight from the beginning of the project's lifecycle. (Recommendation 4)

Agency Comments

We provided a draft of this report to DOE for review and comment. In its comments, reproduced in appendix III, DOE concurred with the report's four recommendations and described the agency's plans to implement them. DOE also provided technical comments that we incorporated into the report, as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Energy, and 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 (202) 512-3841 or andersonn@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

Nathan Anderson
Director, Natural Resources and Environment

Appendix I: Objectives, Scope, and Methodology

House Report 117-397 includes a provision for GAO to review the Department of Energy's (DOE) Office of Environmental Management's (EM) quality assurance functions for capital asset projects, lessons learned from quality assurance issues across the EM complex, and DOE's efforts to stop issues from recurring. This report (1) describes how DOE and EM oversee quality assurance for EM's capital asset projects, (2) examines how EM's quality assurance oversight process may have affected the performance of selected projects, and (3) assesses the extent to which DOE has taken actions to ensure that identified quality assurance issues on EM projects do not recur.

To describe how DOE and EM oversee quality assurance for EM capital asset projects, we reviewed DOE and EM documents that describe oversight requirements and practices, including DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*; DOE Order 414.1D, *Quality Assurance*; DOE Order 226.1B, *Implementation of DOE Oversight Policy*; and EM-QA-001, *EM Quality Assurance Program*. In addition, we reviewed information about DOE databases used to collect and share information about projects, such as the Occurrence Reporting and Processing System.

We also interviewed officials in DOE's Office of Project Management; DOE's Office of Environment, Health, Safety, and Security; EM's Office of Project Management; and EM officials associated with six of EM's 15 cleanup sites to learn more about the roles of various DOE and EM offices in conducting oversight. The nongeneralizable sample of six selected sites were those that, according to a list provided by EM officials in April 2023, had 13 ongoing capital asset projects that (1) had reached at least CD-1 in the project lifecycle, (2) had estimated total project costs of $100 million or more, and (3) were subject to 10 C.F.R. Part 830, *Nuclear Safety Management*. To ensure we had a full understanding of the different project oversight reviews conducted by both DOE and EM offices, we developed a spreadsheet of the project oversight reviews described in DOE documents or noted by DOE officials in interviews. The spreadsheet included columns for the type of information that project oversight reviews were intended to capture, how the reviews were used, and if there was any guidance associated with the reviews. This spreadsheet was reviewed by officials in EM's Office of Project Management to correct and clarify existing information and fill in missing information.

To examine how EM's quality assurance oversight processes may have affected the performance of selected projects, we first established a methodology for selecting projects. Our findings from the selected projects are not generalizable to all EM capital asset projects, but they illustrate how oversight processes may help or hinder project performance. We selected a nongeneralizable sample of five projects, four of which were ongoing projects and one which was a completed project. To select the ongoing projects, we reviewed the list of 13 projects that EM provided that (1) had reached at least CD-1 in the project lifecycle, (2) had estimated total project costs of $100 million or more, and (3) were subject to 10 C.F.R. Part 830. To obtain a wide range of project types, the primary factors we considered were (1) size (i.e., estimated total project cost), (2) stage in the project lifecycle (i.e., at different critical decision points), and (3) complexity (i.e., using new or proven technology). To select one completed project for review, we compiled a list of completed EM capital asset projects that the DOE Office of Inspector General (OIG) and we had previously reported on and that had started operating within the past 5 years. This list yielded two projects. In addition, we sought to ensure that all projects selected were located at different EM sites. Using these criteria, we selected the following projects:

- Sludge Processing Facility Buildouts (SL-PFB) at the Oak Ridge site in Tennessee.

- Waste Treatment and Immobilization Plant (WTP) at the Hanford site in Washington.
- X-326 Process Building Demolition (X-326) at the Portsmouth site in Ohio.
- Safety Significant Confinement Ventilation System (SSCVS) at the Waste Isolation Pilot Plant in New Mexico.
- Integrated Waste Treatment Unit (IWTU) at the Idaho site in Idaho.

After we selected the five projects, we reviewed our previous reports and existing DOE OIG reports on those projects to determine what quality issues, if any, had already been identified. We also collected and reviewed project documentation—such as project peer reviews and external independent reviews—to learn about any other quality issues EM may have identified, as well as if any issues had been identified with EM's oversight. In addition, we conducted semi-structured interviews with the federal project directors of the four ongoing projects to learn more about the oversight processes used on the projects and any issues that had arisen. We also sent a question set to other officials working on the IWTU project to learn more about the final costs associated with getting the facility to operate, the effect of the delays on other EM work, and EM oversight of the project.[1]

To determine the extent to which DOE and EM have taken steps to ensure that identified quality assurance issues do not recur, we reviewed DOE policies intended to help prevent recurrence, such as DOE Order 226.1B, *Implementation of DOE Oversight Policy*. We also reviewed DOE root cause analyses and our previous report on one of those analyses. Further, we analyzed previous DOE OIG reports that included reviews of the effectiveness of DOE's oversight to better understand where issues with oversight may have arisen in the past. We also reviewed a Defense Nuclear Facilities Safety Board review of DOE's safety oversight, including DOE's effectiveness assessments, and interviewed Board officials who worked on the review.

To learn more about EM reviews of oversight effectiveness, we analyzed nine project peer reviews. We requested the most recent project peer reviews conducted for the ongoing capital asset projects that (1) had reached at least CD-1 in the project lifecycle, (2) had estimated total project costs of $100 million or more, and (3) were subject to 10 C.F.R. Part 830. We received project peer reviews for nine projects. The year in which these nine reviews were conducted ranged from 2018 to 2023. For our analysis of the reviews, we first determined if there was a question related to oversight effectiveness. If there was an oversight effectiveness question, we then evaluated the information provided in the review to see if it supported the review's determination of oversight effectiveness. We used a 4-point scale for our analysis: no review of effectiveness; review of effectiveness with no support; review of effectiveness with some support; and review of effectiveness with full support. Two analysts independently evaluated each project peer review and then discussed their individual results to come to an agreement on the final result for each review.

In addition, we interviewed DOE and EM officials to learn more about the practices used by DOE and EM to prevent issue recurrence. For example, to learn about DOE's use of lessons learned, we spoke with DOE officials in the Office of Environment, Health, Safety, and Security to learn about their efforts to implement a new lessons learned database, and with EM field office officials to understand how they use the lessons learned database.

[1]Federal project directors oversee capital asset projects. After a project moves into operations, it is overseen by other site officials. For example, because the IWTU is currently in operations, we spoke with an assistant manager at the Idaho site.

Finally, we compared DOE and EM's current practices to prevent issue recurrence with various relevant criteria, including DOE policies relevant to project reviews and the Project Management Institute's *Governance of Portfolios, Programs, and Projects: A Practice Guide*.[2]

We conducted this performance audit from March 2023 to July 2024 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.

[2]Project Management Institute, Inc., *Governance of Portfolios, Programs, and Projects: A Practice Guide* (2016). The Project Management Institute is a not-for-profit association that, among other things, provides standards for managing various aspects of projects, programs, and portfolios.

Appendix II: Description of Selected Office of Environmental Management (EM) Capital Asset Projects

This appendix provides individual summaries of the five EM capital asset projects that we selected to review for illustrative examples of how oversight processes may help or hinder project performance. The summaries include information such as cost and schedule estimates and recent project performance. The information included in these summaries is based on our review of Department of Energy and EM documentation and our reports, as well as interviews with EM officials.

Appendix III: Comments from the Department of Energy

Department of Energy
Washington, DC 20585

July 24, 2024

Mr. Nathan Anderson
Director
Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Anderson:

The Department of Energy (DOE) Office of Environment Management (EM) appreciates the opportunity to comment on the U.S. Government Accountability Office (GAO) draft report, *NUCLEAR WASTE CLEANUP: More Effective Oversight Is Needed to Help Ensure Better Project Outcomes (GAO-24-106716).*

EM conducts proactive quality assurance oversight from the beginning of a project and that oversight continues throughout the project's lifecycle. The tools for providing effective oversight come not only through the requirements and guidance provided through DOE directives, but also through incorporating lessons learned that help to improve the overall process. As a continuously learning and improving organization, EM strives to achieve and maintain a strong safety culture where organizational learning is embraced, and operating experience is highly valued along with the capacity to learn from experience.

The Department appreciates GAO's recognition that EM uses several means to help carry out policies and conduct quality assurance oversight on capital asset projects, including leveraging contractor data to monitor project cost and schedule performance. The Department understands the importance of effective oversight to ensure contractors deliver quality projects that meet the agency's needs and advance the EM cleanup mission.

EM concurs with GAO's recommendations. The insights and perspectives provided in the draft report are valued and will be used to continue strengthening EM's "toolbox" for providing effective oversight of program and project management for the acquisition of capital assets. EM's response to the recommendations is provided in the enclosure. Technical comments on the draft report have been provided separately.

2

If you have any questions, please contact me or Mr. Dae Y. Chung, Associate Principal Deputy Assistant Secretary for Corporate Services, at (202) 586-9636.

Sincerely,

Candice Trummell Robertson

Candice Trummell Robertson
Senior Advisor for Environmental Management

Enclosure

Enclosure

Management Response to Recommendations
GAO-24-106716 Draft Report, *NUCLEAR WASTE CLEANUP: More Effective Oversight is Needed to Help Ensure Better Project Outcomes*

Recommendation 1: The Secretary of Energy should ensure that the Senior Advisor for the Office of Environmental Management (EM) develops or updates relevant guidance for conducting project reviews – including root cause analyses – for EM capital asset projects to include steps for analyzing Federal management performance and oversight effectiveness.

Management Response: Concur.

The Office of Environmental Management will modify its standard operating procedure for project peer reviews to evaluate Federal management performance and oversight effectiveness. EM will also establish a standard operating procedure for root cause analysis, corrective action plans, and evaluation of the effectiveness of the corrective actions.

Estimated Completion Date: December 31, 2024.

Recommendation 2: The Secretary of Energy should ensure that the Senior Advisor for the Office of Environmental Management works with the Director of the Office of Project Management to leverage existing mechanisms to hold applicable contractors accountable for maintaining a compliant Earned Value Management System (EVMS), evaluate if additional mechanisms are needed – such as withholding payment if an EVMS is not compliant – and, if necessary, request authority from Congress to use those mechanisms.

Management Response: Concur.

EM will work with the Director of the Office of Project Management to leverage existing mechanisms to hold applicable contractors accountable for maintaining a compliant EVMS, evaluate if additional mechanisms are needed – such as withholding payment if an EVMS is not compliant – and, if necessary, request authority from Congress to use those mechanisms.

Estimated Completion Date: June 30, 2025.

Recommendation 3: The Secretary of Energy should ensure that the Senior Advisor for the Office of Environmental Management evaluates how EM capital asset project officials develop and use lessons learned to determine if new lessons learned are being adequately documented and existing lessons learned are being adequately reviewed, analyzed, and applied, or if further guidance is needed.

Management Response: Concur.

EM will modify its standard operating procedures for Project Peer Reviews to evaluate if lessons learned are being adequately documented and existing lessons learned are being adequately reviewed, analyzed, and applied.

Estimated Completion Date: December 31, 2024.

Recommendation 4: The Senior Advisor for the Office of Environmental Management should ensure that the Director of EM's Office of Project Management develops a process to determine if EM capital asset projects that meet certain criteria—such as those that are particularly high risk or complex—need additional proactive federal oversight from the beginning of the project's lifecycle.

Management Response: Concur.

EM will establish a process to determine if capital asset projects that meet certain criteria – such as those that are particularly high risk or complex – need additional proactive federal oversight from the beginning of the project's lifecycle. This process will be incorporated into the critical decision approval process.

Estimated Completion Date: March 31, 2025.

Accessible Text for Appendix III: Comments from the Department of Energy

July 24, 2024

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Director
Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

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Sincerely,

Candice Trummell Robertson
Senior Advisor for Environmental Management

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Estimated Completion Date: March 31, 2025.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Nathan Anderson, Director, Natural Resources and Environment, (202) 512-3841 or andersonn@gao.gov

Staff Acknowledgments

In addition to the contact named above, Amanda K. Kolling (Assistant Director), Kelly Butler (Analyst in Charge), Ariana Booker, and Kathy Pedalino made key contributions to this report. Also contributing to this report were John Delicath, Cindy Gilbert, Claudia Hadjigeorgiou, William Laing IV, Jennifer Leotta, and Dan C. Royer.

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