



**OFFICE OF INSPECTOR GENERAL**

U.S. Department of Energy

# AUDIT REPORT

DOE-OIG-23-09

November 2022

**U1A COMPLEX  
ENHANCEMENTS PROJECT**



**Department of Energy**  
Washington, DC 20585

November 22, 2022

**MEMORANDUM FOR THE ASSOCIATE ADMINISTRATOR FOR INFRASTRUCTURE;  
DIRECTOR, OFFICE OF PROJECT MANAGEMENT**

**SUBJECT: Audit Report on U1a Complex Enhancements Project**

The attached report discusses our review of the National Nuclear Security Administration's project management for the U1a Complex Enhancements Project. This report contains three recommendations and three suggested actions that, if fully implemented, should help improve project management performance. Management concurred in principle with two of the recommendations and fully concurred with one.

We conducted this audit from February 2021 through April 2022 in accordance with generally accepted government auditing standards. We appreciated the cooperation and assistance received during this audit.

A handwritten signature in black ink, appearing to read "Jennifer L. Quinones", with a long horizontal line extending to the right.

Jennifer L. Quinones  
Deputy Inspector General  
Office of Inspector General

cc: Deputy Secretary  
Chief of Staff



## Department of Energy Office of Inspector General

### U1a Complex Enhancements Project (DOE-OIG-23-09)

#### WHY THE OIG PERFORMED THIS REVIEW

A significant gap in the capabilities available to meet the responsibilities of the Stockpile Stewardship Program was identified in 2014. Under the Enhanced Capabilities for Subcritical Experiments portfolio, the U1a Complex Enhancements Project (UCEP) will construct an underground laboratory that enables new experimental and diagnostic capabilities. UCEP had an original cost range of approximately \$109–\$166 million and a completion date in the second quarter of fiscal year 2023.

However, UCEP's estimated costs have significantly increased to a cost range of \$455–\$577 million and it is expected to be completed by the first quarter of fiscal year 2027. Because of the significant increase in costs and schedule, we initiated this audit to assess the project management of UCEP.

#### What Did the OIG Find?

We found that weaknesses in the National Nuclear Security Administration's (NNSA) project management of UCEP led to significant unanticipated cost increases and schedule overruns. We noted that the project management weaknesses were due, in part, to the Nevada National Security Site management and operating contractor's lack of experienced staff initially assigned to the project, poor project performance, and Earned Value Management System certification issues. Further, NNSA did not include a defined minimum performance standard or an acceptable level of performance to reward or penalize actions on significant contractor activities and requirements. Finally, NNSA could improve its efforts to identify the root cause of cost increases when initial estimates are exceeded.

#### What Is the Impact?

The Stockpile Stewardship Program has the responsibility to assess the effects of aging and other issues affecting the certification of the current and future stockpile. Even though NNSA had taken several actions to hold Mission Support and Test Services, LLC accountable for lack of performance, the project continues to experience budget and schedule overruns. Without the data provided by the Enhanced Capabilities for Subcritical Experiments, NNSA and the Nation would be accepting increased risk in the ability to adequately certify the stockpile. Further, NNSA should ensure its performance evaluation process is balanced and aligns rewards not only with the entire scope of work but also incentivizes performance on significant line-item projects to hold the contractor accountable.

#### What Is the Path Forward?

We made three recommendations and three suggested actions that, if fully implemented, should help enhance project management procedures and improve project performance.

## BACKGROUND

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The National Nuclear Security Administration's (NNSA) Stockpile Stewardship Program has the responsibility to assess the effects of aging and manufacturing processes on proposed approaches to stockpile life-extension programs and other issues affecting the certification of the current and future stockpile. In 2014, the national security laboratories and the Nevada National Security Site (NNSS) jointly identified a significant gap in the capabilities available to meet the responsibilities of the science-based Stockpile Stewardship Program. The Enhanced Capabilities for Subcritical Experiments (ECSE) will enable new experimental and diagnostic capabilities needed to fill a capability not currently available to the Stockpile Stewardship Program. The ECSE portfolio comprises a Major Item of Equipment (the Advanced Sources and Detectors (ASD) project) and the U1a Complex Enhancements Project (UCEP), a congressional line-item project<sup>1</sup> that will establish the infrastructure to support the ECSE program. There are also two programmatic components within the ECSE portfolio: Entombment and Neutron Diagnosed Subcritical Experiments technology.

In 2015, the Deputy Administrator for Defense Programs determined that the only viable location for the ECSE capability was the U1a Complex. The U1a Complex is an underground laboratory used for subcritical experiments and physics experiments to obtain technical information about the United States nuclear weapons stockpile. These experiments support NNSA's Stockpile Stewardship Program, created to maintain the safety and reliability of the United States nuclear weapons stockpile. National Security Technologies, LLC (NSTec), the prior NNSS management and operating (M&O) contractor, was selected for the project's design and construction because the length of time required for an outside contractor to become efficient in the specialized mining and construction techniques would likely have delayed UCEP. When the NSTec contract ended on November 30, 2017, Mission Support and Test Services, LLC (MSTS) assumed responsibility for the management and operation of the NNSS. UCEP was subdivided into two projects: Subproject 010 included a new access tunnel, refuge station, and power and ventilation for mining new tunnels that compose the ECSE infrastructure; and Subproject 020 included developing existing and new tunnels for radiography, neutron and other diagnostic equipment, as well as supporting equipment and diagnostic rooms. Subproject 020 would support the U1a Complex, subcritical experiments, and the ASD project. ASD and other programmatic components are currently under development through a partnership between Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Sandia National Laboratories, and MSTS.

Overall, UCEP has not proceeded as originally planned, which has led to project delays and cost range increases. Initially, NNSA approved Critical Decision (CD)-0, Approve Mission Need, in September 2014 and CD-1, Approve Alternative Selection and Cost Range, in August 2017 with a recommended original cost range of approximately \$109–\$166 million and a completion date in the second quarter of fiscal year (FY) 2023. In March 2019, Subproject 010 achieved a combined CD-2/3, Approve Performance Baseline and Start of Construction/Execution.

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<sup>1</sup> Department of Energy Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, defines line-item projects as having a distinct design and/or construction of real property. A request is submitted to Congress for authorization to fund this project.

However, as the UCEP design matured, additional requirements that should have been previously considered were included and caused the project to exceed its original cost range. NNSA completed a reassessment or reaffirmation of CD-1 for UCEP in FY 2021 that resulted in a new cost range of \$455–\$527 million. According to the recently issued Construction Project Data Sheet, the design delays combined with supply chain issues (e.g., increased material/equipment costs and extended delivery schedules) and the change in the fire extinguishing system have increased the upper range to \$577 million, and the project is now expected to be completed by the first quarter of FY 2027. Since CD-1 reaffirmation, the requirements necessary to receive approval of CD-2/3 for Subproject 020 have been completed, including the Final Design in March 2022 and Earned Value Management System (EVMS) certification in June 2022. On June 23, 2022, NNSA approved CD-2/3 for Subproject 020. Because of the importance of UCEP to the Stockpile Stewardship Program and the significant costs involved, we initiated this audit to assess the project management of UCEP.

## **PROJECT MANAGEMENT WEAKNESSES**

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NNSA follows Department Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*. As the primary criteria for UCEP, it is required for capital line-item projects and provides the program and project management direction with the goal of delivering projects within the original performance baseline, cost, and schedule. Department Order 413.3B also requires a certified EVMS for all projects with total project costs greater than \$100 million. MSTS provides project management oversight through its Project Execution Office. NNSA assigned the Acquisition and Project Management Federal Project Director (FPD) responsibility to regularly monitor the project's progress. To provide project management oversight, the EVMS is a project management tool used to measure the value of completed work against the planned work schedule and estimated costs. In a series of letters to MSTS, the FPD and Nevada Field Office Contracting Officer outlined expectations for the project's costs and schedules and expressed concerns with project work quality. Despite NNSA's efforts to improve project execution, and limit cost and schedule overruns, MSTS continued to experience significant project management problems. NNSA identified several issues that impacted the project management of UCEP, which took several years to overcome. Specifically:

- NNSA and both M&O contractors did not ensure that UCEP's work scope was fully defined during the project's planning phase. For example, the initial planning assumptions for Subproject 020 were inadequate and required major infrastructure upgrades.
- MSTS' project management performance and deliverables were incomplete and did not meet NNSA's expectations. For example, MSTS had been working on the project design since early 2019 and submitted key project documents that were incomplete, insufficient, and required additional work. MSTS received certification of its EVMS, over 4 years after taking over as the M&O contractor.

## **Failure to Fully Define Work Scope**

Neither NNSA nor the NNSS contractors ensured that the UCEP work scope was fully defined at the original CD-1 or the conceptual design and project definition phase of the project.

Department Order 413.3B states that capital asset project decisions shall be made based on clearly defined scope and shall include all the project-specific work scope needed to accomplish the mission need. However, in February 2020, NNSA detailed key items and additional requirements that were missing in the Subproject 020 work scope when developing the original CD-1. Specifically, NNSA revealed that when the original plan was developed, there was insufficient understanding of the power and cooling requirements necessary to support the facility, subcritical experiments, and the ASD radiography project. NNSA identified and incorporated these additional requirements as the project design matured, which increased the total project cost and caused the project to exceed its original cost range by more than 50 percent. The UCEP scope was reassessed in FY 2021 and resulted in a revised schedule completion date of FY 2026 and a revised cost range of \$455–\$527 million.

Early project decisions adversely impacted UCEP’s work scope and design efforts. Specifically, NNSA divided two components of the overall ECSE portfolio into separate projects (ASD and UCEP) after its initial approval as one project. As mentioned earlier, the ECSE portfolio is composed of a Major Item of Equipment (ASD), and UCEP is the infrastructure that will house the ASD equipment. This decision impacted conceptual design requirements of UCEP because key requirements regarding ASD were unavailable to be considered at the same time. The ASD conceptual design was not started when the UCEP conceptual design was completed because the ASD project had not received full funding from Congress. Therefore, NNSA determined that UCEP should be the first priority because the facility would house ASD. However, as noted in the Department’s Office of Project Management Oversight and Assessments 2016 Independent Cost Review, the ASD conceptual designs provided the sizing requirements for UCEP. The UCEP infrastructure upgrades were to occur while the ASD project designs were finalized. This did not happen because only the UCEP conceptual design proceeded forward and received CD-1 approval in July 2017. CD-1 provides the authorization to use funds for preliminary design activities. However, the ASD project’s conceptual design was not completed until June 2018, after receiving funding for the project in FY 2018.

In a briefing to the Senate Energy and Water Development Subcommittee on Appropriations in April 2020, NNSA identified that initial planning assumptions were invalid for UCEP, as the requirements for ASD and UCEP had matured. NNSA identified issues with additional equipment, as well as required space for the equipment, and power and cooling requirements, which caused an increase to UCEP’s cost range. According to an NNSA official, in developing CD-1, the UCEP project did not take a holistic view of key requirements for power, cooling, fire protection, and ancillary systems. NNSA planned to have CD-1 reaffirmed in July 2020; however, the CD-1 reaffirmation was not approved until February 2021. Department Order 413.3B requires that if the top end of the originally approved CD-1 cost range grows by more than 50 percent as the project proceeds to CD-2, the program, in coordination with the Project Management Executive, must reassess the alternative selection process to identify the new or reaffirmed selected alternative and provide an updated CD-1 cost range. NNSA’s reaffirmation

memo stated that since the NNSS was the only site approved for subcritical experiments, this previously selected alternative remains the most viable option. NNSA approved the revised CD-1 for UCEP with an increased cost range of \$455–\$527 million. The cost estimate has since increased to an upper range of \$577 million as requested in the FY 2023 budget.

As far back as 2014, Congress raised concerns about NNSA’s ECSE project. Specifically, the House of Representative’s Committee on Appropriations states in House Report 113–486, *Energy and Water Development Appropriations Bill, 2015*, that no funding was provided for new radiography capabilities and that NNSA must be able to show a direct link to stockpile needs if additional radiography capabilities were needed. In 2016, the Committee on Appropriations again stated that no funding was provided to support the construction of an advanced radiographic facility at the NNSS because NNSA did not provide cost, scope, and schedule for the project to show it was being carried out in accordance with Department Order 413.3B. NNSA was directed to provide a project data sheet for the major items of equipment in the ECSE and to commission a JASON Defense Advisory Panel to investigate the need for new radiographic facilities. Further, NNSA was directed to improve its justification for the mission needs of this new capability. The JASON report, issued in 2016, agreed that a gap existed in the current capabilities available to carry out and diagnose such experiments, and closing this gap would reduce uncertainties in the stockpile assessment. In addition, the JASON report notes that important design options for the major item of equipment still needed be chosen, which would impact its overall size and cost. Due to the timing delays of the ASD designs, the completion of the UCEP conceptual design was not adequately planned.

Although the reaffirmation of CD-1 mainly addressed changes to Subproject 020 costs, MSTs also did not ensure that the project scope for Subproject 010 was well defined before it was baselined in March 2019. MSTs told us that not all costs were initially included in the original budget and that scope changes were made when the refuge station location was moved to another location. In July 2020, NNSA also questioned MSTs’ cost data and its staffing plans and estimates, as they identified that inappropriate costs were included. In its response to NNSA in September 2020, MSTs acknowledged that the budget established for project management included in the Subproject 010 performance measurement baseline was understated and Subproject 010’s project management costs were expected to significantly exceed the baseline budget. MSTs officials informed us and NNSA that UCEP did not have a core team for managing a line-item project, and the baseline on Subproject 010 was not fully developed, which caused Subproject 010 to go over budget. Although MSTs realized the budgeted work scope for Subproject 010 was underbudgeted, NNSA did not authorize a change to the cost baseline.

NNSA, NSTec, and MSTs’ designs and work scope for Subproject 020 were inadequate due to poor risk management and coordination between project stakeholders (i.e., NNSA, NSTec, MSTs, Los Alamos National Laboratory, and the ASD contractor). According to Department Order 413.3B, risk management is an essential element of every project and should be started early in the project and documented in the risk register. Further, Department Order 413.3B requires detailed risk assessments that identify critical technical, performance, schedule, and cost risks. When risks are identified and prioritized, risk mitigation strategies and actions must also be developed and documented in a risk register.

Design risks were identified with ASD and UCEP as early as 2016; however, we were unable to review risk register documentation showing how those risks were mitigated. The Department's Office of Project Management Oversight and Assessments' 2016 Independent Cost Review notes that the risk associated with the development of UCEP, in advance of the design of the major item of equipment accelerator project, were well understood and accounted for in the risk register. Further, in September 2016, an independent subject-matter expert recommended that the project team consider the risk associated with any significant change in the linac design (e.g., ASD) that might drive an increase in electrical power or cooling requirements. Despite their admission of identified risks in 2016, under the prior contractor, NSTec, neither NNSA nor MSTs officials could demonstrate that these risks were documented in a risk register and addressed through corrective actions because they could not provide risk registers prior to September 2018. It appears that the previously identified risks with cooling and power requirements in 2016 were not managed correctly and not mitigated, as these issues eventually led to the CD-1 reaffirmation in 2021. Further, changes to those requirements ultimately impacted the UCEP total cost estimate in 2020. Since earlier risk register documents were not maintained by NNSA after the transition of contractor and Federal employees, NNSA was unable to provide documentation to show the appropriateness of actions, if any, taken by NNSA or MSTs to mitigate risks during the planning phase of the project. Department Order 243.1B, *Records Management Program*, requires that records be stored in a manner that ensures ease of access, retrieval, and control. Furthermore, Department Order 243.1B and MSTs' Company Directive, *Records Management Program*, require a records transfer process to ensure access to records by a successor contractor or employee. Although NNSA has maintained its risk register since 2019, it is important to emphasize that record management is an integral part of effective project management and involves managing a record through its entire life cycle. Also, using project management tools such as the risk register are meant to assist in controlling project costs and schedules. As a result, once risks are identified, risk mitigation strategies should be documented and maintained in a way that allows them to be located and reviewed at any time.

Department Order 413.3B also states that the Department's framework for successful project execution is effective communication among all project stakeholders. We found that poor communication between stakeholders and not mitigating risks resulted in ineffective project management execution. According to an NNSA official, poor communication between the stakeholders was one reason why the complete set of requirements were not established during the UCEP conceptual design. The same official stated that when NNSA figured out that there was poor communication of requirements between UCEP and the ASD project, Subcritical Experiments Program, and the U1a Complex, it formalized the communication process. The ECSE Technical Change Control Board was established to make decisions on proposed technical changes to the projects associated with ECSE; however, this was not established until December 2019. An MSTs official also told us that there was poor communication between the project stakeholders. This same official added that the prior MSTs project team made management assumptions and decisions in the early phase of the project that did not appear reasonable and opined that the subject-matter experts should have been consulted for input.

Department Order 413.3B states that projects with several sub-systems may have design reviews completed at various points in time; however, design reviews should be conducted for all projects and involve a formalized, structured approach to ensure the reviews are comprehensive,

objective, professional, and documented. According to NNSA, the UCEP conceptual design review was conducted by a team from the national laboratories and NSTec. Although this review team did identify issues with power and cooling, NNSA reported that nothing was done to address prior comment dispositions. Specifically, a 60 percent design review conducted by MSTs in July 2020 notes that the 30 percent design review comments could not be addressed. The report further states that the original plan was to document the 30 percent design comment dispositions in the 60 percent design review, but this was not always possible due to significant changes that occurred after the 30 percent design review.

The decision to sequence UCEP and ASD activities in such a manner was based on several factors, including lack of support for ASD from Congress and NNSA's determination that it would need UCEP first since it was the facility that would house ASD. Department Order 413.3B encourages breaking large projects into multiple, smaller, discrete, usable projects that collectively meet the mission need. However, it also states that project phases should not impede one another, and well-defined projects should be executed first. Department Order 413.3B states that projects shall develop and maintain an Integrated Master Schedule (IMS). The IMS shall be developed, maintained, and documented in a manner consistent with methods and best practices identified in the Planning and Scheduling Excellence Guide, published by the National Defense Industrial Association, as well as the United States Government Accountability Office's (GAO) Schedule Assessment Guide, *Best Practices for Project Schedules* (GAO-16-89G). GAO's Schedule Assessment Guide states, "The schedule should be planned so that critical program dates can be met. To do this, activities must be logically sequenced and linked—that is, listed in the order in which they are to be carried out and joined with logic."

NNSA did not ensure that the UCEP project team established an IMS during the 2016 and 2017 timeframe, which would have been helpful in managing two separate projects. According to GAO's Schedule Assessment Guide, an IMS constitutes a program schedule that includes the entire scope of effort, including the effort necessary from all the stakeholders. The IMS connects all the scheduled work in a logically linked sequence of activities. If the schedule is not dynamic, then it will be unable to identify the consequences of changes or possible managerial action to respond to them. While MSTs is designing UCEP, the ASD design is being completed by Los Alamos National Laboratory's contractor with input from MSTs, Lawrence Livermore National Laboratory, and Sandia National Laboratories. NNSA officials and the two contractors did not take a holistic approach or strategy to coordinate the key requirements such as power, cooling, fire protection, and ancillary systems. Coordinating the design requirements could have improved the management of the overall UCEP and its budget. According to an MSTs official that we interviewed, the prior MSTs project team simply did not have a good integration strategy early in the project. Without clear coordination and communication, the design requirements, both projects' costs, and schedules were negatively impacted.

According to NNSA officials, an IMS for UCEP and ASD was developed through InterProject Links in 2018 and completed in 2019 with revisions continuing in 2022. The absence of an IMS at the beginning of the project in 2016 and 2017 contributed to the poor communication and design development of the two separate ECSE projects and impacted the cost and schedule. Although there is no action to take regarding the IMS for this project, we included a suggested

action to ensure that Department Order 413.3B requirements are followed to improve project management on any future projects.

### **Project Management Performance and Inadequate Deliverables**

During our review, we observed that some of MSTS' work performance and deliverables were incomplete, did not meet expectations, and required corrective actions. For example, we found that MSTS repeatedly prepared and submitted inadequate EVMS documentation in its attempts to achieve a certified EVMS. We also observed that MSTS encountered design issues as it submitted incomplete design documentation that required additional work identified by NNSA.

### **EVMS Certification Challenges**

While MSTS obtained EVMS certification prior to CD-3, as required by Department Order 413.3B, MSTS struggled with required core elements and was behind its previously scheduled certification. Department Order 413.3B requires that prior to CD-2, the contractor must implement an EVMS that is compliant with Electronic Industries Alliance-748C. Department Order 413.3B further requires a certified EVMS prior to CD-3 for all projects with a total project cost greater than \$100 million. For the last 4 years, MSTS worked to strengthen its implementation of a certified EVMS. Specifically, an MSTS official stated that since 2018, MSTS discussed with the Department's Office of Project Management Project Controls the steps necessary to achieve EVMS certification. The same MSTS official stated that MSTS conducted internal reviews in July 2019 and December 2019 to improve its EVMS process towards eventual certification. Furthermore, in support of UCEP project management and EVMS certification efforts, MSTS established a Project Execution Office and hired control account managers who were responsible for planning and executing assigned statements of work. Although the control account managers were identified as part of the control structure in the Project Execution Plan in July 2017, MSTS did not establish these additional roles to support UCEP project management and EVMS certification efforts until March 2019.

A prior Department Office of Project Management Project Controls review indicated that MSTS had taken ineffective corrective actions to address its EVMS weaknesses. Specifically, an EVMS certification review conducted by the Department from March 2021 through June 2021 disclosed that core EVMS processes were either absent or below standard. As a result, the review noted that MSTS was not in full compliance with Electronic Industries Alliance-748C and had not met Department expectations. The Department's June 2021 EVMS certification review revealed concerns that some current findings of noncompliance were a recurrence of previous issues identified, which paused the original certification review initiated in June 2020. In addition, the Department noted that the EVMS did not serve its intended purpose as a project management tool because MSTS personnel were disconnected from basic EVMS functions. Specifically, MSTS could not demonstrate that it fully understood and consistently used documented processes to perform its work and make informed decisions regarding the project. According to an NNSA official, MSTS' efforts focused on evaluating identified issues, developing root cause analyses, and identifying appropriate corrective actions to address the EVMS process and concerns with the EVMS implementation. Finally, the same NNSA official told us that MSTS submitted 190 of the 220 corrective actions for closure as of March 2022 to

meet the CD-2/3 requirement for certification at the end of May 2022. On June 7, 2022, the Office of Project Management approved certification of MSTTS' EVMS. The Office of Project Management certification letter stated that the material deficiencies previously identified in the prior reviews were adequately addressed. The letter also stated that there were residual corrective actions that remain open; however, it was noted that the cost and schedule performance had been demonstrated to be sufficiently credible and reliable for determining current cost and schedule status and forecast at completion.

Delays in obtaining EVMS certification were due, in part, to a lack of adequate and experienced MSTTS project staff. MSTTS' contract states that it shall provide the personnel necessary for designing and completing construction of capital projects. Department Order 413.3B further states that qualified staff, including contractors, must be available in sufficient numbers to accomplish all contract and project management functions. An MSTTS official informed us that the prior MSTTS project team did not have an adequate and experienced staff to take on a capital line-item project of this magnitude, which contributed to the less than adequate work performance on its EVMS efforts. The official added that the former project manager did not have capital line-item and EVMS experience and was not familiar with project management requirements. During our review, we noted that MSTTS made personnel changes to improve its project management performance. Additionally, in October 2021, recognizing that UCEP was a project larger in size and complexity than its normal mission projects, MSTTS established a Project Delivery Leadership Team, led by Jacobs Engineering, who would assign a Project Director and Project Executive to lead the UCEP team, providing the needed visibility and oversight by executive management. However, in June 2022, MSTTS named a new Project Director. For a complex, one-of-a-kind project like UCEP, it is important to ensure that the work scope is matched to the capacity and capabilities of the project team early in the project life cycle.

According to an NNSA official, the contractor was responsible for implementing and achieving certification of the EVMS. It was not NNSA's role to help MSTTS achieve a certified EVMS. MSTTS' contract required that MSTTS establish, maintain, and use a project management system, including an EVMS. Therefore, NNSA's role was to hold MSTTS accountable for implementing tasks such as establishing an EVMS and obtaining EVMS certification in accordance with Department Order 413.3B. However, according to NNSA's 2019 Site Governance Model, high-risk activities and areas with significant performance weaknesses must be evaluated to determine the necessary activity-specific oversight. Further, NNSA's Site Governance Supplemental Directive established the Site Governance Model as a system that the Federal Government and NNSA's contractor partners work within to help ensure effective mission performance and operational excellence. The Site Governance Model further states that Federal managers share responsibility and accountability for mission accomplishments and provide technical direction, when necessary, to the contractor.

The Department's Project Management Office identified repetitive findings and recommended that NNSA work with MSTTS to fully implement the EVMS in the planning and management of Subproject 020 as it proceeded through the Department Order 413.3B process. Although NNSA cannot assist the contractor in developing methods or processes to execute contract requirements, NNSA could have collaborated with MSTTS to ensure that the EVMS achieved certification and

met NNSA's mission goals in a timely manner while still preserving the Federal independence needed to function in NNSA's self-regulatory role. Per Department Order 413.3B, monthly project cost and schedule data is required to be uploaded to the Department's Project Reporting, Assessments and Progress Review (PARS II) system. PARS II is the central repository for key Department-level project information. According to a Project Management official, project data received directly from a certified EVMS provides the Department with reassurance of the data's integrity and accuracy. The information and earned value data in PARS II must accurately reflect current project status and provide acceptable forecasts to facilitate project management and decision-making processes according to Department Order 413.3B. An NNSA official told us that NNSA's role was not to direct MSTS on how to achieve EVMS certification, but to hold MSTS accountable and ensure that MSTS is implementing an EVMS. While NNSA had taken actions to hold MSTS accountable by reducing the award fee amount, the current performance evaluation process in place led us to question the reasonableness of the incentive fee reduction.

Although MSTS obtained approval for its EVMS prior to our report issuance, MSTS will need to ensure that its certified EVMS remains in full compliance. Department Order 413.3B states that the Office of Project Management Oversight and Assessments will conduct a risk-based, data-driven surveillance during the tenure of the contract, during contract extensions, or as requested by the FPD, the Program, or the Project Management Executive. In addition, MSTS is required to conduct an EVMS surveillance annually. The purpose of surveillance is to verify that a contractor's certified EVMS remains in full compliance. Consistent use of EVMS to monitor and track scope, cost, and schedule will help MSTS to maintain an EVMS compliant with Electronic Industries Alliance-748C. Since the EVMS was certified after our audit fieldwork, there is no recommended action to take for this project; however, we have included a suggested action to ensure that Department Order 413.3B requirements are followed to improve project management on any future projects.

### **Design Package Submittals**

MSTS submitted design packages that were incomplete and did not meet NNSA expectations, which adversely impacted the overall project progress. In January 2021, NNSA wrote a letter to MSTS' President expressing concerns regarding MSTS' performance on the Subproject 020 design. Specifically, NNSA stated that MSTS had been working on the UCEP design since early 2019 and submitted three major design packages for review, all of which were incomplete and did not meet expectations. According to Department Order 413.3B, complete design submittals are required at completion of established design stages. However, NNSA identified the following issues with the 60 percent and 90 percent design package submissions:

- In November 2019, a 60 percent design review found that the design did not meet expectations for preliminary design, as specified in the May 2018 NNSA Guidance Memo. For example, the fire protection design was less than 30 percent complete and MSTS did not complete the Preliminary Fire Hazards Analysis.
- In August 2020, NNSA's memorandum states that another 60 percent design review was conducted that noted documents submitted for the August review were either not

complete or not provided, and the quality of the design package did not meet the requirements for this deliverable.

- In November 2020, MSTS sent the 90 percent design package for the CD-3A work scope to NNSA for review; however, NNSA’s memorandum noted that the design work had not been completed, and MSTS had only submitted documentation for three of the five planned scopes of work. The FPD stopped the review and provided MSTS with guidance for NNSA’s expectations for a 90 percent design deliverable that included a quality control review performed by the design contractor.

In January 2021, NNSA directed MSTS to correct the design issues to ensure that future submittals resulted in high quality design deliverables that met expectations. In response, MSTS identified 13 corrective actions addressing NNSA’s concerns with its performance on the UCEP Subproject 020 design. However, the FPD informed us that MSTS did not meet NNSA’s expectations for the 90 percent design submittals, in part, because MSTS did not adequately implement those corrective actions. In addition, NNSA issued a letter with expectations for the 100 percent design and documented MSTS’ failures in meeting performance expectations on the 90 percent design. The 100 percent design was eventually completed on March 11, 2022.

According to MSTS officials we interviewed, the design package issues occurred, in part, because UCEP was a “first of a kind project” and the project team did not understand the design complexities for such a project. In September 2020, NNSA conducted a Technical Independent Project Review of UCEP Subproject 020 and identified staffing issues within the project. NNSA’s review states that an immediate increase in design staff, notably fire protection engineers, and a long-term staffing strategy for engineers, miners, and procurement specialists was needed. NNSA’s review also notes a lack of qualified, specialized design engineering support to complete the 90 percent design and final design. Further, NNSA’s review notes that MSTS experienced challenges in hiring and retaining skilled miners that resulted in schedule delays for UCEP Subproject 010. NNSA recommended that MSTS finalize a staffing strategy (e.g., engineers, miners, procurement) to support project needs with an expected completion date of January 4, 2021. However, this recommendation was not closed until January 2022, nearly 1 year later. NNSA also recommended that MSTS supply sufficient design staff to meet schedule requirements. This recommendation was to be completed by October 30, 2020; however, the recommendation was not closed until December 10, 2020.

### **Improvements to Evaluate Contractor Performance**

According to the Nevada Field Office Contracting Officer, the Nevada Field Office used the Performance Evaluation Measurement Plans (PEMPs) to evaluate MSTS’ performance instead of developing a quality assurance surveillance plan. Department of Energy Acquisition Regulation 970.1100–1, *Performance-based contracting*, requires the development of a quality assurance surveillance plan to facilitate the assessment of contractor performance and ensure the appropriateness of award fee payment. NNSA implements this requirement through NNSA’s policy NAP 540.3, *Corporate Performance Evaluation Process for Management and Operating Contractors*, which establishes a contractor performance evaluation process at NNSA. NAP 540.3 establishes and implements a uniform, corporate process for evaluation of NNSA M&O

contractors' performance that results in a documented, consistent, and fair evaluation that is aligned with the Federal Acquisition Regulation (FAR), Department of Energy Acquisition Regulation, and related DOE directives and NNSA policies. Prior to FY 2021, MSTs' PEMP included one objective to accomplish capital projects in accordance with scope, cost, and schedule baselines, but it did not always include clear goals and expectations that corresponded specifically to its performance on UCEP.

Without a defined minimum performance standard and acceptable level of performance for each of the significant activities and requirements, and due to the subjectivity inherent in the performance evaluation process, the current process can make it difficult for performance evaluators to consistently and objectively apply ratings for the contractor's performance, and to ensure that award fee payment made to the contractor was appropriate. For example, there are no specific dollar amounts or minimum performance expectations associated with the performance on UCEP. During our review of the PEMPs, we found that NNSA used professional judgment (i.e., subjective) rating categories of "Excellent," "Very Good," "Good," "Satisfactory," and "Unsatisfactory" in accordance with FAR 16.401(e)(3), *Incentive Contracts*. However, additional justifications were not documented for the final fee determination. An independent third party such as the Office of Inspector General (OIG) cannot determine the appropriateness of the fee or penalty amount without any documentation or justification regarding how UCEP delays were evaluated as part of the goal award.

We reviewed the PEMPs from FY 2018 through FY 2020 and found one objective to accomplish capital projects in accordance with scope, cost, and schedule baselines. Although not specifically identified in this objective, UCEP would have been included as a capital project. In addition, the FY 2019 PEMP had an associated key outcome—specific performance outcomes require attention from senior leadership—to advance the ECSE portfolio by achieving CD-2/3 for UCEP Subproject 010. The FY 2020 PEMP had an associated key outcome to execute UCEP, including the ECSE/ASD projects in accordance with negotiated outcomes. The PEMPs state that each objective and key outcome would be assessed against authorized work in terms of cost, schedule, and technical performance. However, the final evaluations on UCEP were assessed in aggregate with other projects and activities to determine an overall adjectival performance rating. In addition, the final evaluations did not always include key performance information. For example, the FY 2018 *Performance Evaluation Report* disclosed that MSTs continued the successful execution of capital line-item projects, but it was not evident as to how MSTs successfully executed UCEP because the *Performance Evaluation Report* did not include detailed information related to MSTs' performance regarding costs and schedule for UCEP. In FY 2019, despite the fact that UCEP was behind schedule with the potential to significantly impact the ECSE program, MSTs earned 85 percent of the award fee allocated for Goal 5, *Mission Enablement*, because the work on UCEP was assessed in aggregate with other activities under this goal.

In FY 2021, NNSA included a key performance expectation in MSTs' PEMP to plan and execute projects in accordance with scope, cost, and schedule baselines, including MSTs' assigned projects in the ECSE portfolio and UCEP. The PEMP also notes that emphasis will be placed on areas such as risk management, cost estimation, communication, quality, procurement, and cost control. Despite having detailed performance measures for FY 2021, MSTs failed to

deliver a complete quality design, which resulted in a 6-month CD-2/3 delay. Construction activities and the EVMS certification were also behind schedule. MSTS received a “Very Good” rating by NNSA for its award fee from FY 2018 through FY 2021 on the associated Goal 5<sup>2</sup>. However, NNSA was not able to provide us with supporting documentation that showed justification as to how NNSA arrived at that rating. Although award fee determination letters described that the UCEP project was delayed, was not meeting cost and schedule expectations, and MSTS was struggling to demonstrate an EVMS, there was no detailed justification as to how the award fee was reduced for these issues or any incentives to focus their efforts to complete this project, as required. The lack of detailed justification led us to question the reasonableness of the final determinations of incentive fees and related reductions.

Without the minimum expectations defined or documented justifications for any reductions, NNSA was not able to justify if the award fee was appropriate. The Nevada Field Office and NNSA Headquarters provided input to the Fee Determining Official who made the final decision on the fee amount to award MSTS. However, an NNSA official stated that there was no further documentation, other than what was in the PEMP, that allowed outside reviewers to either understand the specific oversight being conducted for each objective or how the results of that oversight were being used to evaluate the contractor’s performance against the established baselines. In addition, NNSA should have ensured that MSTS’ performance award fee corresponded to its performance on significant line-item projects to hold the contractor accountable for meeting its goals. According to NNSA officials, NNSA moved away from the use of specific performance incentives or milestones to a strategic approach so that contractors did not focus solely on specific performance incentives. Further, through the current performance evaluation approach, the contractor’s performance across the entire scope of work was measured against authorized work in terms of cost, schedule, and technical performance, as well as respective outcomes, demonstrated performance, and impact to the missions of the Department and NNSA. This approach enabled a balanced assessment that promoted and rewarded success across the entire scope of work rather than pockets of work specifically covered by individual incentives. Also, based on the supporting documentation provided, external reviewers should have been able to come to the same conclusion as NNSA in making award fee determinations to ensure that costs were reasonable. Performance evaluations that are not adequately supported may be indicative of a performance management process that functions as a post hoc justification of the award fee and do not incentivize achievement of the established goals.

GAO found similar issues with NNSA’s performance evaluations in a 2019 report, *Department of Energy: Performance Evaluations Could Better Assess Management and Operating Contractor Costs* (GAO-19-5, February 2019). Specifically, the report identifies that NNSA should develop and document clear procedures for implementing NAP-4C and specify the process for collecting contractor performance information and describing how officials are ensuring this information can be traced to rating determinations. NNSA informed GAO it issued FY 2021 Corporate Performance Evaluation Process Annual Implementation Guidance, which included a section specifying the process for collecting contractor performance information and further details regarding the preparation of interim feedback reports and final performance

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<sup>2</sup> Goal 5 was in entitled *Operations & Infrastructure* in FY 2018 and changed to *Mission Enablement* from FY 2019 through 2021.

evaluation reports. However, GAO stated that this guidance was unclear regarding how the performance information could be traced to rating determinations. GAO further stated that to provide more transparency and ensure this traceability, NNSA guidance and the Performance Evaluation Reports should more clearly link how collected performance information tracks to rating determinations. Based on GAO's assessment of NNSA's corrective actions, as of June 2022, GAO shows that this recommendation remains open until NNSA takes further actions to satisfy the recommendation's intent. Due to the significance and size of this capital line-item project (i.e., the amount of time the project has been delayed and the amount of cost range increases), NNSA should reconsider how it defines acceptable levels of minimum performance for significant activities to incentivize its contractor and to be transparent with how the award rating is determined.

Articulating specific forward-looking expectations and milestones early and often provide clarity to both contractors and oversight officials which establishes a basis for metrics and measurement when determining award fees.

In a recent OIG audit on the *Performance Management Process at the Idaho National Laboratory*, the OIG identified that the performance management process in place at the Idaho National Laboratory did not provide reasonable assurance that award fees correlated with contractor performance. Without adequate documentation and a defined performance standard, the Idaho Operations Office was not able to support the contractor's performance score and associated award fee. Utilizing foundational documents such as the PEMP, as the Department intended, can result in relevant and supportable performance evaluations. Further, the feedback the Department provides can help build a strong, accountable, and more effective contractor corps across the entire Department. Supporting effective performance management requires a culture of commitment to strong oversight that includes periodic meetings with stakeholders, articulation of forward-looking expectations and milestones, and does not permit evaluations to function in a post hoc manner. In support of that culture, future OIG audits of performance awards will analyze supporting documentation and evaluations to determine if the award fees were reasonable and question any costs that are not fully supported or determined to be unreasonable.

### **Improvements to Cost and Schedule Estimates**

In 2012, NNSA established an Office of Acquisition and Project Management to focus on construction projects' delivery and acquisition improvements. According to NNSA's website, "...modeled after the Department of Defense and industry practices, the office provides the NNSA Administrator, Program, and Field Offices independent counsel to ensure NNSA implements federal acquisition and project management policies and regulations." In 2019, NNSA also established a Programming, Analysis, and Evaluation group within its Office of Management and Budget, to provide direct support to field offices in developing project cost estimates. This group has access to data from other NNSA sites and projects to produce cost estimates based on trends and input from other NNSA projects. According to an NNSA official, this group was created in 2019 after the initial planning for UCEP took place; therefore, the UCEP project team was not able to use this group's input and analyses in developing initial cost

estimates. However, another NNSA official stated that the predecessor office to this group contributed to the initial cost estimating efforts of UCEP.

In 2014, through the National Defense Authorization Act for Fiscal Year 2014, Congress directed the establishment of NNSA's Office of Cost Estimating and Program Evaluation. This group performs independent cost estimates on major acquisitions and life extension programs, conducts program reviews, and coordinates with the Department of Defense on budget matters. However, the group was limited in conducting cost estimates on capital asset acquisition projects prior to FY 2020 following legislative changes under the John S. McCain National Defense Authorization Act for Fiscal Year 2019.

As mentioned previously, Congress has repeatedly expressed concerns regarding NNSA's estimates for major line-item projects and budget requests. In May 2018, the Senate's Committee on Appropriations stated that it was concerned about NNSA's ability to properly estimate costs and timelines for large projects. NNSA was encouraged to assess its current performance on projects costing more than \$750 million and make appropriate project management changes. The Committee encouraged NNSA to identify problems in cost and schedule estimates early and provide updated information to the Committees on Appropriations in both Houses of Congress in a timely manner. In July 2020, the House of Representatives Committee on Appropriations again notes in the *Energy and Water Development and Related Agencies Appropriations Bill, 2021*, that it was concerned with recent cost increases and the acquisition approach for the ECSE, and requested NNSA report the status of the ECSE and the updated performance baseline no later than 60 days after the enactment of the Consolidated Appropriations Act of 2021.

In another recently issued GAO report, *High-Risk Series: Key Practices to Successfully Address High-Risk Areas and Remove Them from the List* (GAO-22-105184, March 2022), GAO recognizes NNSA's efforts in establishing the Cost Estimating and Program Evaluation group and conducting independent cost estimates and evaluating performance baselines. GAO reports that the Department has made progress in managing its contracts and projects, but still has room to improve. Specifically, GAO states that NNSA could improve its monitoring efforts since it has not developed a full set of program management tools to monitor schedule performance for some program activities, as required by its program execution guidance. Based on prior GAO reports from 2019 through 2021, the project management tools NNSA needed included developing integrated schedules, providing adequate oversight of the work by M&O contractors, and monitoring schedule performance for some program activities.

Many of the issues identified in this report are similar to prior issues identified in GAO and Congressional reports. We recognize that NNSA has made efforts to improve its project management; however, improvements are still needed, especially regarding cost estimating. Public Law 111-23, Weapon Systems Acquisition Reform Act of 2009, is a resource that identifies several Department of Defense requirements to provide accurate information and realistic cost estimates. These requirements should be considered by NNSA as best practices to improve its cost and schedule estimates. For example, Public Law 111-23 states that a senior official should be responsible for advising acquisition officials on performance issues that may arise and conducting performance assessments and root cause analyses. Root cause analyses,

under Public Law 111–23, § 103(d), *Root Cause Analyses*, are assessments of the underlying cause or causes of shortcomings in cost, schedule, or performance of the program if, for example, there is an unanticipated design or poor performance by the Government or contractor personnel responsible for program management. This definition of root cause analyses is also included in Department Order 413.3B, citing 50 United States Code § 2753(c)(3), *Notification of cost overruns for certain Department of Energy projects*, for approved baseline deviations. In addition, under 10 United States Code § 2433(a), *Critical cost growth in major defense acquisition programs*, when there is critical cost growth increase with a major defense acquisition program, the root cause or causes of the cost growth should be determined along with an assessment by the program of the projected costs needed for completion.

According to an NNSA official, when MSTS reaffirmed its cost range estimates for CD-1, a root cause analysis was not conducted. As part of the reaffirmation process for CD-1, NNSA, in coordination with the Project Management Executive, must reassess the alternative selection process and the Project Management Executive must approve a revised CD-1 identifying the new or reaffirmed selected alternative and an updated CD-1 cost range. A Department Office of Project Management official stated that this reassessment process would share many similarities with a root cause analysis, including the need to identify and understand the drivers behind the cost growth. Department Order 413.3B states that the Program Office is required to conduct an independent and objective root cause analysis to determine the underlying contributing causes of cost overruns, schedule delays, and performance shortcomings; however, this requirement is for managing performance baseline deviations (after an approved CD-2). NNSA’s Office of Programming, Analysis, and Evaluation conducted a root cause analysis of NNSA construction projects, which included the ESCE project; however, this analysis was conducted after the CD-1 reaffirmation.

Moreover, in a recent news article, an MSTS official stated that an independent cost estimate for UCEP was started to review the project’s costs and schedule, as a precursor to achieving the CD-2/3 milestone. Department Order 413.3B requires that the Department’s Project Management Office conduct a review of the cost estimate prior to CD-2 for projects greater than \$100 million.

## **INCREASED RISK TO THE STOCKPILE LIFE EXTENSION PROGRAM**

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NNSA considers the ECSE a critical and required national capability that is not currently available to the Stockpile Stewardship Program. The Stockpile Stewardship Program has the responsibility to assess the effects of aging and other issues affecting the certification of the current and future stockpile. Although NNSA had taken several actions to hold MSTS accountable for lack of performance, the project continues to experience budget and schedule overruns. NNSA’s current performance evaluation process and the justification for award fees should be improved to ensure contractors are rewarded or penalized for their performance and incentivized for future efforts. Because the NNSM M&O contractor will be performing mission requirements that rely on this facility for decades to come, it also has a vested interest in successful project completion. Without the data provided by the ECSE capabilities, NNSA and the Nation would be accepting increased risk in the ability to adequately certify the stockpile.

## RECOMMENDATIONS

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Based on the issues noted in this report, to help enhance project management procedures, and to improve project performance at NNSA sites, including the NNSS, we recommend that the Associate Administrator for Infrastructure:

1. Ensure contractors regularly monitor and adjust staffing plans for each project to ensure that experienced and adequate staff are in place to complete projects in a timely manner.
2. Define minimum standards and acceptable levels of performance for each significant activity, such as line-item projects, allowing evaluators to consistently apply performance ratings and document the reasonableness of award justifications in final evaluations.

We also recommend that the Director, Office of Project Management:

3. Update Department Order 413.3B to ensure lessons learned are captured during the reassessment of a selected alternative (CD-1 reaffirmation) and uploaded in the Operating Experience database (i.e., OPEXShare), the Department's corporate lessons learned database.

Finally, we suggest that the Associate Administrator for Infrastructure also encourage the reinforcement of the following, early in the project life cycle, to promote effective project management:

4. The use of risk mitigation strategies and actions are documented and maintained throughout the project in accordance with Department Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, and maintained in accordance with Department Order 243.1B, *Records Management Program*.
5. The need for communication and a formalized approach to coordinate multiple projects.
6. The consistent use of project management tools and best practices to meet project expectations and goals with certified data (e.g., IMS and EVMS).

## MANAGEMENT RESPONSE

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NNSA concurred in principle with Recommendations 1 and 2. Specifically, for:

- Recommendation 1, NNSA asserted that the contractor developed staffing plans for UCEP prior to CD-1 in August 2017. NNSA stated that it subsequently identified staffing challenges on the project and directed the contractor to develop an executable long-term staffing strategy. Additionally, NNSA stated that the FPD developed a staffing plan consisting of direct/matrixed Federal personnel and support service contractors to ensure sufficient Federal oversight. Staffing plans are reviewed routinely and updated by NNSA and the contractor, as necessary, to reflect progress. NNSA considered this

recommendation closed based on continuous monitoring of contractor and Federal staffing levels.

- Recommendation 2, NNSA asserted that it has a strong, descriptive process for evaluating contractor performance to achieve justifiable rating determinations. Specifically, NNSA stated that it uses defined adjectival ratings and associated descriptions as required by FAR 16.401(e)(3) and FAR 42.15 when determining award fee and contractor performance. Additionally, NNSA stated that line-item project performance is overseen by the FPD through Headquarters monthly project reviews, and milestone or annual peer reviews. This information is used to assess annual performance. Depending on a project (size, complexity, impact, etc.), the project's acceptable performance for final evaluations is evaluated in several ways. Furthermore, NNSA stated that while the contractor performance evaluation process is consistent with applicable requirements, NNSA will consider whether more detailed guidance should be provided to performance evaluators on the sources of information to be used for evaluating performance objectives and writing performance evaluations to provide more traceability to those sources. NNSA estimated the completion date for this action is December 31, 2023.

The Office of Project Management fully concurred with Recommendation 3, stating that it will add language to Department Order 413.3B to require the capture of lessons learned during the reassessment of a selected alternative and uploaded in OPEXShare. The estimated completion date is April 28, 2023.

Management comments are included in Appendix 3.

## **AUDITOR COMMENTS**

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The proposed actions by NNSA were responsive to our recommendations, and we agree with the actions to be taken. We commend NNSA for identifying staffing challenges and directing the contractor to develop an executable long-term staffing strategy. We conclude that continuous monitoring of contractor and Federal staffing levels will help improve project performance on UCEP. However, to help enhance project management on future projects, we encourage NNSA and NNSS management to focus on the early project planning process to establish properly resourced and appropriately skilled staff at a project's inception. Initial staffing plans should be well planned and address the skills and positions needed to manage the project.

Regarding Recommendation 2, we agree with the comment received from NNSA, and its planned actions meet the intent of the recommendation. We are encouraged that NNSA is considering whether more detailed guidance should be provided to performance evaluators on the sources of information used for evaluating performance objectives and writing performance evaluations to provide more traceability to those sources. Through the current performance evaluation approach, MSTs' performance on UCEP is assessed in aggregate with other projects and activities to determine an overall adjectival performance rating and fee earned. However, the adjectival performance rating is not supported by any documentation or justification regarding how the UCEP ratings were evaluated as part of the overall award. The current

practice does not allow external reviewers to understand the basis used by NNSA in determining the award fees correlated with contractor performance. It is critical for management to be able to justify its assessment of contractor performance to protect taxpayer dollars and support any fees paid to the contractor.

Finally, we agree with the comment received from the Office of Project Management, and its planned action meets the intent of the recommendation.

## **Appendix 1: Objective, Scope, and Methodology**

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### **OBJECTIVE**

We initiated this audit to assess the project management of the U1a Complex Enhancements Project.

### **SCOPE**

The audit was performed from February 2021 through April 2022 at the Nevada Field Office and Mission Support and Test Services, LLC (MSTS) offices located in North Las Vegas, Nevada. The audit scope included activities pertinent to the management of the U1a Complex Enhancements Project from fiscal year 2014 through fiscal year 2021. All information was obtained via remote access techniques. The audit was conducted under Office of Inspector General project number A21LV003.

### **METHODOLOGY**

To accomplish our audit objective, we:

- Reviewed applicable Federal laws and regulations, Department of Energy and National Nuclear Security Administration (NNSA) policies, and MSTS contract provisions related to project management;
- Interviewed key Department, NNSA, and Contractor officials;
- Reviewed reports related to the Office of Inspector General, Government Accountability Office, the Department, and NNSA;
- Reviewed contractor reviews, self-assessments, and external reviews; and
- Reviewed various project-related documents such as NNSA's letter to MSTS regarding poor project management performance; MSTS Corrective Action documents relating to the recommendations from the Annual Peer Reviews from 2018 and 2020; and Subproject 010 and 020 Monthly Project Reviews to review the status of the project costs and schedule, lessons learned, and project delays.

We conducted this performance audit 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 objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. We assessed internal controls and compliance with laws and regulations necessary to satisfy the audit objective. In particular, we assessed the control environment component and underlying principles of establishment of structure, responsibility, and authority. We assessed the risk assessment component and the underlying principles of identifying, analyzing, and responding to risks. We also assessed control activities and the underlying principles of implementing policies and procedures. Finally, we assessed the monitoring component and underlying principles of performance of

## **Appendix 1: Objective, Scope, and Methodology**

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monitoring activities. However, because our review was limited to these internal control components and underlying principles, it may not have disclosed all internal control deficiencies that may have existed at the time of this audit. We assessed the reliability of data received as we: (1) reviewed related documentation, and (2) interviewed MSTs officials knowledgeable about the data. We determined that the data were sufficiently reliable for the describing the status of the project.

NNSA and Office of Project Management officials waived an exit conference on November 16 and November 17, 2022, respectively.

## Appendix 2: Related Reports

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### Office of Inspector General

- Audit Report on [\*Radioactive Liquid Waste Treatment Facility Replacement Project at Los Alamos National Laboratory\*](#) (DOE-OIG-19-20, March 2019). The audit found that despite the National Nuclear Security Administration's (NNSA) adequate oversight in the areas of improving project execution, and correcting cost and schedule overruns for the low-level waste and transuranic liquid waste projects, Los Alamos National Security, LLC (LANS) continued to experience significant problems in the design process, construction quality, and subcontractor management of the low-level waste project; and design phase of the transuranic liquid waste project. Notably, LANS slipped 7 months behind an NNSA-approved revision to the low-level waste project baseline. These conditions occurred in part, because LANS lacked a consistent method of analyzing and addressing project management lessons learned. Further, LANS did not effectively incorporate lessons learned from prior capital asset projects into the planning and execution of subsequent capital asset projects. These problems in project execution continued despite NNSA's repeated attempts to direct change and hold LANS accountable. In addition, the *Capital Projects Assessment* issued in November 2016, demonstrated that LANS had a pattern of weak capital asset project execution, with specific systemic issues in subcontractor bidding, selection, and management.
- Audit Report on [\*The Sandia National Laboratories Silicon Fabrication Revitalization Effort\*](#) (DOE-OIG-18-42, August 2018). The audit found that Sandia National Laboratories (Sandia) had managed the Sandia Silicon Fabrication Revitalization (SSiFR) project scope within the planned cost and schedule, but NNSA did not require Sandia to execute the project within Department of Energy requirements. The audit identified issues that, if corrected, should improve Sandia's management of SSiFR and NNSA's oversight of SSiFR. The audit noted that Sandia had not generated reliable, accurate, and reasonable earned value data related to cost and completion estimates for managing SSiFR; employed an Earned Value Management System certified by the Department as compliant with established standards; included NNSA in the baseline change approval process; and established management reserve based on a formal risk analysis, and instead, determined management reserve as a percentage of remaining project costs. These conditions occurred because NNSA Safety, Infrastructure, and Operations, the organization originally overseeing the SSiFR project, did not require Sandia to manage the SSiFR project in accordance with Department Order 413.3B.
- Audit Report on [\*Management of the National Ignition Facility and the Advanced Radiographic Capability\*](#) (DOE-OIG-18-04, October 2017). The audit found that while Lawrence Livermore National Laboratory has generally been successful in managing the National Ignition Facility to address NNSA, Department, and external needs, Lawrence Livermore National Laboratory had not effectively managed the development and installation of the Advanced Radiographic Capability, a key National Ignition Facility diagnostic tool. Specifically, the Advanced Radiographic Capability was completed 5 years behind schedule, over budget, and with only half of the originally planned capability. The shortcomings in the Advanced Radiographic Capability's schedule, cost, and scope occurred because NNSA did not ensure Lawrence Livermore National

## Appendix 2: Related Reports

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Laboratory managed the Advanced Radiographic Capability as a separate project under Department Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*.

- Audit Report on [\*Department of Energy Contractors' Implementation of Earned Value Management\*](#) (OAI-L-17-03, November 2016). The audit disclosed that the Office of Project Management Oversight and Assessments has identified deficiencies with the contractors implementing Earned Value Management (EVM). During the audit, the Office of Inspector General observed that reviews of some contractors' EVM systems were delayed; however, the Office of Project Management Oversight and Assessments was taking corrective actions. For example, two contractors did not have certified EVM systems because their EVM systems were deemed significantly noncompliant with Electronic Industries Alliance-748 based on reviews for cause; and despite having certified systems, two contractors were reporting what is potentially incomplete and unreliable EVM data to the Department.
- Special Report on [\*NNSA's Management of the \\$245 Million Nuclear Materials Safeguards and Security Upgrades Project Phase II at Los Alamos National Laboratory\*](#) (DOE/IG-0901, January 2014). To address aging security infrastructure, NNSA upgraded the security at Los Alamos National Laboratory's Technical Area-55 through the Nuclear Materials Safeguards and Security Upgrades Project—Phase II. The audit revealed that the Project suffered from a number of project management weaknesses. These weaknesses included failures to ensure that work scope was fully and accurately planned or that construction subcontractors were required to promptly correct inferior work. These issues ultimately resulted in cost increases of as much as \$41 million and delayed completion of the project by nearly a year. In addition, management information systems failed to provide accurate and complete information about the funds available to complete the remaining work scope. These project management issues created a series of problems that collectively resulted in significant unanticipated cost and schedule impacts. NNSA had taken a number of positive actions to hold Los Alamos National Laboratory accountable for lack of performance; however, project management concerns remain despite these actions.

### Government Accountability Office

- High-Risk Series: [\*Key Practices to Successfully Address High-Risk Areas and Remove Them from the List\*](#), (GAO-22-105184, March 2022). The United States Government Accountability Office (GAO) recognized NNSA's efforts in establishing the Cost Estimating and Program Evaluation group and conducting independent cost estimates and evaluating performance baselines. GAO reported that the Department has made progress in managing its contracts and projects, but it still has room to improve. Specifically, GAO stated that NNSA could improve its monitoring efforts, as NNSA had not developed a full set of project management tools to monitor schedule performance for some program activities, as required by its program execution guidance.

## Appendix 2: Related Reports

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- High Risk Series: [\*Dedicated Leadership Needed to Address Limited Progress in Most High-Risk Areas\*](#) (GAO-21-119SP, March 2021). GAO designated the Department's contract and project management as a high-risk area. Since 2019, NNSA has improved its capacity to manage contracts and projects. However, NNSA needs to improve oversight of contractors and incorporate program and project management best practices. NNSA does not have a process to determine the number of acquisition professionals it needs to award and oversee contracts. An April 2020 NNSA internal review found that NNSA had inadequately resourced program offices to oversee two activities. NNSA monitors contractor performance against cost and schedule baselines monthly for its capital asset construction projects and quarterly for certain programs. However, NNSA has not yet developed a full set of program management tools to monitor schedule performance for some program activities. Similarly, in September 2020, GAO reported that NNSA had not yet completed a program management tool to manage and monitor an integrated schedule for multiple plutonium projects and its supporting program. NNSA has improved its cost estimates for projects and programs but continues to face challenges with its schedule estimates and analyses of alternatives. As of December 2020, 57 recommendations related to this high-risk area remain open, 21 of which were made since the last high-risk report in March 2019.
- High Risk Series: [\*Substantial Efforts Needed to Achieve Greater Progress on High-Risk Areas\*](#) (GAO-19-157SP, March 2019). The GAO designated the Department's contract and project management as a high-risk area. The GAO report disclosed that in August 2018, a statutorily required internal review of NNSA's capacity identified unmet critical staffing needs. In addition, in June 2018, an Office of Personnel Management study found that the agency was understaffed across all functions. In recent years, NNSA has increased the number of oversight staff in some of its major project management offices. The GAO report also disclosed that NNSA's cost estimates for a new uranium enrichment capability did not fully meet best practices. Also, while NNSA has taken steps to implement statutorily required common financial reporting across the nuclear security enterprise, the GAO found in January 2019 that NNSA's plan for this effort does not follow leading project management practices including having a detailed schedule and budget for implementing the project.

## Appendix 3: Management Comments



Department of Energy  
Under Secretary for Nuclear Security  
Administrator, National Nuclear Security Administration  
Washington, DC 20585



October 28, 2022

MEMORANDUM FOR TERI L. DONALDSON  
INSPECTOR GENERAL  
OFFICE OF THE INSPECTOR GENERAL

FROM:

JILL HRUBY

A handwritten signature in black ink, appearing to read "Jill Hruby".

SUBJECT:

Response to the Office of Inspector General Draft Report *U1a Complex Enhancements Project* (A21LV003)

Thank you for the opportunity to review and comment on the subject draft report. The U1a Complex Enhancements Project (UCEP), like many National Nuclear Security Administration (NNSA) line-item construction projects, is a technically complex, one-of-a-kind project necessary to support NNSA's stockpile stewardship program. NNSA acknowledges the inherent challenges involved in planning and executing these types of projects and has made strides in addressing these challenges and improving project performance over the last several years. Notably, the Government Accountability Office has removed NNSA from its High-Risk List for projects under \$750 million like UCEP and have maintained that view in its biennial reports since 2013.

NNSA appreciates the auditors' independent review of the UCEP project. The report highlights a number of prior project challenges identified by NNSA project management teams and the effective corrective actions taken prior to the audit to enhance management of these critical activities. NNSA will continue to reinforce these positive actions, consistent with the report's suggestions. The attached management decision provides detailed responses to the OIG recommendations. Our subject matter experts have also provided technical comments under separate cover for the auditors' consideration to enhance the accuracy and clarity of the report. If you have any questions regarding this response, please contact Mr. Dean Childs, Director, Audits and Internal Affairs, at (202) 836-3327.

Attachment

**NATIONAL NUCLEAR SECURITY ADMINISTRATION**  
**Management Decision**

*U1a Complex Enhancements Project (A21LV003)*

The Office of Inspector General (OIG) recommended that the National Nuclear Security Administration (NNSA):

**Recommendation 1:** Ensure contractors regularly monitor and adjust staffing plans for each project to ensure that experienced and adequate staff are in place to complete projects in a timely manner.

*Management Response:* Concur in Principle. The contractor developed staffing plans for the U1a Complex Enhancements Project (UCEP) prior to Critical Decision-1 (CD-1) in August 2017. As noted in the audit report, NNSA subsequently identified staffing challenges on the project and directed the contractor to develop an executable long-term staffing strategy. The Federal Project Director also developed a staffing plan consisting of direct/matrixed Federal personnel and support service contractors to ensure sufficient Federal oversight. Staffing plans are reviewed routinely and updated by NNSA and the contractor as necessary to reflect progress. NNSA considers this recommendation closed based on continuous monitoring of contractor and Federal staffing levels.

**Recommendation 2:** Define minimum standards and acceptable levels of performance for each significant activity, such as line-item projects, allowing evaluators to consistently apply performance ratings and document the reasonableness of award justifications in final evaluations.

*Management Response:* Concur in Principle. NNSA has a strong, descriptive process for evaluating contractor performance to achieve justifiable rating determinations. As required by Federal Acquisition Regulation (FAR) 16.401(e)(3) and FAR 42.15, NNSA uses defined adjectival ratings (Excellent; Very Good; etc.) and associated descriptions when determining award fee and contractor performance. With respect to award fee, the FAR also states that “the amount of award fee earned shall be commensurate with the contractor’s *overall* [emphasis added] cost, schedule, and technical performance...” Management and operating contracts are very large, with expansive and diverse work scopes. Successful performance requires significant planning and integration of the workforce to complete all required work.

In addition, line-item project performance is overseen by the Federal Project Director, via Headquarters monthly project reviews, and through milestone or annual peer reviews. These projects are monitored and rated using quantitative measurements defined in the Project Execution Plan, principally via the Department’s earned value management system of record to gauge project performance and is reported in the Project Assessment and Reporting System (PARS). Performance on infrastructure modernization projects (below the PARS reporting threshold) are captured through similar, contractually required quantitative analysis processes and procedures, which are reported regularly via the G2 system.

This information is used to assess annual performance via the Federal Contractor Performance Assessment Reporting System and the NNSA-specific Performance Evaluation Report system to determine fee award, if applicable. Depending on a project's size, complexity, impact, integration with other operations, and stage of development, the project's acceptable performance for final evaluations is evaluated in the following ways:

- **Mission Enablement:** Used for smaller projects that are closely integrated with ongoing operations or without a notable milestone during the year, as well as for the area planning and infrastructure inventory management portfolios of infrastructure modernization projects.
- **Key Outcome:** Used when a project is intended to meet a critical decision during the year and provides a specific milestone and timing (typically a fiscal quarter) for achievement.
- **Subordinate Contract Line Item:** Used in major projects where fee incentives and measurements distinct from the parent contract are beneficial.

On schedule and on budget performance, measured against the approved baseline or critical decision plan, is the principal standard for acceptable performance. This provides a consistent and transparent standard across sites and projects to gauge mission impact. For projects with a critical decision milestone in the reporting year, especially when using a Key Outcome or Subordinate Contract Line Item, objective evaluation is straightforward. Quantitative data from the cost performance index, schedule performance index, or a variety of other standard metrics is also used for objective performance evaluations.

While the NNSA contractor performance evaluation process is consistent with applicable requirements, NNSA will consider whether more detailed guidance should be provided to performance evaluators on the sources of information used for evaluating performance objectives and writing performance evaluations to provide more traceability to those sources. The estimated completion date is December 31, 2023.

The OIG also recommended that the Department of Energy's Office of Project Management:

**Recommendation 3:** Update Department Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, to ensure lessons learned are captured during the reassessment of a selected alternative (CD-I reaffirmation) and uploaded in the Operating Experience database (OPEXShare), the Department's corporate lessons learned database.

*Management Response:* Concur. The Office of Project Management will add language to DOE Order 413.3B to require the capture of lessons learned during the reassessment of a selected alternative and uploaded in OPEXShare. The estimated completion date is April 28, 2023.

## FEEDBACK

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