



National Nuclear Security
Administration

Mission Support and
Test Services, LLC

Performance Evaluation
Report (PER)

NNSA Nevada Field Office (NFO)

Evaluation Period:
October 1, 2021 - September 30,
2022

December 15, 2022

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Department of Energy review required before public release.

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Date: 10-12-2022

Guidance: Department of Energy National Nuclear Security
Administration review required before public release

Executive Summary

This Performance Evaluation Report (PER) provides the National Nuclear Security Administration (NNSA) assessment of Mission Support and Test Services, LLC's (MSTS) performance of the contract requirements for the period of October 1, 2021 to September 30, 2022, as evaluated against the established Performance Evaluation and Measurement Plan (PEMP).

Pursuant to the terms and conditions of the Contract, the PEMP sets forth the criteria by which NNSA evaluates MSTS' performance, as required by Federal Acquisition Regulation (FAR) Part 16.4, which outlines expectations for administering award-fee type incentive contracts. This is the type of contract in place between NNSA and its management and operating (M&O) partners. A key requirement of FAR Part 16 is to establish a plan that identifies award-fee evaluation criteria and "how they are linked to acquisition objectives which shall be defined in terms of contract cost, schedule, and technical performance."

In accordance with the regulation, the PER assesses MSTS' performance against the PEMP and provides the basis for determining the amount of award fee earned by MSTS. The NNSA took into consideration the dynamic work environment, COVID-19 impacts with operational restrictions, and all input (e.g., Contractor Assurance Program (CAS), Program Reviews, etc.) obtained from NNSA Program and Functional Offices both at Headquarters and in the field.

MSTS earned an overall rating of Very Good during this performance period. MSTS' commitments to the NNSA continued from FY 2021 for increasing operational cadence on experiments, enhancing capabilities to execute an expanded program portfolio, improving project management, and significantly improving the Nevada National Security Site (NNSS) infrastructure. Specific observations for each Goal are summarized below.

Goal 1: Mission Execution: Nuclear Weapons

MSTS Amount of At-Risk Fee Allocation: \$ 7,853,471

MSTS exceeded many of the Goal 1 Objectives earning a rating of Very Good and 90 percent of the award fee allocated to this goal, as evidenced by accomplishments that greatly outweighed issues with no significant issues in performance. MSTS met performance expectations within expected costs. MSTS completed all assigned Science/Stockpile and Infrastructure National Level 2 milestones for work within their control, as well as generally met overall cost, schedule, and technical performance requirements in aggregate for this goal.

MSTS successfully led a complex, coordinated exercise to test operational technology sensors and detection equipment. MSTS also provided logistics, coordination, planning and execution for four Operational Resiliency Regimen courses.

MSTS continued installation of new timing and firing systems, diagnostics, and imaging equipment for Flash X-ray Capability for high explosives experiments at Big Explosives Experimental Facility (BEEF) in support of Defense Programs' Life Extension Programs. MSTS procured a new assembly

ARMAG for classified operations at BEEF providing space for sensitive components and high explosives storage. MSTs also expanded the NNSS Machine Shop capability to meet special tooling demands for weapon modernization and stockpile risk-reduction initiatives. MSTs played a leadership role, particularly for communications across design and production agencies, for the Agile Processes and Technologies program. MSTs continued to be a key player in the Joint Technology Demonstrator project, Strategic Advisory Group of Executives and supported the development of the Enterprise Programmatic Infrastructure Capability visualization tool. MSTs also completed executive prioritization, onsite analysis, and briefings for Operational Technology Assurance NNSS Site Priority.

MSTs successfully completed planning and execution of numerous stockpile stewardship and stockpile management experiments, including supporting four Subcritical Experiment (SCE) series; continued development, implementation, and expansion of cutting-edge diagnostics; continued collaboration with the National Security Enterprise Laboratories (NSEL); and effectively managed multiple mission priorities/activities at the U1a Complex, Joint Actinide Shock Physics Experimental Research (JASPER) facility, Device Assembly Facility (DAF), BEEF, and the Dense Plasma Focus (DPF) Facility. MSTs continues to execute the Capabilities Based Investments (CBI) project portfolio in accordance with the 2022 CBI Implementation Plan and Site Execution Plan which upgrades capabilities for future SCEs. MSTs successfully completed construction of prototype racks at Radiological/Nuclear Countermeasures Test and Evaluation Complex for the Enhanced Staging Program, completed the U1a hoist outage and screen room air-conditioning repairs, completed installation of the tritium fume hood in Area 11 and completed installation of the Hard X-Ray Synchrotron Radiation Source Project. Supply chain challenges and delayed receipt of procurements presented challenges to multiple projects and programs. Issues identified during the fiscal year were proactively resolved.

MSTs provided excellent support to four SCE series and served as an integrating partner for NNSA work in diagnostics, test data analysis, and radiographic source development, also assisting efforts at Los Alamo National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratories (SNL). MSTs successfully completed Post Nightshade (NS)-C data analysis and achieved Nimble beneficial occupancy in March 2022. MSTs provided the Principal Investigator for Nimble Diagnostics, deployed diagnostics for Saturn Scythe 9-11 focused experiments at LLNL, and delivered diagnostic, analysis and operations support to field and execute the Miramar experiment. MSTs provided extensive coordination between LLNL, MSTs, and LANL to prepare for future operations at U1a. MSTs completed Cygnus Research & Development campaigns for Red Sage, Nimble, and Great Basin experiments and performed double-sided scintillator imaging tests to support an improved capability for Cygnus radiographic tests, including Great Basin subcritical experiments. MSTs completed refurbishment of the Cygnus machine and validated operability. The completed refurbishment significantly increases the lifespan and efficiency of the Cygnus source. MSTs also met mission requirements of construction and maintenance work at the U1a Complex.

For the Zeus Testbed, MSTs proceeded at risk with a minor construction project concurrently with the design of the Neutron Diagnosed Subcritical Experiment (NDSE) testbed. After analyzing multiple options, the project is moving forward with a plan to construct two new tunnels with utilities to house the ZEUS NDSE system. The impact to NNSA is a significant increase in project costs, and the Excalibur experiment will be delayed between 18-24 months into FY 2026. MSTs completed shotcrete application for the Entombment project ahead of schedule and under budget. MSTs progressed the design and fabrication of the Neutron Diagnosed Subcritical Experiment Gamma Detector wall, gas

management system and rail system. Additionally, MSTs began executing deuterium experiments in Area 11 to support evaluation of neutron source before transition to the U1a Complex and completed tritium fume hood installation. MSTs completed a management self-assessment of tritium-handling operations on the ZEUS DPF and completed a 1 percent tritium shot using ZEUS, returning Area 11 to tritium operations for the first time since 2019. MSTs also delivered seven fully assembled NDSE gamma ray detectors and performed gamma ray sensitivity measurements completing a Level 2 milestone. Collaboration between LANL, LLNL, and MSTs to ensure completion of all program components is strong and functioning well.

For Enhanced Capabilities for Subcritical Experiments (ECSE) non-capital construction activities, NNSS completed the Entombment mining ahead of schedule and under budget and successfully completed several U1a upgrades. However, some ECSE activities and project planning for the Zeus Testbed caused schedule delays for overall Defense Program efforts and requires focused MSTs management attention.

MSTs met Dynamic Materials Properties, Secondary Assessment Technologies, and High Energy Density requirements through design, development, and testing of cutting-edge diagnostics that revolutionize and improve data collection systems for future experiments across the NSEL. MSTs, with LLNL, successfully executed one actinide, two confirmatory and three developmental JASPER experiments, supported qualification for the 40mm Ultra-fast Closure Valve system and delivered/performed spectral characterization of a new streak spectrometry diagnostic system required to collect important data for temperature experiments. One actinide experiment was significant to evaluate the response of accelerated aged plutonium of ~300 years in support of the Plutonium Aging Program. MSTs also prepared JASPER for increased cadence with expanded diagnostic capabilities to address FY 2023 and future experimental schedules. MSTs executed an X-Ray Diffraction Experiment analyzing the changes in crystalline structure of weapons materials under dynamic compression and deployed microchannel plate diagnostics on multiple experiments at Z machine providing images of hot and dense plasmas relevant to secondary assessment technologies. NNSS, with LANL, successfully executed a series of experiments for Army Research Laboratory at the Proton Radiography facility, providing four frames of x-ray radiography to measure the density profile of each shot. MSTs successfully completed the design, development, and measurement of a multi-pulse soft x-ray source, producing the first of a kind double pulse x-ray images from a single anode for microsecond scale pulse spacing (provides measurements not previously achievable with multi-anode sources). MSTs collected the first-ever multi-frame digital holographic images of micron-scale ejecta demonstrating the feasibility to measure composition of mixed ejecta metal fields. MSTs also provided a new capability to measure ejecta behavior under conditions where many traditional diagnostics fail through the development of an Atomic Ejecta Source Optical Probe, collecting 15 complete sets of high-quality spectroscopic data of 28 transitions in 10 elements.

MSTs established a new explosive component disposition capability that effectively eliminates difficult materials in various shapes.

Goal 2: Mission Execution: Global Nuclear Security

MSTs Amount of At-Risk Fee Allocation: \$5,235,648

MSTs exceeded almost all of the Program Objectives earning a rating of Excellent and 91 percent of the

award fee allocated to this goal, as evidenced by several significant accomplishments that significantly outweighed issues with no significant issues in performance. MSTS met performance expectations within expected costs. MSTS completed assigned milestones for work within their control, as well as generally met overall cost, schedule, and technical performance requirements for Defense Nuclear Nonproliferation (DNN) and Counterterrorism and Counterproliferation (CTCP) work in aggregate.

MSTS completed an Office Radiological Security (ORS) project in Belarus. However, the ongoing regional conflict halted ORS Belarus activities due to the sanctions imposed on the Republic of Belarus as a result of the Russia-Ukraine War.

MSTS efforts supported far-reaching national and international policies in reducing global nuclear security threats and improved science, technology, and expertise in areas including the Global Material Security program, underground nuclear explosion detection, radioactive material detection, foreign nuclear weapons programs, and the national response to nuclear incidents. MSTS strengthened U.S. proliferation and nuclear security capabilities by successfully supporting the FIREBIRD high-explosive hydrodynamic test campaign; leading a significant effort to repair, update, and expand infrastructure for Uranium Production Detection; and leading a multi-laboratory science team to develop natural language processing to support the Advanced Data Analytics for Proliferation Detection program.

MSTS demonstrated effective integration of a multi-laboratory team to increase cadence of DNN activities at the NNSS that contributed both scientific expertise and experimental test bed capabilities. For example, MSTS conducted three DNN large-scale experiments/campaigns across three different testbeds simultaneously at the NNSS. MSTS completed critical instrument installation necessary for Experiment Operations Readiness Review at the Low Yield Nuclear Monitoring Testbed including drilling of 29 boreholes for accelerometer instrumentation ahead of schedule, surface installation of the electromagnetic instruments, and execution of the first electromagnetic source experiment. MSTS supported the successful execution of the spring campaign for uranium production detection supporting over 100 personnel across 15 agencies/organizations, including returning the facility to primary power, upgrading communications, and repairing ventilation equipment. MSTS continued lab-scale experiments to collect data for shot characteristics, including signatures and material dynamics during the Firebird shots at the BEEF, completing all six shots in Firebird series ahead of schedule.

MSTS initiated program planning and work authorization for the Source Physics Experiment Rock Valley Direct Comparison testbed; completed the seismic vaults for the placement of Atomic Weapons Establishment instruments enabling a U.S. national capability and bilateral support for the detection and characterization of underground low yield nuclear tests; and deployed Minion sensors and information technology (IT) infrastructure at the Signals Exploratory Testbed. MSTS completed a subcontract for ASPEN phase 1 mining, began mining of the new P-Tunnel testbed and initiated a core drilling campaign to address geology concerns, completed mining upgrades to the P-tunnel facility, initiated full-time P-Tunnel facility construction and operations, initiated multiple construction projects at U12p, U12u, and provided experimental support to High Explosive Facilities operations. Resource, communication, and supply chain challenges, including delayed receipt of procurements, presented challenges to multiple project and program schedules. Issues identified during the performance year were proactively worked.

MSTS implemented a project gate review process and integrated process teams to address challenges previously identified with communication between NNSA Program Offices and other National

Laboratory partners required to plan for, integrate and anticipate current and future program requirements, including project and budget execution. MSTS also implemented a new functional organization dedicated to Global Security facility operations and support. Continued management attention is required to ensure these changes result in increased rigor in project/work planning, improved transparency/accuracy for scope and budget expectations, and the strengthened communication/integration with program and partner organizations needed to support DNN missions.

MSTS provided excellent support to the Nuclear Compliance Verification Program by providing members on the Test Site Verification Team and focused leadership of US Army Corp of Engineers and SNL technical implementation of a grouting taggant study. MSTS also led a multi-laboratory science team to develop natural language processing supporting the Advanced Data Analytics for Proliferation Detection program.

MSTS effectively managed the watch bill, including the Foreign Emergency Support Team and Domestic Emergency Support Team, and ensured that Department of Energy (DOE) Primary Mission Essential Function 2, Respond to Nuclear Incidents, response capability was maintained despite a nationwide public health emergency that constrained normal operations.

MSTS demonstrated operational excellence during a historic year of high-impact, high-visibility national security support completing all planned scope while also responding to real world events. In addition to more than 80 engagements representing Nuclear Emergency Support Team (NEST) national assets, MSTS personnel spent over 200 days and 10 deployments supporting the NEST response to Russia's War on Ukraine for radiological and nuclear detection systems and networks. In emergency events, these networks provide the most accurate and actionable information to inform public health and safety decision makers as well as attribute responsibility for these events. MSTS went above and beyond in supporting the NEST response to Russia's War on Ukraine. MSTS offered instrumental and flexible support for the Department's ongoing efforts in response to the Russian invasion of Ukraine and redirected, on short notice, nearly \$500,000 in funding toward these efforts. MSTS staff expertise proved indispensable in support of the Department's efforts. Additionally, MSTS/Remote Sensing Laboratory provided exemplary technical and logistical support for an unanticipated emergent response mission. Their contribution led to the successful deployment of a technical capability in support of nuclear forensics. In the event of a radiological or nuclear emergency or event, these networks will provide the most accurate and actionable information, which will support Ukrainian authorities in public health and safety decision making as well as allow for the attribution of responsibility for these events. MSTS's timely and effective efforts in sensor emplacement and subsequent data collection informed policy discussion at the highest levels of NNSA, DOE, and the U.S. Government.

MSTS led NEST interagency interactions for public health and safety training, exercises and coordination for nuclear incidents including the NEST full-scale exercise Cobalt Magnet 22 and the FY 2022 RAPTER series of capstone training. MSTS successfully provided support for International Atomic Energy Agency consultancy subject matter expertise and radiological and nuclear incident response training and capacity building for international partners. MSTS made progress with P-tunnel contingency planning and status reporting on operations and maintenance supporting execution of CTCF incident response and nuclear forensics missions, including two Diamond Thunder exercises. MSTS facilitated identification and nomination of materials of interest at the NNSS to the National Nuclear Material Archive and supported discussions with the national laboratories and headquarters regarding inclusion of these materials into the archives.

Goal 3: DOE and Strategic Partnership Projects Mission Objectives

MSTS Amount of At-Risk Fee Allocation: \$ -0-

MSTS exceeded almost all of the Performance Objectives, earning a rating of Excellent and 95 percent of the award fee allocated to this goal, as evidenced by significant accomplishments that significantly outweighed issues with no significant issues in performance. MSTS met performance expectations within expected costs. MSTS completed assigned milestones within their control, as well as generally met overall cost, schedule, and technical performance requirements related to the successful execution of the mission objectives for the DOE Environmental Management (DOE-EM) Program, Strategic Partnership Projects (SPP) and Strategic Intelligence Partnership Projects (SIPP).

MSTS supported the national security complex and legacy cleanup waste disposal through successful operation of the Radioactive Waste Management Complex (RWMC) and continued support of environmental restoration activities at the NNSS. MSTS kept critical shipments on schedule and the RWMC in normal operations while implementing COVID-19 protocols. MSTS revised the Resource Conservation and Recovery Act permit for hazardous and mixed waste that required: coordination with the Nevada Department of Environmental Protection (NDEP), a revision of the groundwater monitoring program, a new flood study, and overhauling the waste acceptance provisions to meet expectations of the NNSA, DOE-EM, and NDEP. MSTS also developed the final Closure Report for Corrective Action Unit 577 and received NDEP approval; closed two waste cells; and constructed a new waste cell at the RWMC adding three million cubic feet of available disposal space to provide flexibility for disposal of NNSA and DOE-EM waste. MSTS performed all required sessions of Real-Time Radiography (RTR) on waste packages, fulfilling the settlement agreement reached with the NDEP regarding material received from Y-12 National Security Campus, despite the RTR capability being unavailable for six months. Additionally, MSTS performed the physical upgrades necessary to convert the RTR building to a Limited Area for additional verification of classified waste packages fulfilling provisions of the Settlement Agreement and reducing the risk of accepting prohibited items for waste disposal at the NNSS.

MSTS was key to helping DOE-EM meet their goal of completing environmental restoration activities at the Tonopah Test Range by providing independent verification of the radiological clearance activities. Additionally, MSTS provided key support to environmental restoration activities on the NNSS through timely coordination with the DOE-EM Nevada contractor for work at the Engine Maintenance, Assembly, and Disassembly Facility and Target Chamber Center, well site cleanup, and conducting groundwater sampling at WW-C-1 on short notice allowing DOE-EM Nevada to fulfill regulatory requirements for the closure of Yucca Flat. MSTS addressed areas of concern and submitted requested information to the U.S. Environmental Protection Agency that resulted from the 2021 compliance evaluation inspection related to the Toxic Substance Control Act. MSTS also continued to support the Waste Management Community of Practice assisting NNSA with developing a weapons material acceptance criterion. MSTS continues to exceed expectations on coordination with Radioactive Waste Acceptance Program and DOE-EM to provide information to support data calls, the Waste Acceptance Criteria rewrite and ensuring consistency with the permit and Documented Safety Analysis. MSTS needs to ensure that Q-cleared staff knowledgeable in the RWMC Performance Assessment are available to review classified waste information.

MSTS executed leveraged SPP/SIPP activities for federal and non-federal entities to meet national security goals; providing access to specialized MSTS and NNSS facilities, services, and technical capabilities; increasing research and development interactions between MSTS and industry; and maintaining core competencies and enhancing the science and technology base at the NNSS. MSTS provided SPP/SIPP customers with products that support national security. For example, MSTS' execution of work for Department of Defense, Department of Homeland Security, Defense Threat Reduction Agency, and other government agencies provided data recovery for immediate use in the national and international security community. MSTS Counter Terrorism Operations Support trained first responders while implementing COVID-19 protocols via resident courses at the NNSS, mobile training teams that visit requesting jurisdictions, web-based training, and train-the-trainer programs. MSTS also certified a new web-based course focused on providing first responders, supporting agencies and their leadership with a comprehensive orientation to federal guidance for Radiological Dispersal Device response and planning which also allows the Federal Emergency Management Agency to increase the number of students trained nation-wide at a reduced per-student cost.

MSTS also expanded its SPP/SIPP scope by securing new project work that will grow the scientific and technical staff at the Special Technologies Laboratory and the Remote Sensing Laboratory. MSTS increased counter Unmanned Aerial System activities at the NNSS contributing to revitalization and maintenance of facilities in Area 25. While MSTS increased SPP/SIPP work, MSTS struggled to engage appropriate organizations/subject matter experts in project planning/execution, follow MSTS internal processes for work approval/authorization, and to provide timely documentation and on-site deconfliction required to execute this work. Continued management attention is needed to ensure appropriate processes & resources are in place for the safe execution of increased SPP/SIPP workload on a non-interference basis with NNSA missions.

Goal 4: Mission Execution: Science, Technology, and Engineering (ST&E)

MSTS Amount of At-Risk Fee Allocation: \$ -0-

MSTS exceeded almost all of the Performance Objectives, earning a rating of Excellent and 95% of the award fee allocated to this goal, as evidenced by several significant accomplishments with no issues in performance. MSTS met performance expectations within expected costs. MSTS completed planned activities, as well as generally met overall cost, schedule, and technical performance requirements of the Site Directed Research and Development (SDRD) and Technology Transfer programs to advance national security missions and the frontiers of ST&E.

MSTS completed planned activities of the SDRD and Technology Transfer programs to advance national security missions and the frontiers of ST&E. MSTS continued emphasis on high-quality and high-impact activities, including recruiting and retention of Science, Technology, Engineering, and Mathematics (STEM) personnel, professional publications, and university collaborations, that enhance credibility in the national security sciences.

Through SDRD, Technology Transfer, and University Relations, MSTS continued efforts to develop the image processing toolbox that quantifies and statistically characterized dislocation defects which enhanced theoretical models for material equations of state providing higher fidelity models to the National Laboratory hydrocodes supporting certification efforts. MSTS performed a first of its kind aerial drop of a smaller unmanned aircraft system (sUAS) from a larger sUAS demonstrating the

capability to gather high resolution data. This has potential for future positive impact to NNSA emergency response and consequence management missions.

MSTS funded 39 SDRD exploratory research projects and 16 SDRD feasibility studies in FY 2022. Fifty percent of these projects were new starts, 15 were mid-year feasibility studies, and 16 were artificial intelligence (AI)/machine learning efforts with use cases that apply directly to programmatic efforts.

MSTS implemented a new Science & Technology directorate, to provide new or enhanced ST&E capabilities to the NNSA that will enable agility at responding to future national security threats. Such capabilities include improved resource allocation, cross-training and development of their ST&E staff, and better alignment of SDRD funding to programmatic needs. MSTS increased attention on STEM recruiting and retention, with a focus on expanding the scientific bench strength, expanding the college internships program, and strengthening university partnerships.

MSTS continued use of their external and DOE Lab Partnering Services to make them readily accessible and searchable for potential commercialization of NNSA technologies. MSTS progressed on two cooperative research and development agreements and one license. MSTS met all requirements and expectations for submission of Scientific and Technical submissions for FY 2022. MSTS fully met the compliance milestone by submitting 100 percent of the Accepted Manuscripts for journal articles produced by NNSA/MSTS. Public access to DOE funded research in scholarly publications continued to be an important focus area and supported broad access to NNSA/MSTS published research.

Goal 5: Mission Enablement

MSTS Amount of At-Risk Fee Allocation: \$7,853,471

MSTS exceeded many of the Objectives under this Goal, earning a rating of Very Good and 85 percent of the award fee allocated to this goal, as evidenced by accomplishments that greatly outweighed issues. Except for the items noted below, MSTS met performance expectations within expected cost and completed assigned milestones for work within their control, as well as generally met overall schedule, and technical performance requirements, in aggregate, related to the safe, secure, and effective execution of program and site operations, as well as infrastructure sustainment and improvements.

MSTS worked to improve mission enablement in the areas of Environment, Safety, and Health & Quality management. MSTS received the Voluntary Protection Program Star of Excellence from DOE-AU, which recognizes implementation of best practices in safety and health. MSTS reinforced COVID-19 protocols and adjusted resources and priorities, keeping the safety of the workforce and NvE community at the forefront. MSTS offered COVID-19 booster vaccination clinics and obtained state regulatory approval for onsite COVID testing. Additionally, MSTS' BeyondZero® Program continued deployment of expanding manager/supervisor training, monthly safety culture surveys, and BeyondZero® Hero employee recognition program. MSTS demonstrated a continued focus on safety and achieved Total Recordable Incident Rate and Days Away, Restricted and Transfer Rate remained below DOE, NNSA and industry averages amidst increased work and an ongoing pandemic. Criticality safety, industrial hygiene, worker safety, quality, fire and rescue wildland fire planning, radiation protection, aviation safety, and most enabling functions met expectations. MSTS proactively used external operating experience and internal management assessments to continuously advance their

ability to identify, evaluate, and correct issues related to Integrated Safety Management.

MSTS utilized the multi-disciplinary expertise of the Underground Facility Safety and Health Board to make informed underground life safety code determinations for the U1a Complex and to investigate approaches for fighting fires underground. Although life and property are protected from fire, improved performance is required to comply with fire protection requirements of the Underground Facility Safety and Health Program Description, resolve backfit analysis issues and to develop an overall fire protection strategy for U1a to enhance overall life safety of the underground. Performance improved throughout the fiscal year in completing general fire hazard analyses, facility fire protection assessments, and inspection, testing, and maintenance of non-nuclear fire protection systems; however, continued focus is required to completely resolve outstanding actions. The MSTS Conduct of Operations (CONOPs) advisor reports continue to mature resulting in work execution improvements and value-added feedback.

MSTS continued to implement improvements to enhance the quality of MSTS safety basis submittals; institutionalizing lessons learned and best practices, instituting “page turns” for draft safety basis changes, conducting draft process hazard analysis reviews with NWLs and NFO, and replacing subcontractor nuclear safety analysts with in-house talent. MSTS continued to increase the number of required safety basis submittals to support NNSA programs. MSTS also demonstrated responsiveness to issues identified by the Defense Nuclear Facilities Safety Board for the Area 3/5 Radioactive Waste Facilities Documented Safety Analysis. Partnering meetings between MSTS and NFO on comment resolution supported timely comment/issue resolution. Overall, safety basis deliverable quality improved this year, although there were issues with several deliverables earlier in the year. MSTS needs to improve timeliness in declaring Potential Inadequacies in the Safety Analysis and completing associated Unreviewed Safety Question Determinations (U1a Vessel Unreviewed Safety Question (USQ) took longer than one month to complete; with multiple PISAs taking significant NFO involvement prior to declaration).

MSTS has one capital project that exceeded expectations and two capital projects that executed below expectations for this period as they continued to struggle to perform within expected cost and schedule. MSTS U1a Complex Enhancements Project (UCEP) subproject 010 achieved CD-4 14 months ahead of schedule and \$3.3 million under budget. MSTS U1a Complex Enhancements Project (UCEP) subproject 020 is under budget and behind schedule. Bore hole work started several months late; U1a.102 mining was completed three months early. The Advanced Sources and Detectors (ASD) project incurred cost growth of over 50 percent and schedule increase of 4 years which forced reaffirmation prior to CD-2. Unsatisfactory MSTS management and estimating was responsible for approximately \$82 million of the \$121 million of growth on the MSTS portion of work. MSTS received EVMS certification in June 2022 and fully implemented a self-governance surveillance program consistent with DOE Office of Project Management standards.

MSTS delivered an effective, efficient, and responsive safeguards and security program and executed DNS-approved funding and scope as planned with no major performance issues. MSTS completed required documentation including approved security analyses, security incident response plans, and associated security plans and effectively worked with the NNSS security contractor to complete performance testing required to transition to the Design Basis Threat (DBT) threat policy. MSTS was the first site to complete transition to the DBT. In addition, MSTS demonstrated diligence and timely completion of the DBT Change 1 analysis. During the 2022 Office of Enterprise Assessments survey,

MSTS Vulnerability Assessment and Risk Planning was recognized for three Best Practices. MSTS met most of the Performance Assurance, Nuclear Material Control and Accountability, Physical Security, Information Security, Foreign Visits and Assignments, Personal Security and Classification program requirements. MSTS partnered with SOC, LLC to develop a creative option for an indoor firing range resulting in a five-million-dollar cost avoidance and procured Nuclear Material Control and Accountability equipment that should result in more effective mission support.

MSTS demonstrated a reduction in negative and undesired schedule and cost variances in approved baselines for NNSA Office of Infrastructure projects. MSTS continued to progress its efforts to address planning issues identified in the previous performance periods resulting in improved project performance by key measures, including cost performance index, schedule performance index, cost Variance at Complete, milestones, spend and rigor. MSTS executed infrastructure and mission critical facility projects to address mission requirements, including risk reduction, workforce safety and site user services at Mercury, Area 6, Area 11, Area 12, U1a, DAF, JASPER, and North Las Vegas (NLV).

MSTS completed the Frenchman Flats Substation Upgrade project; advanced construction of surface utility projects at U1a completing the new 34.5kV power line and communications shelter, sewage lagoon and potable water tank; completed DAF Operations Complex power installation; completed Mercury transportation, storm drainage and utilities upgrades to support new buildings and the new Mercury Campus; and completed field execution of NSF Electrical Power Distribution System assessment project successfully integrating power outages under estimated cost. MSTS approved Mercury Building 2 project baseline and began construction completing CMU walls, steel erection and building enclosure. MSTS also completed award of “Three Building Bundle” (U1a Building 1, Mercury Building 3, and DAF Building 1). MSTS successfully executed the Asset Management Programs (AMP) at NNSS and NLV, completing two Cooling & Heating AMP projects, initiating two others, and completing pre-bid walkdowns in support of Roofing Asset Management Program (RAMP) projects in NLV; including response to the C-1 Building rain incursion event/cleanup resulting from issues with the RAMP contractor work execution.

MSTS aggressively added resources and capability to respond to additional program demand and unplanned project planning and execution work. MSTS completed the U1a New Access Shaft Mission Needs Statement and Program Requirements Documentation in support of project acceleration. MSTS improved in delivery, quality, and due diligence reviews of real estate products and MSTS’ support to the Northwest Las Vegas relocation project resulted in an approved Mission Needs Statement and Preliminary Real Estate Plan. MSTS continued to make progress on sustainability and climate adaptation milestones, submitting three additional buildings that comply with the Guiding Principles for Sustainable Federal Buildings, accelerating efforts to transition to a zero-emissions fleet and installation of electric vehicle changing stations, and submitting a rapid response accelerated NNSS solar expansion proposal. MSTS maintained a strong execution pace for the Maintenance and Repair program, including increasing maintenance execution at the U1a Complex and significant deferred and emergent maintenance at DAF. MSTS continuously worked to minimize the COVID-19 impacts to the safety of personnel and support the accomplishment of the NNSS mission, the assigned Infrastructure Level-2 national milestones, all functional programs, and capital construction projects.

Some impacts in the form of cost, scope and schedule were realized in maintenance, operations of facilities, general plant projects, and capital construction. MSTS made good progress on completing prior year funded recapitalization projects, however, continued to struggle with schedule adherence and

project readiness. Some FY 2022 projects experienced delays in project starts due to a lack of design readiness and site resources and newly submitted project schedules extended timelines outside of the accepted range for recapitalization projects. Many of the issues experienced were outside of MSTS control with unprecedented inflation and commodity schedules post-COVID. ProtoStar design reviews overran available funds and increased significantly from initial estimate; however, final estimates were based on previous lessons learned and construction actuals for the NNSS. Continued oversight on Nevada Site Operations Center Building 23-461 is required.

MSTS delivered efficient, effective, responsible, and transparent financial management operations and systems throughout the fiscal year.

MSTS delivered effective legal risk assessment and practices.

MSTS Cyber Security continued to maintain a secure IT environment amongst unprecedented State-sponsored attacks. MSTS identified counterfeit/remanufactured IT equipment before introduction into the network. MSTS Cyber also established Transport Layer Security between the NNSS and the United Kingdom's Atomic Weapons Establishment. MSTS exceeded expectations for one (1) Cybersecurity Program Execution Guidance (PEG) Implementation Factors (IF) deliverables; met expectations for 23 Cyber PEG IFs; and did not meet the expectations of 5 Cyber PEG IFs applicable to the site. MSTS provided exceptional Emergency Communications Network exercise and real-world mission support and 24/7 support to the NNSA Headquarters Network Operations Center. MSTS met expectations for 28 IT PEG IF deliverables and did not meet expectations of 5 IT PEG IF applicable to the site. MSTS performed unsatisfactorily in a DOE Computer Security (COMSEC) assessment. MSTS continued to experience issues with system reliability.

MSTS completed Wildland Fire recovery planning following an unprecedented wildland fire season in 2021 to address actions necessary to restore the Site/facilities/activities to normal operations and implemented a cheatgrass herbicide and seeding treatment study to reduce wildland fire risk. While MSTS successfully completed required drills/exercises under COVID-19 protocols and used virtual tools to meet emergency management requirements, issues were identified with exercise planning, execution, and implementation of emergency management roles/responsibilities. MSTS did not maintain a site-level exercise program to validate offsite interface emergency response capabilities based on the hazards identified in Emergency Planning Hazard Assessments. Recent independent assessments identified several issues that need to be addressed in the Emergency Management program (i.e., Local Emergency Directors were not identified as part of the Emergency Management cadre).

MSTS delivered effective business operations and systems. MSTS exceeded its overall small business goal, the largest in the NNSA complex, with an actual percentage of 81.65 percent versus a target of 70 percent and exceeded expectations in most of the socio-economic subcategories.

MSTS improved First Pass Yield of Requisitions by 12.8 percent for Supply Chain Management Center agreements. MSTS continued to apply risk management strategies to address the supply chain issues to mitigate risk early in the procurement process. MSTS Procurement continued to pursue activities designed to overcome quality issues with solicitation and subcontract consent packages.

MSTS Internal Audit, Contractor Human Resources, and Property Management functions met expectations and provided timely and effective support on Office of Inspector General and U.S.

Government Accountability Office audits. MSTS significantly improved communication, responsiveness, and quality of real estate actions/deliverables. In the area of human resources, MSTS added site incentives and quickly implemented the NNSA-approved mid-year compensation adjustment to address recruitment & retention challenges. MSTS continued the use of affinity groups (nominated by the workforce) that work to foster a more diverse and inclusive environment. MSTS also implemented a robust intern program with over 100 students this year.

MSTS's Employee Concerns program missed several deliverable due dates and both NFO and NNSA HQ were required to ask for additional investigations on several of the reported issues.

MSTS successfully developed and implemented an Annual Controlled Baseline (ACB) framework that included a communication plan for baseline change enhancements and monthly funding reviews to identify potential scope changes. MSTS incorporated their previously existing Task Plans into the ACB process resulting in a comprehensive tool. MSTS successfully submitted their third ACB proposal at the end of the evaluation period.

Goal 6: Mission Leadership

MSTS Amount of At-Risk Fee Allocation: \$5,235,648

MSTS leadership met or exceeded many of the Objectives under this Goal earning a rating of Very Good and 90 percent of the award fee allocated to this goal, as evidenced by accomplishments that greatly outweighed issues. MSTS generally met the overall cost, schedule, and technical performance requirements of the Contract in the aggregate, except as noted related to line-item project execution. MSTS met planned safety, security, and mission requirements providing leadership support for DOE/NNSA missions and cultivating a Performance Excellence Culture that encompassed a commitment to safe and secure enterprise mission execution.

MSTS leadership proactively sought out and met with NNSA/NFO, National Laboratory partners, and Other Government Agency sponsors to discuss strategies and goals for operating at the NNS and to understand individual program expectations, issues, and requirements, opening communication pathways between all the partners of the NNS. The information obtained through these interactions was reflected in the NNS Strategic plan which highlights the objectives, strategies, actions, tactics, and outcomes necessary to assure the effective, efficient, safe, and secure completion of NNSA missions in alignment with NNSA's Strategic Vision.

MSTS provided leadership for the Nevada Enterprise (NvE) community during the continued unprecedented period of uncertainty for the COVID-19 pandemic, executing mission while simultaneously minimizing impacts to the safety of the NvE community and public. MSTS continued outstanding management and site-specific implementation of COVID-19 protocols to minimize mission impact while simultaneously protecting the NNS and outlying location workforce and users. The MSTS Site Occupational Medical Director and his team provided proactive support for all actions related to COVID-19, constantly researching, completing contact tracing, visiting site operations and personnel to answer questions and concerns, and providing the most up-to-date data available to the NvE community. MSTS leadership proactively worked to reinforce and improve COVID-19 protocols, adapted to changing Executive Order requirements, adjusted resources and priorities to put the safety of the workforce and NvE community first.

CAS performance and implementation continued to improve and mature. MSTTS efforts to enhance the rigor of their issues management processes and implementation resulted in improved quality of cause analyses/Corrective Action Plans, improved Interim Forum Report & PER issue resolution, reduction in open legacy and aged issues, reduced average age of open issues, and continued positive Self Identification results. MSTTS developed and implemented new CAS tracking and trending tools to integrate and analyze disparate data sets from multiple separate CAS software platforms to improve visibility/transparency, accountability of Responsible Performance Authorities, tracking/trending, and consistent reporting. MSTTS also proactively leveraged Operating Experience, LLC support to obtain independent assessments, cause analysis and effectiveness reviews in multiple areas throughout FY 2022.

MSTTS continued their Voice of the Customer program to provide feedback on issues, integration, and execution. Data from this program was used by MSTTS leadership to develop corrective actions to better enable of collaboration and integration for mission execution. The ECSE/ASD project partners (NTESS, Triad, LLNS, and MSTTS) continued to demonstrate strong collaboration. MSTTS also continued supporting multiple National Security Enterprise Working Groups, including the 99 Mil working group to define guard-banding, deriving a 4:1 from a one-sided tolerance, and measurement acceptance criteria for attribute gages that will improve future interpretation issues across sites.

MSTTS, in collaboration with the national laboratories, needs to continue to work together to support mission execution, improve performance, resolve issues, and ensure effective communications with NNSA. MSTTS leadership focus is required to ensure sustained improvement in project planning, execution, and document quality/timeliness.

MSTTS' parent companies provided personnel to oversee and support the development of the UCEP baseline and completion of CD-2/3 requirements. MSTTS also assigned a Project Director to lead UCEP and consolidated ASD, NDSE, ITS, and SSF under a single director. MSTTS used parent company reach-back for expertise in safety, design engineering, water distribution engineering, asset management, cost analysis, and mining, however, corporate and local actions need to be taken to build MSTTS strength in these areas. MSTTS corporate needs to be aggressive in replacing Key Personnel in a timely manner and in providing proactive assistance rather than reactive responses to issues.

MSTTS continued to experience challenges in recruitment and retention. To address this situation, MSTTS implemented approved compensation enhancements including extended pay supplements for critical positions such as Nuclear Facility/Systems Engineers, Nuclear Safety/USQ Analyst, and DAF Technicians and zone pay for non-bargaining NNSA personnel. MSTTS also collaborated with the local community as well as local schools and state-level Nevada universities to improve the perception of the NNSA and enhance the future employee pipeline. MSTTS maintained strong relationships with numerous universities: University of Nevada – Las Vegas, University of Nevada- Reno, Brigham Young University, University of California Santa Barbara, University of Southern California, University of Michigan, and University of Missouri. MSTTS continued providing resources for the Tech Trekker (mobile STEM lab), supported the University of Nevada Las Vegas senior design competitions, established Science Saturdays at the Atomic Test Museum, paired NNSA scientific personnel with faculty members to work technical solutions, and was a member of numerous University of Nevada Las Vegas and Reno Advisory Boards. MSTTS actively engaged in many community-outreach programs. All of these activities help to create a talent pipeline to address difficult workforce recruitment issues.

MSTS met planned safety, security, and mission requirements by providing leadership for missions and cultivating a Performance Excellence Culture encompassing a commitment to safe and secure enterprise mission execution. MSTS leadership successfully delivered on mission: supporting four separate SCE series and nuclear and high hazard experiments at all NSEL sites and the NNSS; designed, developed, and tested cutting-edge diagnostics that already revolutionized and improved data collection systems for experiments across the NSEL; upgraded and improved multiple nuclear and high hazard testbeds; and responded to real-world events.