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National Nuclear Security  
Administration

Mission Support and Test  
Services, LLC

Performance Evaluation  
Report

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NNSA Nevada Field Office

Evaluation Period:  
October 1, 2022, through  
September 30, 2023

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December 15, 2023

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Controlled by: National Nuclear Security Administration, (b)(6),  
Nevada Field Office, AMMI, (b)(6)

## Executive Summary

This Performance Evaluation Report (PER) provides the National Nuclear Security Administration (NNSA) assessment of performing entity, Mission Support and Test Services, LLC (MSTS), performance of the contract requirements for the period of October 1, 2022, through September 30, 2023, as evaluated against the Goals defined in the 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 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. NNSA took into consideration all input (e.g., contractor assurance systems, program reviews, assessments, oversight activities) obtained from NNSA Program and Functional Offices both at Headquarters and in the field.

MSTS leadership engaged stakeholders to identify opportunities to integrate mission execution more effectively at the Nevada National Security Site (NNSS). MSTS maintained operational capabilities required to execute Subcritical Experiments (SCEs) and aging/production science experiments to provide data relevant to improving predictive capability, assessing the current stockpile, and certifying the future stockpile in accordance with milestone schedules. MSTS significantly increased the experimental pace across multiple facilities and enhanced capabilities and personnel associated with mission delivery including execution of a large portfolio of recapitalization and maintenance projects. For Counterterrorism and Counterproliferation (CTCP), MSTS demonstrated operational excellence conducting over 170 worldwide NNSA high-impact, high-visibility operations, drills, and training events and provided exceptional expertise and operational support to the Ukraine mission.

Amidst an unprecedented level of work at NNSS, MSTS experienced an increase in workplace injuries and near-miss events across several facilities that revealed deficiencies with the integrated work control process. To address the issue, MSTS leadership proactively paused work for a week at a major facility to reinforce the values and importance of a strong safety culture and re-establish a commitment to process adherence. While incremental change is already apparent, this is an area that will require continued senior leadership engagement.

MSTS earned an overall rating of Very Good and 89 percent of the award fee during this performance period. MSTS earned an Excellent rating for Goals 1 and 3 and Very Good for Goals 2, 4, and 5.

**Goal 1: Mission Delivery: Nuclear Weapons**  
MSTS Amount of At-Risk Fee Allocation: \$11,058,805

Under this goal, MSTS earned a rating of Excellent, and 91 percent of the award fee allocated to this goal. Accomplishments significantly outweighed issues and no significant issues in performance existed. MSTS exceeded almost all Objectives and Key Outcomes and generally met the overall cost, schedule, and technical performance requirements of the contract under this Goal in the aggregate.

MSTS maintained operational capabilities required to execute SCEs and aging/production science experiments to provide data relevant to improving predictive capability, assessing the current stockpile, and certifying the future stockpile in accordance with milestone schedules. MSTS increased the experimental pace across multiple facilities and enhanced capabilities and personnel associated with mission delivery. MSTS delivered next-generation diagnostic research and development to support stockpile experimentation and fielding support to collaborative partners.

At the Big Explosives Experimental Facility (BEEF), MSTS supported 4 experimental series to provide data for the weapons programs and expand diagnostic capabilities; 8 timing and training Jabberwocky experiments to collect fragment data; 8 Warbird hydro experiments increasing diagnostic capabilities for Photon Doppler Velocimetry and flash x-ray; 6 Ceres experiments enhancing Multi-point Photon Dosimetry Detection and high-speed camera diagnostic capabilities; and 3 Ewok experiments for the B-61 Program. MSTS completed installation of new timing and firing systems, diagnostics, and imaging equipment for Flash X-ray Capability for high explosives experiments at BEEF in support of Life Extension Programs and completed electrical and fiber optic cabling to the new BEEF ARMAG for classified operations. Additionally, MSTS expanded and provided high quality classified and unclassified machining services for key programs across the Nuclear Security Enterprise (NSE), such as the award of a major five-axis milling capability for increased demands for weapon modernization and stockpile risk-reduction initiatives.

MSTS successfully completed planning, execution and mission enablement of stockpile stewardship and stockpile management programs including support for 3 SCE series; development, implementation, and expansion of cutting-edge diagnostics; collaboration with the Nuclear Security Enterprise Laboratories (NSEL); and effective management of 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 Facility. MSTS executed the Capabilities Based Investments (CBI) project portfolio in accordance with the 2023 CBI Implementation Plan and Site Execution Plan. MSTS completed construction of prototype racks at Radiological/Nuclear Countermeasures Test and Evaluation Complex for the Enhanced Staging Program (ESP) and began construction of ESP racks in DAF; completed design for the U1g fan upgrade project; installed a new rotary uninterruptible power supply system for the U1a Cygnus testbed and awarded a procurement for a new truck-mounted mine rescue hoist at U1a. MSTS provided diagnostic fielding and component characterization for the National Ignition Facility (NIF) fusion/ignition scientific milestone achievement; measuring first beam light on hard X-ray beamline for Stanford Synchrotron Radiation

Lightsource beamline recommissioning; and accelerated archiving and data management digitization effort supporting historical data preservation.

MSTS maintained operational capabilities required to execute SCEs, provided excellent support to three SCE series, and served as an integrating partner for NNSS work in diagnostics, test data analysis, and radiographic source development, as well as at the Nuclear Weapons Laboratories (NWLs). MSTS provided the Principal Investigator for the Nimble SCE series diagnostics, deployed diagnostics for the Miramar II experiment at Lawrence Livermore National Laboratory (LLNL), and delivered diagnostic, analysis and operations support to field and execute the experiment. MSTS provided extensive coordination with LLNL and Los Alamos National Laboratory (LANL) to prepare for future operations at U1a, including conducting a feasibility evaluation for advancing timing and interleaving of Excalibur Morgana and Great Basin experiments into the schedule. MSTS also assumed two non-traditional roles for the Great Basin SCE series - Diagnostic Coordinator and Optical Diagnostic Principal Investigator.

For the Nimble and Great Basin SCE series, MSTS completed the major Cygnus refurbishment, including installation of significant Marx bank capacitors ahead of projected schedule, while implementing a process to increase safety during installation. MSTS also installed a new acoustic diagnostic that allowed for the rapid identification of a component breakdown or failure; and completed Device Response Methodology measurements to ensure safe operational margins and validate that the maximum electromagnetic induction field value had not increased post machine refurbishment. In support of Nimble timing and firing efforts, MSTS collected data to characterize down-hole facility power transformers during Cygnus charging and firing and reached a 5,000-shot milestone on Cygnus. To ensure facility availability and prevent major skill gaps, MSTS completed critical facility maintenance and repair to support SCE execution, hired eight new diagnosticians, and cross-trained existing diagnosticians to fill critical roles.

MSTS completed the Entombment mining ahead of schedule and under budget in support of Enhanced Capabilities for Subcritical Experiments (ECSE) non-capital construction activities. For U1a ECSE activities, MSTS successfully completed several supporting infrastructure projects. MSTS awarded major procurements for ZEUS Testbed Diagnostics project which will provide a significant increase in channels for Generation 4 Multiplexed Photon Doppler Velocimetry to be used in the ZEUS Testbed.

MSTS met Dynamic Materials Properties (DMP), Secondary Assessments Technologies, and High Energy Density Physics (HEDP) requirements through design, development, and testing of cutting-edge diagnostics that revolutionized and improved data collection systems for future experiments across the NSEL. MSTS, with LLNL, successfully obtained 100 percent data on 5 actinide and 2 developmental JASPER experiments to further investigate actinide shock release physics and the resultant dynamic temperature response. The pyrometry data obtained provides the baseline for future experiments where the streak spectroscopy diagnostic will be added. MSTS-developed software was modified to maximize data collection using fewer digitizers, thus reducing equipment costs. MSTS designed a new thermographic imaging diagnostic that will improve surface temperature data capture. MSTS successfully deployed micro-channel plate camera-based diagnostics on a wide range of experiments at Z Machine for Inertial Confinement Fusion, radiation effect sciences, HEDP, and DMP programs. MSTS also performed the first



successful test of the new direct-coupled diode for X-ray diffraction (XRD) measurements and quantitative rod-pinch polycapillary XRD experiments.

**Goal 2: Mission Delivery: Global Nuclear Security**  
MSTS Amount of At-Risk Fee Allocation: \$6,319,317

Under this goal, MSTS earned a rating of Very Good, and 90 percent of the award fee allocated to this goal. Accomplishments greatly outweighed issues and no significant issues in performance existed. MSTS exceeded many of the Objectives and Key Outcomes and generally met the overall cost, schedule, and technical performance requirements of the contract under this Goal in the aggregate.

MSTS increased cadence of Defense Nuclear Nonproliferation activities at the NNSS contributing scientific expertise and experimental testbed capabilities for several multi-laboratory venture teams. For CTCP, MSTS demonstrated operational excellence conducting over 170 worldwide NNSA high-impact, high-visibility operations, drills, and training events and provided exceptional expertise and operational support to the Ukraine mission. MSTS did not implement project management principles and processes consistently across the Global Nuclear Security Portfolio.

MSTS continued contributing to U.S. nuclear detonation detection capabilities by supporting the radionuclide tracer release experiment test and developing a high explosive confinement plan for the Low-Yield Nuclear Monitoring (LYNM) experiments. MSTS completed testbed preparation for LYNM PE1 Experiment A, including explosive emplacement and construction of 5 permanent bulkheads for high-explosive confinement, a capability not demonstrated in over 30 years. MSTS completed Aspen Phase I mining 100 percent design, mobilized the mining subcontractor to complete construction preparation activities (including equipment placement, ventilation enhancements, etc.), and began mining operations. MSTS did not communicate cost increases for Aspen Phase I mining in a timely manner. MSTS successfully implemented integrated planning to support and deconflict multiple activities, including LYNM PE1 confinement implementation, Aspen Phase 1 mobilization/mining, and nuclear forensics exercises. MSTS completed infrastructure repairs/investments for a proliferation detection testbed and supported successful execution of 2 24/7 experimental campaigns with more than 75 participants from 14 agencies and organizations.

MSTS completed the 60 percent Design Review for Phase 1 (Roads and Pads) of the Rock Valley Direct Comparison Demonstration Testbed and provided timely cost/background information to integrate Test Well-F into the baseline. Additionally, MSTS led a working group for testbed construction, drilling, relocation, modeling, and supported requirements development for core hole drilling. MSTS also issued a geotechnical subcontract to evaluate native soil characteristics to support design efforts.

MSTS, in conjunction with the Signals Exploratory Testbed Venture Team, took action to recover schedule delays from fiscal year (FY) 2022, however, failures in project control, cost

estimates and communications resulted in execution of unapproved scope, additional cost (\$3.7 million), and schedule delays (1 year) to achieve initial operating capability.

MSTS provided valuable contributions toward United States Government (USG) support of the Preparatory Commission for the Comprehensive Test Ban Treaty Organization On-site Inspection regime, including three technical experts as members of the Test Site Verification Team.

Through an unprecedented number of operations, drills, and exercises, MSTS effectively managed the watch bill, including the Foreign Emergency Support Team and Domestic Emergency Support Team, and ensured readiness of Department of Energy (DOE) Primary Mission Essential Function 2, *Respond to Nuclear Incidents*, response capability.

MSTS exceeded expectations in supporting the Nuclear Emergency Support Team's (NEST) response to Russia's War on Ukraine. MSTS staff's expertise proved indispensable in the production, deployment, and monitoring of NEST's sensor networks deployed into Ukraine and the surrounding region. These networks provide the most accurate and actionable information to support Ukrainian authorities in public health and safety decisions, which could ultimately save Ukrainian lives. These networks also provide data in support of USG policy development at the highest levels.

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, including the deployment of an international version of the Advanced Visualization and Integration of Data software package.

MSTS provided excellent support for execution of CTCP incident response and nuclear forensics missions. MSTS communicated and completed contingency planning as needed, including planning to address multi-user needs, and co-use facility deconfliction. MSTS successfully participated in nuclear forensics exercises Prominent Hunt 23, Diamond Thunder 23-01 and 23-02. MSTS completed initial planning for Nevada Capabilities that will support future OPSIS activities. NNMA task requirements were met.

MSTS provided exceptional expertise and operational support to the Ukraine mission. MSTS provided strong operational and training support to 5 real-world detectability assessments to inform threat profile evaluations for the USG response to potential weapons of mass destruction; 53 interagency events representing U.S. nuclear response capabilities and technical expertise to inform nationwide concepts of operation; 23 Render Safe events for radiological detection and response, tactics for detection/defeat of device penalties, and electrical/mechanical support to field operations; and 16 full-scale exercises involving deployment of one or more NEST teams from NNSS deployment locations. MSTS delivered 7 technical training evolutions for the RAP, including 4 sessions of the RAPTER, 2 Advanced Equipment seminars, and the delivery of the newly developed Advanced Consequence Management training. MSTS provided critical staffing and expertise to a complex preventive radiological/nuclear detection mission for multiple events (e.g., Presidential State of the Union Address, US-Africa Leaders' Summit, Super Bowl LVII, Boston Marathon, Indianapolis 500). MSTS completed the Functional

Requirements Document and began engineering design to develop the first NNSA Public Health and Safety Training Facility for NEST; however, MSTS did not deliver timely construction estimates, resulting in schedule delays.

**Goal 3: Mission Innovation: Advancing Science and Technology****MSTS Amount of At-Risk Fee Allocation: \$1,579,829**

Under this goal, MSTS earned a rating of Excellent, and 100 percent of the award fee allocated to this goal. Accomplishments significantly outweighed issues and no issues in performance existed. MSTS exceeded all Objectives and Key Outcomes and generally met the overall cost, schedule, and technical performance requirements of the contract under this Goal in the aggregate.

MSTS completed planned activities within expected cost of the Site-Directed Research and Development (SDRD) and Technology Transfer (TT) programs to advance national security missions and the frontiers of Science, Technology and Engineering. MSTS continued to emphasize high-quality and high-impact activities, including recruiting and retention of Science, Technology, Engineering, and Mathematics (STEM) personnel, professional publications, and university collaborations, which enhance credibility in the national security sciences. MSTS provided exceptional support to the national security complex and legacy cleanup waste disposal through successful operation of the Radioactive Waste Management Complex (RWMC) and environmental restoration activities at NNS. MSTS collaborated with regulatory agencies to streamline and standardize NNS permits, decreasing the risk of regulatory violations in the future.

Through SDRD, TT, and University Relations, MSTS pursued advanced technology partnerships that benefit broader national security needs and enhance U.S. competitiveness. MSTS scientists and engineers contributed to the gamma reaction history diagnostic in collaboration with LANL and LLNL that supported NIF experiments. MSTS deployed technologies previously developed through the SDRD program that proved vital to Ukraine support, such as the Multi-Path Communication Device project that developed the foundational technologies for many technical capabilities supporting Nuclear Incident Response programs, including Radiological Assistance, Consequence Management, and Nuclear Search programs. MSTS demonstrated advances in innovative national security technologies through research and development (R&D) investigations of multiple technologies, which will improve toolkits for nonproliferation, emergency response, and stockpile diagnostic portfolios, respectively. MSTS also leveraged SDRD and Strategic Partnerships Program (SPP) investments to build additional human performance and analytics expertise and tools used to benefit NNSA and interagency missions.

MSTS funded 47 SDRD exploratory research projects and 1 SDRD feasibility study. 50 percent of these projects were new starts. The MSTS FY 2023 SDRD project portfolio supported the advancement of pulsed power systems, accelerator and beam diagnostics, beam science, target interactions, and accelerator controls and data acquisition, which will benefit ECSE and future accelerator projects, specifically Advanced Sources and Detectors (ASD) and Neutron Diagnosed Subcritical Experiment (NDSE).

MSTS continued to focus on mentoring and professional development of scientists and engineers through its Scientific and Technical rotational program and university partnerships. MSTS implemented a Rotational Program, focused on early career staff in the STEM field, which led to 23 accepted offers of employment. The Rotational Program provides MSTS with a proactive mechanism for hiring and training staff to mitigate attrition, recruit future staff/leaders, and promote internal upward movement and enhance retention of existing staff.

MSTS demonstrated leadership in the NNSA's LDRD Program, assuming the role of Chair of the LDRD/SDRD Tri-Lab Working Group, a first for NNS. MSTS finalized a new umbrella Cooperative Research and Development Agreement (CRADA) with the University of Nevada Las Vegas to provide a pathway for further collaboration and progressed towards a prototype with a current MSTS CRADA partner. MSTS published 7 articles in peer-reviewed journals, submitted 2 R&D 100 Award applications, and disclosed 8 records of invention, 6 of which derived from SDRD projects. MSTS met all requirements and expectations for Scientific and Technical Information submissions for FY 2023.

MSTS supported the national security complex and legacy cleanup waste disposal through successful operation of the RWMC and supported environmental restoration activities at the NNS. MSTS fulfilled regulatory commitments by completing permanent closure of Cell 21, initiating preparation of the final documentation to Nevada Division of Environmental Protection (NDEP) to ensure fulfillment of all Nuclear Fuel Services Settlement Agreement items, and opening a new waste cell at the RWMC adding three million cubic feet of available disposal space to provide flexibility for disposal of NNSA and Office of Environmental Management (DOE-EM) waste. MSTS received a 10-year permit renewal for the Resource Conservation and Recovery Act permit from NDEP, incorporating negotiated improvements to monitoring requirements and reducing regulatory risk by minimizing the footprint of the permitted storage facilities. MSTS also updated and submitted permit applications for 4 solid waste landfills and the E-Tunnel wastewater discharge systems. MSTS performed all required sessions of Real-Time Radiography (RTR) on waste packages, fulfilling the settlement agreement reached with the NDEP regarding the incompletely documented waste received from Y-12 National Security Campus. MSTS completed an upgrade of the Low-Level Waste Information System database to improve database capabilities used to ensure accurate and reliable tracking of waste received at NNS. MSTS also continued activities to upgrade the RTR facility and to procure a new drive-through, portal style radiography system that will enhance waste verification activities.

MSTS provided exceptional support to environmental restoration activities on NNS through timely coordination with the DOE-EM Nevada contractor for work, including supporting increased waste characterization, packaging, shipment, and disposal, as well as completing road repairs to significantly improve access to demolition sites and Underground Test Area sites. MSTS also successfully supported the Waste Management Community of Practice (CoP), assisting NNSA with developing a weapons material acceptance criterion. MSTS exceeded expectations on coordination with Radioactive Waste Acceptance Program and DOE-EM to provide information for data calls, the Waste Acceptance Criteria rewrite, and ensuring consistency with the permit and Documented Safety Analysis (DSA). MSTS also provided an



exceptional presentation to the DOE-EM Regulation Compliance CoP on the revegetation of Area 5 on short notice.

**Goal 4: Mission Enablement****MSTS Amount of At-Risk Fee Allocation: \$7,899,146**

Under this goal, MSTS earned a rating of Very Good, and 85 percent of the award fee allocated to this goal. Accomplishments greatly outweighed issues and no significant issues in performance existed. MSTS exceeded many of the Objectives and Key Outcomes and generally met the overall cost, schedule, and technical performance requirements of the contract under this Goal in the aggregate.

MSTS executed a large portfolio of recapitalization and maintenance projects, maintaining schedules and budgets within available funding and providing quality, timely and reliable reporting. MSTS effectively completed transition and assumed responsibility for the protective force contract scope of work. MSTS experienced an increase in workplace injuries and near-miss events across several facilities that revealed deficiencies with the integrated work control process. Line-item projects continued to be behind schedule.

MSTS worked to improve mission enablement in the areas of Environment, Safety, Health, and Quality management. MSTS' BeyondZero® Program continued deployment of expanding manager/supervisor training and monthly safety culture surveys. MSTS achieved DOE Voluntary Protection Program Star status, including first-time certification for the satellite facility locations. MSTS demonstrated a continued focus on safety and achieved Total Recordable Incident and Days Away, Restricted and Transfer rates below DOE, NNSA, and industry averages amidst increased work. Although MSTS injury and illness rates were below NNSA and Industry averages, they trended upward since April 2023.

MSTS experienced an increase in workplace injuries and near-miss events across several facilities. MSTS' investigation into these events revealed deficiencies with the implementation of MSTS integrated work control processes, including hazard identification, hazard mitigation, work planning and control, Roles, Responsibilities, Authorities and Accountabilities (R2A2s), clear expectations, and line management engagement. To address the issues, MSTS leadership paused work at one of the major NNS facilities for a week to reinforce the values and importance of a strong safety culture and re-establish a commitment to process adherence. Expectations for all levels of line management and staff/craft were established, and R2A2s were reviewed, discussed, and emphasized, to include consequences for willful violations of expectations. Practical demonstrations of key operations, maintenance, and construction activities, work package walkdowns in the work areas and formal pre-job briefs were conducted. MSTS implemented a formal process to restart operations on a work package by work package basis. While incremental change was apparent, this is an area that will require continued senior leadership and line management engagement and institutionalization across all MSTS organizations.

Criticality safety, industrial hygiene, worker safety, quality, fire and rescue wildland fire planning, radiation protection, aviation safety, and most enabling functions met expectations. Although life and property are protected from fire underground, MSTS leadership focus is required to improve performance to comply with fire protection requirements of the Underground Facility Safety and Health Program Description and resolve backfit analysis issues for all NNSS active underground facilities. There was little action to close backfit analysis gaps this performance year and documented actions/schedules were not aligned with requested funding. Leadership engagement is required to develop/implement an overall fire protection strategy for U1a and other underground facilities to continue to enhance overall life safety of the underground. Analysis (technical basis and fire modeling) in support of the Maximum Occupancy Limit Underground was inadequate, resulting in a lower limit approved by NNSA/Nevada Field Office (NFO) than was requested. MSTS' identification and timeliness to declare, critique, and resolve reportable incidents continued to be a challenge (e.g., DAF Technical Safety Requirement violation). Management attention is needed to ensure requirements/ implementing procedures are clearly articulated and that responsible managers have the resources necessary to resolve reportable incidents.

MSTS continued to implement improvements to enhance the quality of MSTS safety basis submittals; however, issues remained with the quality of more complex deliverables. Partnering meetings between MSTS and NFO on comment resolution supported timely comment/issue resolution. Focused attention is required on resolving the DAF DSA Rewrite Project comments and completion of the U1a Complex Enhancements Project (UCEP) and ZEUS Preliminary DSAs.

MSTS made excellent progress on sustainability and climate adaptation milestones, incorporating sustainability principles into infrastructure planning and modernization initiatives. MSTS resourced advanced planning to accelerate efforts to transition to a zero-emissions fleet; install electric vehicle charging stations; and expand NNSS solar photovoltaic proposals through engagement with the NREL for assistance with system modeling/validation of a multi-location, microgrid approach. MSTS advanced the High-Performance Sustainable Building Implementation Plan for the NNSS and the North Las Vegas Facility and worked with My Green Lab (MGL) for a bronze certification for Laboratory 23-190, the second MGL certification at the NNSS.

MSTS demonstrated a reduction in negative and undesired schedule and cost variances in approved baselines for NNSA Office of Infrastructure projects. MSTS prioritized and focused on projects in execution within the Recapitalization Program as the lead element of project delivery. These efforts resulted in improved project performance by key measures, including Cost Performance Index (CPI), Schedule Performance Index (SPI), cost variance at completion, milestones, spend, and rigor. MSTS made significant progress in the recapitalization portfolio, executing a large portfolio of projects, maintaining schedules and budgets within available funding, and providing quality, timely and reliable reporting. 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, U1a, DAF, and JASPER. MSTS also provided support to the Northwest Las Vegas relocation project, which resulted in an

approved Mission Need Statement, Preliminary Real Estate Plan, and selection of a non-traditional acquisition path forward that will allow acceleration of the project.

MSTS neared completion on Phase 1 of Mercury Modernization by completing construction and NNSA/Congressional dedication of Mercury Building 2 (Nevada Site Operations Center) and completing more than 50 percent construction of Mercury Building 3. MSTS also completed projects that provide new sidewalks, grounds, landscaping, and lighting, which provide safe walkable space within the Mercury complex linking the new administrative campus environment to enduring facilities. MSTS completed the NNS Fire Alarm Workstation Replacement, which represents required initial upgrades for a modern and reliable NNS fire alarm system.

MSTS continued designs on projects at DAF and U1a, creatively leveraging multiple acquisition options, such as use of in-house design resources, parent company resources, and subcontracted resources. For ESP, MSTS completed installation of all 22 columns and 18 bays of shelves in the DAF to provide flexible staging options/space utilization for programmatic needs. Improving life safety at U1a, MSTS commissioned the U1a .101 refuge station. MSTS also executed the strongest Maintenance and Repair (M&R) program of record, growing M&R cadence across the NNS mission facilities, including increasing maintenance execution at the U1a Complex and DAF for significant deferred and emergent M&R. The MSTS M&R program was recognized and awarded a Silver 2023 NNSA Infrastructure Excellence Award for the successful integration, planning, and execution of maintenance scope. MSTS completed inspection of the DAF water tank, identifying deteriorated conditions, and developed interim mitigations to remediate/extend the existing tank and a path forward to accelerate tank replacement. MSTS completed emergent shotcrete repairs in the U1a Complex, began work on the 100 Drift, and progressed the full underground extent of condition assessment that will support long-term monitoring and repair activities for the entire underground.

MSTS continued surface infrastructure upgrades at U1a to meet increasing operations and mission demands. MSTS achieved 50 percent construction complete for the U1a Building 1 (Mission Technical Support Facility). MSTS executed U1a utilities and supported infrastructure projects, completing testing/turnover for the U1a Sewage Lagoon, U1a Potable Water, and U1a Electrical projects within approved funding. MSTS initiated construction procurement on the U1a New Operations Support Facility, using a newly established construction Basic Ordering Agreement that is expected to reduce time to award by approximately four months per award from the typical procurement process.

MSTS initiated and progressed designs for critical U1a Recapitalization Projects. This included completing the design on the U1a Fire Detection and Alarm System project and the U1a Fan Equipment Upgrade project, as well as the 90 percent design on the U1a Underground Power Distribution project and the U1a.02b Refuge Station project. MSTS improved facility operations by streamlining the U1a Training program, completing U1a Automated Surface Access Project construction activities and installation of new equipment, installation of Wi-Fi underground, and reconfiguration of administrative space to support operational tempo.

For the DAF New Operations Complex, MSTS completed construction of the site preparation two months ahead of schedule enabling early mobilization and optimized electrical design for the

utilities, reducing costs and schedule. MSTS progressed the Tweezer Substation Upgrade project to meet new mission requirements awarding the Design-Build contract and completing 90 percent design. MSTS also completed design for Area 6 Control Point Hill to Fire Station 2 Junction Water Line, which will establish 6,000 feet of critical waterline feeding the Forward Areas.

MSTS delivered an effective, efficient, and responsive safeguards and security program. MSTS completed transition of the roughly \$50 million NNSS Protective Force Services contract scope of work while simultaneously executing approved funding and scope as planned. MSTS developed a range of security configurations to provide risk accepting officials the ability to manage resources and efficiencies to support NNSA missions. MSTS completed procurement and installation of an indoor shooting range solution that resulted in a 35 percent reduction in cost and years of schedule savings compared to a design/build solution.

MSTS delivered efficient, effective, responsible, and transparent financial management operations and systems throughout FY 2023.

MSTS delivered efficient and effective management of legal risk and incorporated best practices.

MSTS Cyber Security maintained a secure information technology (IT) environment. MSTS met expectations for most of the Cybersecurity Program Execution Guidance (PEG) Implementation Factors (IF) deliverables; however, challenges remain with addressing vulnerabilities on the network in a timely manner and multifactor authentication inconsistencies. MSTS met expectations for most of IT PEG IF deliverables but patch and vulnerability management remain areas of concern and need to be addressed to minimize the threat to the NNSA environment. MSTS performed exceptionally in transitioning Supervisory Control and Data Acquisition Systems management and the SOC Protective Force contractor's networks, migrating multiple networks previously operated by two separate organizations without an outage or security incident. MSTS provided exceptional Emergency Communications Network exercise and real-world mission support and 24/7 Network Operations Center support to DOE/NNSA.

MSTS successfully completed required Emergency Management drills/exercises, however, repeat issues were identified with exercise planning, execution, and implementation of emergency management roles/responsibilities.

MSTS delivered effective business operations and systems. MSTS successfully completed the transition of the NNSS Protective Force Services contract from the previous contractor without impact to mission execution. The transition, which resulted in an increase of 10 percent to the workforce, required extensive union coordination and workforce planning. Additionally, MSTS enacted a zone pay allowance for 33 percent of non-bargaining NNSS employees to provide additional compensation based on work location and implemented geographical differential pay to provide more competitive compensation in locations with higher labor costs. MSTS obtained approval of negotiation parameters for and initiated negotiations with 18 labor groups. MSTS continued to significantly increase the use of Supply Chain Management Center agreements, which accelerated the acquisition process and increased bandwidth. MSTS did not meet

expectations with acquisition and procurements (including SPP documentation), which resulted in negative impacts to project schedules across multiple programs. The MSTS procurement organization acts organizationally separate from operational elements making effective collaboration challenging. MSTS initiated several actions aimed at improving their overall procurement performance, however significant change was not realized. MSTS exceeded their goal in four small business categories (Small Business, Historically Underutilized Business Zones, Veteran-Owned Small Business, and Service-Disabled Veteran-Owned Small Business) and was slightly below their goal in two small business categories (Small Disadvantaged Business and Women-Owned Small Business). MSTS achieved \$44.4 million in savings through eSourcing; \$4.7 million in savings through Commodity agreement spend of \$54.4 million; and reported \$55.2 million (13.81 percent) of Strategic Savings against a total invoice spend of \$400.1 million.

MSTS contributed to the ASD Project's Critical Decision (CD)-2/3 approval. MSTS successfully supported the development and approval of a baseline change proposal to add \$66 million of scope to the ASD project's CD-3B Long Lead Procurements. MSTS worked with the design subcontractor to re-evaluate specifications for the ITS transformer which resulted in an approximately 60 percent reduction in delivery time and reduced cost. MSTS performance associated with the scope of work on the ASD project was behind schedule (SPI 0.71) and under budget (CPI 1.38) for FY 2023. The initial improvement actions taken by MSTS procurement were ineffective, which resulted in a Contracting Officer Representative's letter of performance concerns. While the ITS long lead procurements were approved to proceed in FY 2022, even considering the 5-month delay imposed by the FPD, MSTS experienced issues with internal coordination requiring increased federal oversight and direct involvement.

MSTS UCEP subproject 020 successfully completed mining of the U1a.106 Drift and 108 Extension Drift; invert installation in the U1a.102B drift; painting in the U1a.104, 108, and 102B drifts; installation of ventilation duct in the U1a.104 and 102D drifts; and borehole drilling. MSTS was behind schedule (SPI 0.71) and on budget (CPI 0.97) for FY 2023. Despite front loading material procurements, MSTS was challenged by those procurements further delaying work. Additionally, delays that occurred in the award of two major subcontracts impacted schedule.

After analyzing multiple options for the ZEUS Testbed Facilities Improvement Project in U1a, MSTS initiated conversion to a line-item project for FY 2024 and changed the design to construct two new drifts to house the ZEUS NDSE system. MSTS implemented a pause to ensure implementation of adequate project management principles, completed design, and developed Interface Control Documents to support mining efforts. MSTS began mining in the .03E and .03H drifts.

MSTS successfully supported the development of Mission Need Statement, Project Requirements Document, and obtained CD-0 approval for the U1a Complex New Access Project. MSTS supported the NNSA Analysis of Alternatives efforts, including a site visit, historical costs, company composition, and other required data. MSTS also implemented a Contractor Integrated Project Team to support project development.



**Goal 5: Mission Leadership**

MSTS Amount of At-Risk Fee Allocation: \$4,739,488

Under this goal, MSTS earned a rating of Very Good, and 88 percent of the award fee allocated to this goal. Accomplishments greatly outweighed issues and no significant issues in performance existed. MSTS exceeded most of the Objectives and Key Outcomes and generally met the overall cost, schedule, and technical performance requirements of the contract under this Goal in the aggregate.

MSTS leadership engaged stakeholders to identify opportunities to integrate mission execution more effectively at NNSS. MSTS leadership proactively enabled strategic indirect funded investments in NNSS that are already reducing costs and execution risk across construction and mission projects. MSTS overcame retention and competition challenges achieving a hiring rate that exceeded the attrition rate. MSTS leadership continued focus is required to ensure sustained improvement in integrated safety management, project planning, execution, acquisition, procurement, and document quality/timeliness.

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 NNSS and to understand individual program expectations, issues, and requirements, with a goal of opening communication pathways between all the partners of NNSS. MSTS drove improvements in collaboration and integration across NNSS through alignment of FY 2023 Must-Do objectives with the NNSA Strategic Vision and NNSS Strategic plan. MSTS also developed a process and plan to integrate, coordinate, and prioritize work occurring in and around the U1a Complex.

Contractor Assurance System (CAS) performance and implementation continued to improve and mature. MSTS institutionalized and implemented improvements to the CAS trending and analysis processes that resulted in an improved culture of critical self-assessments, transparency, and accountability. However, NFO identified several issues with an ineffective critique process/implementation and incomplete causal analyses leaving the potential for re-occurrence.

MSTS implemented a strong partnership and demonstrated consistent collaboration with ECSE project partners (National Technology and Engineering Solutions of Sandia, LLC; Triad National Security, LLC; Lawrence Livermore National Security, LLC; and MSTS); however, MSTS needs to enhance collaboration with the NWLs to support broader mission planning/execution, resolve issues, and ensure effective and consistent communications with NNSA. MSTS leadership focus and collaboration with the NWLs leadership is needed to develop an integrated strategic plan for DAF that can support multiple NNSA programs including Defense Programs and Global Security missions. MSTS leadership continued focus is also required to ensure sustained improvement in project planning, execution, acquisition/procurement, and document quality/timeliness.

MSTS launched a new focus for 2023-2027: “FS3: Faster, Simpler, Safe & Secure,” setting the stage for employee empowerment and leveraging innovation from the NNSS workforce to enable improved productivity and mission execution. NNSS participated with laboratory, plant, and site

partners across the NSE in the Strategic Outlook Initiative study, using established foresight methods to anticipate changing global security and operational dynamics. MSTS leadership championed several indirect investment projects (\$23 million across NNSS) that will reduce cost and execution risk for all NNSS construction and mission execution projects (Shaker Plant, Area 25 Power, Mobile 4 Maximo, Site Water Availability Study, etc.). These intentional investments improved operations, helped meet programmatic deliverables, increased innovation, and made the NNSS a more attractive place to work for mission partners and MSTS employees.

MSTS leadership successfully delivered on mission. They supported three separate SCE series and nuclear and high hazard experiments at all NSEL sites and the NNSS; designed, developed, and tested cutting-edge diagnostics for improved data collection systems for experiments across the NSEL; continued to improve multiple nuclear and high hazard testbeds; and responded to real-world events. MSTS experienced an increase in workplace injuries and near-miss events across several facilities. To address these issues, MSTS implemented increased leadership presence in the field, safety standdowns (including a weeklong work pause at a major NNSS facility), and a deliberate approach to resuming operations. MSTS senior leadership engagement is required to institutionalize and improve performance with the implementation of MSTS integrated work control processes.

MSTS used parent company reach-back for expertise in safety, design engineering, water distribution engineering, asset management, cost analysis, and mining; however, the MSTS Corporate Parent Companies continued to lag in providing proactive assistance rather than reactive responses to issues. Parent Company and local actions need to be taken to build long-term NNSS strength in these areas. MSTS replaced four Key Personnel, including the MSTS President. There is lack of integration and clear R2A2 across the MSTS organization and senior leadership team. Although committed to during the transition of the M&O President in early FY 2023, MSTS Leadership and Corporate Parents were unsuccessful in recruiting a science advisor for the President to interact with NWL technical leadership on a peer-to-peer basis until September 2023, with a start date in FY 2024.

MSTS Senior Leadership often does not speak with one voice. Because of this, there was a lack of integration, use of institutional processes, and clear R2A2s across the MSTS organization and Senior Leadership team. Sustained MSTS Key Personnel leadership presence and engagement with U1a and infrastructure projects/programs has resulted in positive impacts; the need for sustained Key Personnel leadership presence, engagement, and knowledge of NNSS operational requirements/processes is required for success in other programmatic facilities and operations. In some cases, utilization of remote management personnel resulted in sub-optimized relationships with the national laboratories and MSTS staff, inconsistent direction on requirements, and inconsistent messaging to NNSA program managers and leadership.

MSTS overcame retention and competition challenges, hiring above the attrition rate, through implementation of multiple human resource initiatives. MSTS implemented approved compensation enhancements including extended pay supplements for critical positions, zone pay for non-bargaining NNSS personnel, and geographical differential pay. MSTS expanded the talent pipeline by increasing the student program 15 percent; obtaining additional funding for the NNSS RCT apprentice program; and increasing outreach and hiring activities within existing

programs (e.g., Youth HUB, Hiring our Heroes, College of Southern Nevada Fast Start program). MSTS continued its collaboration with the local community, including local schools and universities, providing funding for research projects, scholarships, and K-12/collegiate STEM programs. MSTS also actively engaged in many community-outreach programs.

## APPENDIX A: Acronyms and Definitions

Acronym	Definition
ASD	Advanced Sources and Detectors
BEEF	Big Explosives Experimental Facility
CAS	Contractor Assurance System
CBI	Capabilities Based Investments
CD	Critical Decision
CoP	Community of Practice
CPI	Cost Performance Index
CRADA	Cooperative Research and Development Agreement
CTCP	Counterterrorism and Counterproliferation
DAF	Device Assembly Facility
DMP	Dynamic Materials Properties
DOE	Department of Energy
DSA	Documented Safety Analysis
ECSE	Enhanced Capabilities for Subcritical Experiments
EM	Environmental Management
ESP	Enhanced Staging Program
FAR	Federal Acquisition Regulation
FPD	Federal Project Director
HEDP	High Energy Density Physics
IF	Implementation Factors
IT	Information Technology
ITS	Integrated Test Stand
JASPER	Joint Actinide Shock Physics Experimental Research
LANL	Los Alamos National Laboratory
LDRD	Lab-Directed Research and Development
LLNL	Livermore National Laboratory
LYNM	Low-Yield Nuclear Monitoring
M&O	Management and Operating
M&R	Maintenance and Repair
MGL	My Green Lab
MSTS	Mission Support and Test Services, LLC
NDEP	Nevada Division of Environmental Protection

NDSE	Neutron Diagnosed Subcritical Experiment
NEST	Nuclear Emergency Support Team
NFO	Nevada Field Office
NIF	National Ignition Facility
NNMA	National Nuclear Material Archive
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NREL	National Renewable Energy Laboratory
NSE	Nuclear Security Enterprise
NSEL	Nuclear Security Enterprise Laboratories
NWL	Nuclear Weapons Laboratory/ies
NWLW	Northwest Las Vegas
PEG	Program Execution Guidance
PEMP	Performance Evaluation and Measurement Plan
PER	Performance Evaluation Report
R2A2s	Roles, Responsibilities, Authorities and Accountabilities
R&D	Research and Development
RAP	Radiological Assistance Program
RAPTER	Radiological Assistance Program Training for Emergency Response
RCT	Radiological Control Technician
RTR	Real-Time Radiography
RWMC	Radioactive Waste Management Complex
SCE	Subcritical Experiments
SDRD	Site-Directed Research and Development
SPI	Schedule Performance Index
SPP	Strategic Partnerships Program
STEM	Science, Technology, Engineering, and Mathematics
TT	Technology Transfer
UCEP	U1a Complex Enhancements Project
USG	United States Government
XRD	X-ray diffraction
ZEUS	Z-Pinch Experimental Underground System