National Nuclear Security Administration

Mission Support and Test Services, LLC

Performance Evaluation Report (PER)

NNSA Nevada Field Office (NFO)

Evaluation Period:
October 1, 2020 - September 30, 2021

December 10, 2021

Summary

This performance evaluation feedback report provides the National Nuclear Security Administration (NNSA) review of Mission Support and Test Services, LLC's (MSTS) performance of the contract requirements for the period from October 1, 2020, to September 30, 2021, as measured against the applicable Performance Evaluation and Measurement Plan (PEMP). The NNSA took into consideration the dynamic work environment, COVID-19 impacts with operational restrictions, and all input provided (e.g., Contractor Assurance Program (CAS), Program Reviews, etc.) from NNSA Program and Functional Offices at Headquarters and in the field. MSTS commitments continued from Fiscal Year (FY) 2020 to increase operational cadence on experiments, enhance capabilities to execute an expanded program portfolio, improve project management, and modernize the Nevada National Security Site (NNSS) infrastructure. MSTS mission execution was impacted by the COVID-19 pandemic, but it was minimized by prompt and decisive COVID-19 pandemic planning and response. Due to the MSTS good relationship with the Southern Nevada Health District, vaccination receipt and distribution to the NNSS workforce lead the National Security Enterprise. MSTS implemented alternate work arrangements to maximize the safety of personnel while successfully supporting Department Primary Mission Essential Functions (PMEFs), Mission Essential Functions (MEFs) and NNSA high-priority mission activities assigned to NNSS. Overall, performance against the Goals is summarized below.

Goal 1: Mission Execution: Nuclear Weapons -- Successfully execute the cost, scope, and schedule of the Nuclear Stockpile mission work for Defense Programs work in a safe and secure manner in accordance with DOE/NNSA priorities, Work Authorizations, and Execution/Implementation Plans.

MSTS Amount of At-Risk Fee Allocation: $7,320,686

MSTS exceeded many of the Defense Programs Objectives and the Key Outcome earning a rating of Very Good and 90 percent of the award fee allocated to this goal, as evidenced by significant 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 overall cost, schedule, and technical performance requirements in aggregate for this goal and for successful mission execution, including MSTS' actions on the *FY 2021 Defense Programs Getting the Job Done List*.

MSTS continually worked with the NNSA Program Office and the National Security Enterprise Laboratories' (NSEL) to maintain mission momentum while minimizing mission impacts due to COVID-19; however, COVID-19 impacts in the form of cost, scope and schedule were realized. Issues identified during the period were proactively resolved. MSTS successfully completed planning and execution of numerous stockpile stewardship (SS) and stockpile management (SM) experiments, including three Subcritical Experiments (SCEs); continued development, implementation, and expansion of cutting-edge diagnostics; grew collaboration with the NSELs; and effectively managed multiple mission priorities/activities at the U1a Complex, Joint Actinide Shock Physics Experimental Research (JASPER) facility, Device Assembly Facility (DAF), Big Explosives Experimental Facility (BEEF) and the Dense Plasma Focus (DPF) Facility. These SS and SM experiments, facilities, and transformational diagnostics improved the linkages between past

underground nuclear tests, full-scale hydrodynamic experiments, subcritical experiments (SCEs), and materials property experiments for nuclear weapons predictive modeling/assessment of performance.

MSTS provided excellent support for four SCE series and Enhanced Capability for Subcritical Experiments (ECSE) simultaneously and served as an integrating partner for NNSA work in diagnostics, test data analysis, and radiographic source development, assisting efforts at LANL, LLNL, and SNL. MSTS minimized COVID-19 impacts to meet mission requirements of increased SCE cadence, construction, and maintenance work at U1a.

- For Red Sage, MSTS successfully completed the U1a.05a SCE testbed configuration, safety basis implementation, and diagnostic readiness to execute three SCEs this year (a record): Nightshade A, B, and C with nearly 100 percent data return on expected primary and secondary diagnostics. The MSTS team successfully integrated with LANL and SNL to resolve serious issues with the Cygnus radiographic diagnostic, during and after each SCE, as well as target issues for Nightshade B and took on many traditional LANL roles due to limited NSEL travel during COVID.
- For the Nimble series, MSTS provided outstanding diagnostic support to the Saturn Scythe and Del Mar experiments at LLNL and successfully coordinated the Nimble shipments prior to the National Security Exemption expiration.
- For Excalibur, successfully completed 60 percent of U1a.03 testbed design, executed the first neutron producing experiment using ZEUS (Z-pinch experimental underground system) and completed the new tritium confinement system test.
- For Great Basin, MSTS successfully designed a new radiographic imaging system and completed major diagnostic system down-selects.
- For ECSE, MSTS successfully demonstrated 6’ vessel fit test at U1a, started Entombment drift mining, completed mining of the U1a.108 drift, developed the resource Organizational model required to operate Scorpius and filled 90 percent of the positions, moved ZEUS from NLV to NNSS, and completed preliminary design of the Integrated Test Stand (ITS) for the Scorpius accelerator. To meet numerous mining schedules, MSTS implemented a new U1a Complex backshift mining. However, fire protection and seismic requirements remained problematic, and engineering failed to deliver a complete quality design for UCEP Subproject 020. which resulted in a six-month CD-2/3 date delay. (See Goal #5)

MSTS met Dynamic Materials Properties (DMP), 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 nine high quality JASPER experiments, including five actinide, supporting certification and R&D experiments at JASPER while also supporting experiments at Z/TA-55. Five diagnostic firsts that will dramatically improve data recovery for the SS program were achieved. For example, to improve radiographic techniques: a MSTS designed soft radiography system captured its 1st data at the Proton Radiography Facility and new framing Kraken camera recorded its first data at LANL. MSTS, in collaboration with LANL, achieved the 1st (and 2nd) plutonium radiance measurement on the TA-55 gas gun that represents a new temperature capability to validate multi-phase material equation of state; as well as designed a new radiance probe and a new MPDV fisheye probe for improved accuracy and resolution. MSTS advanced ejecta chemistry measurements through the highspeed velocimetry and bubble-collapse ejecta Jovial experiments. MSTS advanced the design of the Wolfsbane multi-probe ejecta diagnostic for data on hydrodynamic material mix models, collected over 500 multi-pulse beam-target images on DARHT axis-2 to support new tuning operations and performed the first single-pulse XRD test

shots on the Rod Pinch Polycapilary test stand at SNL.

For infrastructure and capability based infrastructure, MSTS successfully completed critical maintenance to restart and sustain RNCTEC for future facility space, commenced steel prototype rack construction for Enhanced Staging capability, constructed the environmental enclosure for the new metrology lab in the A-01 machine shop, removed large blast pad and began construction/installation of support equipment for a permanent Flash X-ray capability for high explosives at BEEF to support LEPs for future hydrodynamic experiments and completed construction of Beamline Transport System allowing Stanford Synchrotron Radiation Lightsource to achieve a major milestone of 'first light" for Hard X-ray capability MSTS awarded several major contracts for planning/design/procurement supporting Scorpius Support Lab, ITS capabilities, tritium fume hood for DPF Mobile Test Bed Capability, RMAG, communications equipment, etc. For the SM program, MSTS completed the short stack and Legacy Fragmentation Experiments mapping fragmentation for the B61-Mod II, consistently offered component disposition solutions to the WDD community; closed all their assigned actions from the Downdraft Table Readiness Review and received federal authorization to start operations; provided excellent support to NWDA Core team activities (particularly Phase 2 of the Operational Technology Assurance Mission Impact Analysis); completed the EPIC Red facility Initial Content Development and Implementation Plan for deployment and received federal approval; and successfully participated in the cross-site nonconforming material (NMR) improvement project to streamline the existing NMR process.

Goal 2: Mission Execution: Global Nuclear Security -- Successfully execute the cost, scope, and schedule of the authorized global nuclear security mission work in a safe and secure manner to include the Defense Nuclear Nonproliferation, Nuclear Counterterrorism, and Counter Proliferation and Incident Response missions in accordance with DOE/NNSA priorities, Work Authorizations, and Execution/Implementation Plans.

MSTS Amount of At-Risk Fee Allocation: $4,880,457

MSTS exceeded many of the Program Objectives and the Key Outcomes earning a rating of Very Good and 90 percent of the award fee allocated to this goal, as evidenced by significant accomplishments that greatly 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 met overall cost, schedule, and technical performance requirements for Defense Nuclear Nonproliferation (DNN) and Counterterrorism and Counterproliferation (CTCP) work in aggregate, including actions on the *FY 2021 CTCP Getting It Done in 21 and DNN Next Steps to Success FY 2021*.

MSTS continually worked with the NNSA Program Offices, NFO, and the national laboratories to minimize mission impacts due to the COVID-19 pandemic; however, impacts in the form of cost, scope and schedule were realized. For CTCP, MSTS effectively managed the watch bill, including the Foreign Emergency Support Team (FEST) and Domestic Emergency Support Team (DEST), and ensured a credible DOE PMEF 2, Respond to Nuclear Incidents, response capability was maintained despite a nationwide public health emergency that constrained normal operations. 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 (GMS) program, underground nuclear explosion detection, radioactive material detection, foreign nuclear weapons programs, and the national response to nuclear incidents.

MSTS provided superb project implementation support to the Office Radiological Security projects in Belarus. However high staff turnover resulted in project control and financial management errors and delays. MSTS also provided outstanding support to the repatriation and disposal of three radioisotope thermoelectric generators containing U.S. origin Sr-90 that were located in France.

MSTS integrated objective and activities of multi-laboratory teams to support DNN activities at the NNSS contributing to both scientific expertise and experimental test bed capabilities. MSTS executed five multi-domain experiments, obtained the 1st DNN data collection against three SCEs, initiated detailed Source Physics Experiment Phase III testbed planning, installed Rock Valley Seismic array for calibration and baseline data, competed aerial distributed acoustic sensing infrasound tests (ADIT), and successfully executed the METEX experiment for the Physics Experiment – 1 (PE-1) for the Low Yield Nuclear Monitoring (LYNM) program. For the nonproliferation testbed, MSTS completed upgrades, maintenance, and some repairs to the critical testbed infrastructure, as well as successfully enabled three large-scale, multi-agency (both with multiple teams of 150+ personnel) campaigns implementing COVID-19 protocols. MSTS awarded the LYNM mining subcontract (reducing costs 25 percent after initial estimates were higher than anticipated), started mining and completed a new ventilation drift to enhance safety, as well as completed significant utility and facility upgrades for P-Tunnel. MSTS awarded the Aspen subcontract for underground facility conceptual design and construction, but not on original timeline. MSTS successfully supported nuclear forensics capabilities for irradiation experiments at the National Criticality Experiments Research Center, and in a separate effort, collected precision infrasound data. MSTS served as a key contributor providing critical technical support for the multi-site Test Site Verification Team. Improvement is required in project management to develop accurate cost estimates, plans, and effective project controls to successfully execute all required mining activity. Improvement is also required in holistic planning and coordination to accommodate future multiple mission users in U12P and deliver an integrated schedule informed by a risk analysis.

Using full COVID-19 protocols, MSTS provided excellent CTCP response in support of real-world national security events, which required significant multi-agency pre-planning and extensive coverage before, during and after each event (Neptune Guardian 21 exercise planning, Independence Day National Mall Special Event, Radiological Assistance Program (RAP) Region 1 New Jersey Source Assessment and Recovery Operation, RAP Region 6 Air Force Academy Graduation, RAP Region 8 TAK/AVID test with Washington State CST's, FBI Washington Field Office Sustainment Training, six technical search operations/sustainment training events, etc.). MSTS provided technical and operational coordination support in planning for Cobalt Magnet-22 and San Diego Navy Joint Exercise and requests for information regarding the Taishan-1 Nuclear Power Plant in China. For the Aerial Measuring System (AMS) program, MSTS successfully hosted the 8th Annual AMS Technical Exchange in a virtual format that allowed for significantly increased participation from 13 countries. With full COVID-19 protocols (including overnight stays), MSTS successfully executed two Diamond Thunder exercises with more than 50-person for the Disposition and Forensics Evidence Analysis Team. MSTS leadership took several actions to improve overall responsiveness to CTCP programmatic need and strengthen the relationship between personnel and programs at RSL-Nellis and RSL-Andrews such as professionally facilitated team building; created collective accountability; developed project team work sessions to address diversity and inclusion; recruited and onboarded 12 new employees; and improved technical training. However, MSTS did not disclose, in a timely manner, issues with infrastructure (P-Tunnel) critical to the National WMD response mission in support of PMEF 2. Once disclosed, PMEF 2 was degraded from green to yellow until the P-Tunnel Forensics Alcove was returned to normal status. CTCP was clear in direction to plan for contingencies, including options for an alternate facility or permanent replacement facility, when R&D test beds or any other program may compromise the P Tunnel

Forensics Alcove or any other critical mission response infrastructure. Initially, MSTS' ability to forecast, deconflict, and resolve issues with multiple programs simultaneously utilizing the critical U12P facility was poor, but MSTS made systemic adjustments like the Area 12 working group. MSTS National Nuclear Material Archive (NNMA) identification and nominations remained behind pace, but CTCP was regularly apprised of obstacles.

Goal 3: DOE and Strategic Partnership Projects Mission Objectives -- Successfully execute high-impact work for DOE and Strategic Partnership Projects Mission Objectives safely and securely. Demonstrate the value of the work in addressing the strategic national security needs of the U.S. Government.

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

MSTS exceeded most of the Performance Objectives, earning a rating of Excellent and 91 percent of the award fee allocated to this goal, as evidenced by several significant accomplishments that greatly 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 met overall cost, schedule, and technical performance requirements related to the successful execution of the mission objectives for the DOE Environmental Management (EM) Program, Strategic Partnership Projects (SPP) and Strategic Intelligence Partnership Projects (SIPP).

MSTS continually worked with the DOE EM Program Office to minimize mission impacts due to COVID-19 and continue operations; however, impacts to cost, scope and schedule were realized. MSTS also continually assisted SPP/SIPP customers to mitigate the impacts of COVID-19 on their work as well as impacts to the NNSS. For SPP/SIPP, MSTS executed work that leveraged activities/operations to sustain NNSS' unique science and engineering capabilities for the NNSA. MSTS support provided many SPP/SIPP customers with products of far-reaching national security impact.

MSTS leveraged successful practiced SPP/SIPP work into NNSA missions. For example, an IT project augmented the indirect labor pool with direct labor projects. MSTS' execution of work in support of multiple government agencies provided data recovery for immediate use in the national and international security community. For the DHS, MSTS Counter Terrorism Operations Support (CTOS) trained first responders via resident courses at the NNSS, mobile training teams that visit requesting jurisdictions, web-based training, and train-the-trainer programs. With COVID-19 protocols, MSTS conducted 108 percent of stated certifications within 100 percent of the allotted time. The CTOS program trained 6,247 first responders and added a Bio Response Ops course for the National Guard Bureau.

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 characterization activities at the NNSS. For RWMC, MSTS kept mission enabling, critical shipments on schedule and the RWMC in normal operations while implementing COVID-19 protocols; revised the Solid Waste Permit for the Area 5 RWMC to enhance operations and minimize potential waste disposal non-compliances; oversaw completion of disposal cell vegetative cap seeding on a closed RCRA-permitted mixed waste disposal cell and Corrective Action Unit (CAU) 577; completed sampling of the new groundwater monitoring well; completed non-intrusive inspections of transuranic spheres to verify venting pathways; and successfully coordinated and completed the three year disposal project of three radioisotope

thermoelectric generators repatriated from France, reducing risk and liability for both the U.S. and French governments throughout the entire process. MSTS engagement in the Waste Acceptance Review Panel and supporting Facility Evaluations significantly increased confidence in radioactive waste acceptance. MSTS completed construction of a soil cover at a CAU on an extremely abbreviated schedule integrating significant security requirements. MSTS collaborated with EM, NNSA and the State of Nevada to successfully develop a Settlement Agreement in response to the FY 2020 notices of noncompliance from the U.S. Environmental Protection Agency (EPA) and the State of Nevada on waste characterization and disposal of the Y-12 wastes at the NNSS. MSTS developed options to constrain generator fee increases in light of reduced waste receipt volumes. MSTS needs to complete the integrated classified matter and classified waste disposition approach to prevent further delay in shipments from offsite generators and impact to their associated programs. MSTS also needs to assure that Q-cleared staff knowledgeable in the RWMC Performance Assessment are available to review classified waste information and increase efforts to assure quality and timely development of the annual revision of the Area 3/5 Documented Safety Analysis. MSTS had issues with their financial system resulting in late delivery of Earned Value Management data to EM NV four out of 12 times (33 percent of the time).

Goal 4: Mission Execution: Science, Technology, and Engineering (ST&E) -- Successfully advance national security missions and advance the frontiers of ST&E. Effectively manage Site Directed Research and Development (SDRD) and Technology Transfer, etc. in a safe and secure manner in accordance with DOE/NNSA priorities, Work Authorizations, and Execution/Implementation Plans.

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

MSTS exceeded most of the Performance Objectives, earning a rating of Excellent and 100 percent 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 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 continually minimized COVID-19 pandemic impacts on SDRD projects; however, impacts to cost, scope and schedule were realized. On a very limited budget, MSTS continued emphasis on high-quality and high-impact activities, including recruiting and retention of STEM personnel, professional publications, and university collaborations, that lend credence to ST&E performance and enhance credibility in the national security sciences.

Through SDRD and university investments, university partnerships continued with more than 20 active collaborations between SDRD, NNSA mission programs, and special partnership projects. MSTS became a participating member in the Nevada Governor's Office of Science, Innovation, and Technology's Southern Nevada STEM Regional Advisory Committee. MSTS completed a new partnership agreement with Kansas City National Security Complex (KSNSC) and the University of Missouri for research and development on electromagnetic drive concepts for multi-stage launchers (a 1st of its kind collaboration of SDRD and PDRD). Additionally, MSTS expanded their external (NNSS.gov) and DOE Lab Partnering Services to make them readily accessible and searchable for potential commercialization of NNSS technologies. These actions helped MSTS create pipelines for attracting scientists and engineers to support a next generation Science, Technology, Engineering, and Mathematics (STEM) workforce.

MSTS realigned the SDRD program to a new S&T strategic vision with seven Centers of Excellence supporting the NNSA S&T vision and technology roadmap. MSTS awarded 37 new SDRD projects and feasibility studies for FY 2021. This is an ~20 percent increase in projects over FY 2020 due to exercising efficiencies found in awarding/scheduling and funding projects. In FY 2021, ~30 percent of MSTS SDRD projects were accepted for use in numerous national security programs (i.e., demonstrated an alternate scintillator array concept, 1st of its kind, with potential use for Neutron Diagnosed Subcritical Experiments).

MSTS received a 2020 R&D 100 award for the X-ray Polarizing Beam Splitter. Additionally, the MSTS Electromagnetic Spectrum Management System, was selected as a finalist for FedTech Startup Studio 2021.

MSTS submitted numerous new articles for journal publication from ongoing SDRD projects in dynamic materials, advanced diagnostics, and sensor development. Public access compliance percentage ended the period at 100 percent. MSTS also started a new Cooperative Research & Development Agreement (CRADA), the first one for MSTS, with a start-up commercializing NNSS intellectual property developed through SDRD.

Goal 5: Mission Enablement -- Effectively and efficiently manage the safe and secure operations of the NNSS in accordance with cost, scope and schedule while maintaining an NNSA enterprise-wide focus; demonstrating accountability for mission performance and management controls; successfully executing cyber, technical, informational, and physical security requirements, and assure mission commitments are met with high-quality products and services while partnering to improve the site infrastructure. Performance will be measured by the contractor's assurance system, NNSA metrics, cost control, business and financial operations, project baselines, implementation plans, assessment and audit results, etc., with a focus on mission enablement.

MSTS Amount of At-Risk Fee Allocation: $7,320,686

MSTS exceeded many of the Performance Objectives and Key Outcomes, earning a rating of Very Good and 83 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 as well as 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 continually worked with the NNSA Program Offices, NFO, and the NSELs to minimize mission impacts due to the COVID-19 pandemic; however, impacts in the form of cost, scope and schedule were realized in maintenance, operations of facilities, general plant projects, and capital construction. MSTS continuously addressed COVID-19 challenges to minimize impacts to the safety of personnel and support for the NNSS mission, NNSS actions on the *Office of Safety, Infrastructure, and Operations FY2021 Make It Happen List,* the assigned Infrastructure Level-2 national milestones, all programs, and the capital construction projects.

MSTS continued their outstanding management and site-specific implementation of COVID-19 protocols to minimize mission impact while simultaneously protecting the NNSS and outlying location workforce and users. MSTS led the distribution of the COVID-19 vaccines for the entire NvE Community and was in the forefront of NNSA. MSTS developed vaccination plans that included prioritization protocols consistent with the State of Nevada requirements. MSTS successfully responded to volumes of COVID and Return to Work data calls. In addition, the MSTS Site Occupational Medical Direct (SOMD) and his team continued their 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 reinforced COVID-19 protocols and adjusted resources and priorities, keeping the safety of the workforce and NvE community at the forefront.

Implementing COVID-19 protocols, MSTS executed infrastructure and mission critical facility projects to address mission requirements, including risk reduction, workforce safety and site user services at Mercury, U1a, DAF, Area 6 and NLV. MSTS completed: the difficult back side portion of 138kV line repair; the DAF UPS and Substation upgrades; the Area 6 to U1a Underground Access Control; the Mercury Modernization Grounds South, Parking Lot and Ranger Utilities; and the NNSS Material Testing Laboratory upgrade. MSTS awarded large construction contracts for Mercury Building 2, U1a Tank/Pump, Lagoon and Roads; and the "Three Building Bundle". MSTS utilized ProtoSTAR/STAR common design initiative for U1a Building 2 as the 1st NNSA pilot building and developed the acquisition strategy for a Substation Upgrade. For construction planning, MSTS completed the U1a initial common area underground space plan, DAF mission and administrative space plan, the new U1a Access Shaft strategy, and progressed Area 12 and the NWLV Campus planning. MSTS maintained a strong execution pace for the Maintenance and Repair (M&R) program, including increasing maintenance execution at U1a and significant deferred and emergent maintenance at DAF. MSTS implemented new strategies to improve predictive maintenance and increase M&R capability and response time such as implementation of facility user pre-coordination formal planning and providing dedicated facility M&R staff. The completed M&R activities reduced risk, allowed nonconformance report (NCR) closures, created efficiencies, and improved facility safety. Metrics for MSTS project delivery initiative trended positively and started to show improvements in construction project planning and execution; however, the construction program continued to fall behind on several projects requiring cancellation and/or deferment of several due to significant cost increases from self-identified planning deficiencies and commodity market price increases. MSTS Recap estimates were routinely inaccurate resulting in large cost variances resulting in the inability to execute within the original budget. MSTS did not engage the Real Estate Office for important project meetings, resulting in a number of project delays requiring rework for team members and did not follow the NNSA Real Property Asset Management requirements, resulting in re-work of many actions and lack of communication

For Capital Projects, MSTS had two projects that met expectations and two that are below expectations. The first of its kind, the M&O Firm Fixed Price Design-Build 138kV project met expectations for successfully awarding the 138 kV Power Transmission System Replacement (PTSR) contract. The U1a Complex Enhancement Project (UCEP) Subproject 010 is on budget and on schedule for FY 2021. All mining was completed ahead of schedule; however, construction activities are behind schedule. For this period, UCEP Subproject 020 design, Preliminary Documented Safety Analysis and CD-3A activities are over budget (CPI 0.64) and behind schedule (SPI 0.93). The CD-3A 90 percent design had to be resubmitted due to poor quality and was late. The CD-2/3 was submitted in 3 packages, was 6 months late, and the first package did not meet the NNSA established expectations. MSTS Engineering failed to deliver a complete quality design which resulted in a six-month CD-2/3 date delay. The CD-2/3 estimate and schedule is undergoing an extensive review by NNSA and MSTS Corporate. During FY 2021, the Advanced Sensors and Detectors (ASD) Project design, technology maturation, and CD-3A activities are under budget (CPI 1.11) and behind schedule (SPI 0.89). The project received approval for several CD-3A long lead procurements. MSTS has been working towards Earned Value Management System (EVMS) certification since 2018 and for this period, continued addressing the Corrective Action Requests (CARs) from the initial DOE-PM review summer of 2020 and the 28 new CARs from the onsite review in June 2021. MSTS is behind previously scheduled certification.

MSTS exceeded expectations for the High-Performance Sustainable Building (HPSB) goal as Mercury Building 23-460 received HPSB Certification. By square footage, 32 percent of NNSS' buildings met the Guiding Principles for Sustainable Federal Buildings and by building count, 28 percent met the Guiding Principles. This is a significant accomplishment and NNSS leads the NNSA effort toward meeting this challenging goal.

MSTS improved mission enablement in the areas of Environment, Safety, and Health & Quality management. For example, MSTS' BeyondZero® Program continued deployment of expanding manager/supervisor training, monthly safety culture surveys, BeyondZero® Hero employee recognition program, development/implementation of GEMBA iPhone apps to input data immediately from management walk abouts, and implementation of the 5S (Sort, Store, Shine, Standardize, & Sustain) of formal workplace instruction checklists at major facilities. MSTS improved high explosive (HE) facility controls by implementing the new HE inventory system and substantially reducing both MSTS and LLNL legacy HE stored at NNSS; implemented the use of hooded powered air purifying respirators to improve operations where radiological, occupational safety and industrial hygiene hazards exist; developed correlation tables to quickly identify changes in airborne silica concentrations using handheld monitoring equipment at underground facilities by the Industrial Hygiene personnel; and dispositioned ~3000 pounds of expired chemical materials. MSTS received approval of a NNSS specific radiological dispersion analysis protocol that should reduce safety basis control sets for several accident scenarios. MSTS' Total Recordable Incident Rate (TRIR) and Days Away, Restricted and Transfer Rate (DART) remained below DOE, NNSA and industry averages. Criticality safety, industrial hygiene, worker safety, quality, fire and rescue wildland fire planning, and radiation protection, all enabling functions, met expectations. The MSTS work associated with UNLV provided a positive impact on broader nuclear materials management issues. Improvement is required to complete late facility fire protection assessments, and inspection, testing, and maintenance (ITM) of fire protection systems in general facilities. Age-related degradation of fire & rescue apparatuses must be addressed. With significantly increased mission and construction activities, reinforcement of the tenants of a strong safety culture is required, e.g., a strong questioning attitude, trending events, leadership by example, etc. The DOE Office of Enforcement review of the MSTS A1 Battery Room Low Oxygen event will be completed in FY 2022; as such any associated remediation will be developed in FY 2022.

MSTS Senior Leadership took ownership of legacy safety basis performance issues. Improvements were implemented to enhance the quality of MSTS safety basis submittals: revision of governing safety basis development procedures to institutionalize lessons learned and best practices, instituting "page turns" for draft safety basis changes, conducting draft PrHA reviews with NWLs and NFO, and replacing subcontractor nuclear safety analysts with in-house talent. MSTS significantly increased required safety basis submittals to support NNSA programs submitting more than double the documents than in any other year. MSTS, with SNL, completed the 50 percent seismic reduction justification and 100 percent surface acceleration forces as part of the Safety Design Strategy for UCEP. However, the Defense Nuclear Facilities Safety Board (DNFSB) identified and documented several Radioactive Waste Facilities (RWF) safety basis issues, the Onsite Transportation Safety Document 90 percent Annual Update was rejected, and the U1a.03 Test Bed Limited Procurement request was partially rejected for lacking the required technical basis.

In the area of Emergency Management, MSTS with the Bureau of Land Management, demonstrated outstanding management/exceptional commitment to safety for the responders, workers, public through their response and containment of the unprecedented, hazardous NNSS Cherrywood Fire. MSTS F&R was very successful in incorporating lessons learned from the Cherrywood fire to significantly improve wildland fire response for the numerous follow-on summer fires. MSTS successfully completed required drills/exercises

under COVID-19 protocols by developing and implementing virtual tools to meet security and emergency management requirements. MSTS improved severe weather protocols by establishing a severe weather working group to assist NNSS users. MSTS development of emergency management planning documentation was responsive to NFO feedback, as such, 28 high quality Emergency Planning Hazard Surveys/Assessments were NFO approved.

For Safeguards & Security (S&S), MSTS completed updates to all existing security plans and is on track to complete Design Basis Threat Change 1. MSTS strengthened their overall security program, refined their Unanalyzed Security Condition process, and closed all findings from the 2018 Federal Survey and Office of Enterprise Assessment comprehensive review. MSTS met all Performance Assurance, Nuclear Material Control and Accountability, Physical Security, Information Security, Foreign Visits and Assignments, and Personal Security program requirements. The MC&A staff integrated with the NNSA program to lead complex-wide MC&A working groups and the MC&A program, is underpinned by attention to detail with a MC&A Plan that flows down procedure links to requirements. When security incidents trended upward as personnel returned to work, MSTS proactively addressed the issue by sending consistent security reminders to the workforce. The classification program developed and completed the first WebEx delivery of Derivative Classifier and UCNI Reviewing Official training; however, the program saw improper reviews and markings of documents. MSTS made improvements in accuracy and integration of S&S for the Future-Years Nuclear Security Program and Annual Operating Plan products, receiving praise from the HQ Program Office. MSTS proactively worked through CUAS installation issues and completed conceptual planning for several critical S&S projects. However, delays in MSTS procurement negatively impacted the ability to order equipment and issue contracts necessary to support S&S activities.

MSTS Cyber Security Program performed exceedingly well in the DOE independent cyber assessment as strengths were identified in incident response, data security, and protective technology and recovery planning. MSTS Cyber Security exceeded expectations in two EA-62 audits (within a 4-month period), two Inspector General (IG) audits, and one Government Accountability Office (GAO) audit this year while maintaining a secure cyber security posture in one of the most adversarial offensive years to date. The IG and GAO reports are not yet available. MSTS exceeded expectations of seven (7) Cyber Program Execution Guidance (PEG) implementation factors (IF) and a portion of an eighth (8^{th}). MSTS is not meeting expectations of two (2) PEG IFs. Portions of five (5) Cyber PEG IFs had delayed deliverables, although the site is actively managing the IFs while awaiting updated guidance. The site is meeting the expectations of all other Cyber PEG IFs. MSTS is meeting all information technology (IT) PEG IFs. MSTS IT performed well in the NNSA IT Site Assistance Visit noting that MSTS meets expectations for Capital Planning and Investment Controls and Federal Information Technology Acquisition Reform Act reporting, however MSTS IT overall performance and project planning is weak. MSTS continued to experience issues restoring telecommunication services.

MSTS successfully delivered the Emergency Communications Network (ECN) to the user programs despite a substantially reduced budget (that occurred after FY started). MSTS provided ECN equipment, vehicles, and satellite transport to the Strategic Petroleum Reserve Office during three large hurricanes; expanded NNSA's access to world class, fault-tolerant, high-availability, secure facilities to protect and store data: provided 24/7 support to the Network Operations Center (NOC); procured equipment to repair issues at OCONUS teleport sites; provided Mobile ECN kits/onsite communications to SRS Mobile Uranium Facility/Mobile Plutonium Facility; provided live broadcast services between U1a and NNSA HQ; and demonstrated satellite capabilities for the Office of Secure Transportation to live stream between five US locations. The MSTS ECN Forrestal Operations team was recognized for their contributions to NNSA

PMEF Team #3.

MSTS delivered effective legal risk assessment and practices, business operations and systems, and financial management practices. MSTS received a "Pass" rating on all NA-MB measures through this period and delivered efficient, effective, responsive, and transparent financial management operations and systems. MSTS submitted their first Annual Controlled Baseline for all direct programs and indirect support costs late in the period for FY 2021. Of the six small business goals, MSTS exceeded expectations in five categories (SB, SDB, WOSB, HUBZone, VOSB and SDVOSB) and was below expectations in the WOSB category. MSTS also established a Small Business Mentor-Protégé' Plan. MSTS demonstrated its ability to effectively manage costs through their submission of a 2.9 percent Compensation Increase Plan (CIP) to address salaries and positions that are over 4 percent behind market. MSTS changed the standard Pension Benefit Guaranty Corporation premium method to the alternative premium method, saving ~$1.8M. MSTS successfully ratified negotiations and agreements with all 20 NNSS unions, achieving major changes to contractual language while providing reasonable wage increases. MSTS found unique ways to resolve talent resource issues such as sourcing over 30 new miners when the Union was unable to produce viable candidates, launching Project IT INFUSION for the rapid recruitment of over 20 new IT professionals and continuing a strong intern and apprentice program. MSTS also provided exceptional support to the NSE Recruitment Strategy Group through their participation in joint hiring events, leading the metrics sub-team, and submission of monthly metrics. MSTS streamlined and reduced costs training seat time by more than 25 percent. MSTS established six affinity groups (nominated by the workforce) to meet regularly to establish ways to foster a more diverse and inclusive environment. Although, MSTS made improvements to various templates for its subcontracts, some quality and compliance issues with solicitation and subcontract consent packages continue to be identified.

While improvement was seen in some areas, MSTS' focus on long-standing work planning and control, conduct of operations, DOE Order 420 & 10 CFR 851 compliance, vital safety system assessment completion, and maintenance is required (i.e., closure of safety-related issues including those from the underground facility gap analyses, completion of nuclear maintenance management assessments, skill of the worker process issues, etc.). The MSTS Conduct of Operations (CONOPs) coaching reports matured resulting in work execution improvements and value-added feedback for CONOPs functions; however, implementation of CONOPs at NN-1 facilities is inconsistent and weak and matrices are of poor quality.

Improvements were seen in specific areas, but poor quality, lack of engagement of appropriate subject matter experts throughout project planning and execution, and timeliness of document submissions required rework on the part of MSTS and NNSA (fire protection exemption requests, 10 CFR 851 variance evaluation, real estate packages, Real Estate/Operations Permits (REOPs), ESSPs, classification reviews, cost estimating, design engineering, safety basis, work planning documentation, procurement subcontract packages, data calls, cultural resource compliance, etc.). MSTS failed to engage the Real Estate Office and attend important high-profile project meetings, resulting in a number of project delays that required additional pass-backs and caused team member confusion on project direction and status.

MSTS improvements are required in recapitalization estimating, procurement, SME integration at project phases, and execution.

Goal 6: Mission Leadership -- Successfully demonstrate leadership in supporting the direction of the overall DOE/NNSA mission, cultivating a Performance Excellence Culture that encompasses all aspects of operations and continues to emphasize safety and security, improving the responsiveness of MSTS leadership team to issues and opportunities for continuous improvement internally and across the Enterprise, and parent company involvement/commitment to the overall success of the NNSS and the Enterprise.

MSTS Amount of At-Risk Fee Allocation: $4,880,457

MSTS Leadership met or exceeded many of the Objectives earning a rating of Very Good and 87 percent of the award fee allocated to this goal, as evidenced by accomplishments that outweighed issues. In aggregate, MSTS met performance expectations within expected cost. MSTS provided outstanding leadership for the 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 served on the leading edge of COVID-19 vaccine distribution for the NNSA. MSTS met planned safety, security, and mission requirements including overall cost, schedule, and technical performance by providing leadership for missions and cultivating a Performance Excellence Culture encompassing a commitment to safe and secure enterprise mission execution.

MSTS provided outstanding leadership across the entire NvE for site specific implementation of COVID-19 protocols to minimize mission impact while simultaneously protecting the NNSS and outlying location workforce and users. While this period saw COVID cases rise to their highest levels across the U.S. and at the NNSS, MSTS leadership successfully delivered on mission: executed four separate SCE series, ECSE, 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; as well as responded to real-world events. In addition, MSTS developed vaccination plans and COVID-19 testing protocols consistent with the State of Nevada requirements and led the NvE community vaccination program, vaccinating over 70 percent of the NvE community. In order to keep the workforce informed throughout the COVID-19 pandemic, the MSTS President continued issuing daily/weekly videos as well as weekly written messages to help alleviate worker concerns. To minimize mission impacts, 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.

MSTS leadership took strong ownership of the NvE integration role to enhance communications for safe, secure, efficient, and effective mission execution. MSTS leadership proactively sought out and met with NNSA/NFO, National Laboratory partners, and OGA sponsors to discuss strategies and goals for operating at the NNSS and to understand individual program expectations, issues, and requirements, opening communication pathways between all the partners of the NNSS and NvE. MSTS continued their Voice of the Customer (VOC) program to provide feedback on issues, integration, and execution. Data from this program was used continuously by MSTS leadership to develop corrective actions to better enable of collaboration and integration for mission execution.

CAS implementation continued to mature through completion of actions in their FY 2021 corrective action plan and initiation of an independent “look” at CAS that already found & reduced “aged issues” by 50 percent; however, significant challenges remain, such as linking CAS to other MSTS initiatives to appropriately make full use the system.

MSTS leadership successfully supported NNSA corporate initiatives by participating on Career Development Rotations for Enhancement (CADRE) and the Enduring Organization Teams, as well as EFCOG. MSTS provided input and completed all assigned governance and management actions, and the FY 2021 NNSS Strategic Plan and NNSS Strategic Integrated Roadmap updates.

MSTS collaborated with the local community as well as local schools and state-level Nevada universities to improve the perception of the NNSS and enhance the future employee pipeline. Through the pandemic, MSTS maintained strong relationships with numerous universities: UNLV, UNR, BYU, UCSB, USC, Michigan, Missouri, etc. Specifically, MSTS developed and provided resources for the Tech Trekker (mobile STEM lab), supported the UNLV senior design competitions, paired NNSS scientific personnel with faculty members to work technical solutions, and was a member of numerous University of Nevada Las Vegas and Reno Advisory Boards. MSTS actively engaged in many community outreach programs such as monetary donations and volunteer programs at Opportunity Village, as well as is a Diamond Partner at the Nevada Test Site Historical Foundation and a Platinum member of the National Security Forum. MSTS donated over 200 books for local schools, gifts for Angel Tree and led a NvE community three-week toy drive for Southern Nevada Firefighters Burn Foundation. MSTS personnel were recognized outside of the NNSA community as one employee received recognition from the Clark County Commissioner for his Search & Rescue work with Nevada Task Force-1 in the Oregon fires, as well as two employees received the Presidential Award from the Council for the Conservation of Migratory Birds for their studies of burrowing owls and winter raptors.

MSTS used parent company reachback for expertise in safety, design engineering, water distribution engineering, asset management, mining, and external assessments to improve processes. These resources are proving successful in solving NNSS issues and potential issues, however, actions need to be taken to build MSTS strength in these areas.

While the UCEP and ASD Projects are behind schedule and over budget, all organizations are working together to improve performance. Personnel from all four participating organizations resolved issues together, such as the U1a seismic equivalency. This was noted in the ASD annual peer review. However, the latest extremely high UCEP 020 cost estimate was very late, not fully internally project reviewed or coordinated, and lacked immediate communication throughout the estimate development that is required by HQ program to handle such a significant change to the base estimate.

Although MSTS initiated several project management initiatives, MSTS leadership focus is required to ensure improvement in recurring issues related to project planning and execution, as well as sustained improvement in quality and timeliness of MSTS document submittals for NNSA approval.

A lack of integration required NFO to engage MSTS multiple times to set up coordination meetings between NNSA HQ DNN and CTCP about the shared facility in Area 12 and to ensure that there was one master list of activities available to both organizations.

With significantly increased mission and construction activities, continued reinforcement of the tenants of a strong safety culture (e.g., a strong questioning attitude, trending events, leadership by example, etc.) is required. MSTS must continue to push for operational excellence and not accept minimum compliance approaches to safety and emergency management.