



National Nuclear Security
Administration

Mission Support and
Test Services, LLC

Performance Evaluation
Report (PER)

NNSA Nevada Field Office (NFO)

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2020

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Department of Energy review required before public release.

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Summary

This performance evaluation 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, 2019 to September 30, 2020, as measured against the applicable Performance Evaluation and Measurement Plan (PEMP). MSTS commitments to the NNSA continue from FY2019 for increasing operational cadence on experiments, enhancing capabilities to execute an expanded program portfolio, and significantly improving the Nevada National Security Site (NNSS) infrastructure. However, during this year, MSTS execution was impacted by the COVID-19 pandemic. MSTS acted promptly and decisively in the early stages of the COVID-19 pandemic implementing alternate work arrangements to maximize the safety of personnel while continuing to support Department Primary Mission Essential Functions (PMEFs), Mission Essential Functions (MEFs) and NNSA high-priority mission activities. As the year progressed, MSTS successfully transitioned to normal operations with maximum telework implementing required COVID-19 restrictions, with minimal impact to the health and safety of the workforce while meeting PMEFs and MEFs, and executing other essential activities. For this performance period, 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 both at Headquarters and in the field. Overall, performance against the Goals summarized below resulted in an overall rating of Very Good and a score of 88.1% for MSTS.

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: \$5.576M

MSTS exceeded many of the Defense Program Objectives, Key Outcomes earning a rating of Very Good and 90% of the award fee allocated to this goal, as evidenced by accomplishments that greatly outweighed issues with no significant issues in performance. MSTS is generally meeting 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 met overall cost, schedule, and technical performance requirements in aggregate for this goal and for successful mission execution including MSTS actions on the *FY20 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 and minimize mission impacts due to COVID-19. Issues identified during the year were resolved and are no longer of concern. MSTS successfully executed stockpile stewardship (SS) and stockpile management (SM) experiments; continued development, implementation, and expansion of cutting-edge diagnostics; grew collaboration with the NSELs; and effectively managed 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 and the suite of 1st ever, next-generation, transformational diagnostics developed by MSTS improved the linkages between past underground nuclear tests, full-scale hydrodynamic experiments,

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subcritical experiments (SCEs), and materials property experiments for nuclear weapons predictive modeling and assessment of performance.

MSTS provided excellent support for four Subcritical Experiments (SCE) series simultaneously and served as an integrating partner for NNSA work in diagnostics, test data analysis, and radiographic source development, assisting efforts at LANL and LLNL. To minimize impact of COVID-19 protocols, MSTS increased SCE cadence, construction and maintenance work at U1a, implemented unique strategies such as a new safety basis strategy for the mandatory DAF uninterruptible power supply (UPS) replacement eliminating large schedule delays for the SCE program, as well as developed the technical basis for raising the U1a underground personnel limits. For Red Sage, MSTS successfully completed the U1a testbed configuration, safety basis implementation, diagnostic readiness for Nightshade SCE, executed the Iris confirmatory with 100% data return; enabled short-notice, early material shipment to DAF; and demonstrated a new Timing and Firing system. For the Nimble series, MSTS provided outstanding diagnostic support to the Muir Woods II and Del Mar-1 experiments at LLNL, as well as the JOVIAL experimental series campaign conducted at STL. For the new U1a.03 NDSE capability required for the Excalibur series, MSTS executed experiments using the NNSS and NLV DPF pulsed energy sources to improve methods for SCEs and refine measurement techniques; completed Monte Carlo N-Particle simulations; completed mining of the entombment drift; developed game-changing diagnostic for the NDSE capability, ZEUS, a fully functional prototype box-DPF system; and in collaboration with SRNL, designed and fabricated a DPF head system, "Tube-in-a-box," a unique, first-of-a-kind nested confinement system required for future underground tritium operations. For future SCEs, MSTS played a key role in a new Device Shipping Container to eliminate safety and security issues. For ECSE, MSTS created a functional organization to manage resources, develop a technical workforce, create processes, establish training requirements, and perform benchmarking for the Integrated Test Stand (ITS) and Scorpius accelerator. In addition, MSTS in coordination with the Advanced Sources and Detectors (ASD) project team, began commissioning of a 10-Stack Pulser System in NLV to support training, testing, and diagnostic capabilities to maximize growth of technical resources and strengthen NNSS solid-state pulsed power capabilities.

MSTS successfully met Dynamic Materials Properties, Secondary Assessment Technologies, and High Energy Density requirements through cutting edge diagnostic development that revolutionize and improve data collection systems for future experiments across all NNSA sites. Several firsts that are already improving data recovery for the stockpile stewardship program include improved resolution, pulse shapes, data collection, alternative velocities, etc. For example, MSTS completed 1st time near-surface cavitation-driven eject experiments at the Special Technology Laboratory (STL) powder gun to quantify differences in masses and temperature; for the 1st time, fielded the new Broadband Laser Ranging diagnostic on both a hydrodynamic test at LANL and a test at Site 300; developed Ross Filter Diode Array for Nightshade to measure Cygnus energy; completed the 1st fielding of neutron imaging system at the Los Alamos Neutron Science Center and pRad Facilities at LANL; demonstrated optical pyrometry at the LANL DOES shock physics facility to dynamically measure temperature at a pressure in weapon relevant regimes not collected before; fielded the Time Gated High Energy Radiation Pinhole Camera (TIGHER) diagnostic on Z and performed 1st time new sample X-ray Diffraction(XRD) test shots at THOR at SNL; assembled and fielded the prototype Z machine tiny stripline probe that for the 1st experiment compressed platinum to 7.5Megabars, a new record; developed optical streaked spectrometers and interferometric diagnostics for a LLNL campaign at the Janus laser facility to study plasma jet collimation, where non-linear data so complete (as a function of flux and voltage) had never been collected before; provided

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efficient NIST traceable National Ignition Facility (NIF) calibrations for NIF experimental data; made significant progress on reducing noise in NIF Opacity Spectrometer; and obtained the 1st images from the Kraken camera for the next generation fast and high resolution imaging/shadowgraphy capabilities and radiographic applications.

For capability based infrastructure, MSTS successfully completed the U1a.03 Drift expansion, developed the design for a permanent FXR capability at BEEF to support LEPs future hydrodynamic experiments, expanded classified network capabilities at DAF, completed refurbishment and restart of the DAF downdraft table for future stockpile management activities, completed a new Vacuum Lab for ECSE; completed Soils Testing Area Reconfiguration for the Materials Test Lab Upgrade Project to support UCEP, completed gap analysis for the ITS retrofit for ASD, completed U1a Area planning, and initiated DAF Area Planning. In addition, MSTS successfully supported studies for Joint Test Assembly and component disposition, as well as completed an initial Operational Technology Assurance Mission Impact Analysis for Defense Programs.

MSTS, with LLNL, successfully executed six developmental, one surrogate, and two actinide experiments at JASPER. MSTS upgraded systems and diagnostics such as introduction of the 40-millimeter launch tube to increase surface experiment capability, 1st time fielding of the 19-channel photon Doppler velocimetry diagnostic for sound speed, and upgrade of the Continuous X-ray that reduces charge time from over an hour to 2-3 minutes. MSTS, with LLNL, successfully designed a 40-millimeter ultra-fast closure valve for actinide experiments to resolve a serious issue that occurred when the only vendor exited the market.

MSTS provided very good support to the ECSE and UCEP program; however UCEP Subproject 010 was over budget and behind schedule due to failure to complete refuge station design, project management issues, and mining issues (not all in MSTS control). From inadequate planning assumptions and integration in the initial project stages, in 2014, the U1A Complex Enhancements Projects (UCEP) LI project required a significant redesign for UCEP 020 found at the 60% design review in Nov 2019. MSTS submitted a 60% design several times during the year, and the Aug 2020 submittal was still incomplete and did not fully address design review comments provided in Nov 2019. MSTS leadership is now engaged and integration significantly improved between ASD and UCEP. MSTS submitted an updated cost estimate that was independently verified as accurate within 1% by NNSA. For the SCE program, while MSTS executed IRIS readiness in March 2020, readiness was delayed and the U1a 03 testbed design contract was issued months behind schedule; impacts are not fully known at this time. For JASPER, inappropriate planning for a critical lift caused a work pause (this is a repeat issue for NNSA); in addition, recovery requirements were not followed.

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: \$3.717M

MSTS exceeded many of the Program Objectives earning a rating of Very Good and 90% of the award fee allocated to this goal, as evidenced by accomplishments that greatly outweighed issues with no significant

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issues in performance. MSTS is generally meeting performance expectations within expected costs. MSTS completed all assigned milestones for work within their control, as well as met overall cost, schedule, and technical performance requirements for successful execution of the Defense Nuclear Nonproliferation (DNN) and Counterterrorism and Counterproliferation (CTCP) work and actions on the *FY20 CTCP Make It Happen List* at the NNSA and other locations. MSTS continually worked with the NNSA Program Offices 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. Additionally, MSTS successfully planned and executed readiness for NNSA PMEF #2 to support a national response during the COVID-19 pandemic. MSTS efforts demonstrate far-reaching national and international implications 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 conducted multiple foreign visits to support the DNN mission area of protecting and removing radioactive material, including leading alternative technology projects such as installation of x-ray blood irradiator in Belarus. MSTS was able to successfully support the University of Nevada Reno's (UNR) unprecedented seismic data collection of hundreds of aftershocks from the Tonopah, Nevada earthquake with seismic arrays developed for underground nuclear explosion detection program. MSTS responded well to challenges in test bed operations, including developing and executing a power interruption recovery plan under difficult conditions due to restricted access. MSTS continued preparations for the Physics Experiment testbed, hosting multi-agency design reviews and making significant progress on the mining subcontract and testbed authorization documentation. MSTS also collaborated with Defense Programs to conduct opportunistic nonproliferation detection measurements against relevant Defense Programs experiments. MSTS developed a cUAS testbed and structure for the upcoming DNN program, as well as created a project execution plan early to identify goals, potential constraints, and data required to meet program objectives. MSTS provided outstanding laboratory/customer integration, as well, as good facility and campaign support for the DNN programs/support facilities and testbeds. MSTS provided very good support to the Mobile Packaging Program, providing communications training for several team members and providing planning support for communications-related aspects of Exercise Dark Sleeper.

To ensure adequate resources were available to meet all CTCP response conditions during COVID-19, MSTS successfully implemented a sequestration program that applied additional protection measures to responders to maintain a healthy response force. During COVID-19, MSTS also provided key home team support, utilizing a 100% virtual home team, to analyze and model potential impacts to the public due to wildfires in the Chernobyl exclusion zone.

MSTS provided 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 of these events (i.e. NASA MARS Perseverance Rover launch, Seattle Cs source recovery response, Las Vegas New Year's Eve Celebration, Superbowl, and State of the Union). MSTS' Consequence Management personnel supported ingestion pathway exercises/outreaches at multiple nuclear power plants, Cooper, Wolf Creek, and St. Lucie. The MSTS Aviation Program completed King Air B350 pilot and maintenance training and acceptance of three new fixed-wing aircraft for the Aerial Measuring System (AMS). MSTS effectively supported the CTCP Technology Integration program, responded well to special requests for information and assistance when requested, provided training and support for the Nuclear Search Program (NSP)

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according to national policy, and successfully demonstrated a continuity of operations at the onset of and through the COVID-19 pandemic. MSTS provided technical expertise to the international community at International conferences/workshops in support of the Nuclear Incident Policy and Cooperation in Austria, Thailand, India, Canada, UAE, and France. In coordination with the Federal Bureau of Investigation, the Disposition Forensic Evidence and Analysis Team successfully completed the interagency Diamond Thunder (DT) 20-01. In addition, MSTS leadership took several actions to improve overall responsiveness to CTCP programmatic needs. The actions have not been in place long enough to determine if they will be effective.

Outstanding MSTS support to the growing Emergency Communications Network (ECN) program included: completion of the \$10M SWITCH project ahead of schedule and under budget; acquisition of additional satellite bandwidth; significant cost savings by adding unique hardware/software security and consolidating resources in Germany; expansion of the ECN continental United States (CONUS) and outside continental United States (OCONUS); and maintenance of ECN readiness during the COVID-19 pandemic. MSTS provided communications support to several real world events and exercises (i.e., Washington DC July 4, NLV El Royale, DT 20-01). MSTS continued the implementation of system upgrades and interfaces to facilitate Secret/Restricted Data communications between NNSA and many Other Government Agencies (OGAs) such as the Unclassified and Classified Authorization to Connect to Switch Data Center, Final 10 Gigabit link/connection from RSL-N to Switch Las Vegas Building 9 and migrated servers for Pretty Good Privacy (PGP) encryption providing increased node traffic and monitoring capabilities. Select MSTS members of the ECN Program received the Secretary of Energy's Achievement Award as part of the Democratic People's Republic of Korea Denuclearization Team.

For DNN, MSTS incurred a several-month delay in determining project acquisition strategies, had difficulties in reliably estimating costs, was not timely in notifying NNSA HQ of issues impacting cost and schedule, and under-executed FY20 allocated budget (spending less than 10% of \$10.75M) for a high-profile project with Congressional interest. Senior management did display accountability and commitment to mission success by forming an action group to account for project execution shortfalls and devise mitigation strategies. For CTCP, MSTS inappropriately used a thallium medical source to collect data from one of the AMS detection systems resulting in three days of down time for one fixed wing aircraft and one set of sensors due to contamination. MSTS must continue to focus on building/strengthening the relationship between RSL Nellis and RSL Andrews, as well as on recruiting/retaining technical personnel at RSL, especially RSL-Joint Base Andrews, to maintain long-term watch bill requirements in accordance with NNSA CTCP work-life balance goals and reverse the current trend of departing scientific and technical personnel to ensure CTCP program success.

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 almost all of the Program Objectives, earning a rating of Excellent and 95% of the award fee allocated to this goal, as evidenced by several significant accomplishments that significantly

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outweighed very minor issues with no significant issues in performance. MSTS is generally meeting performance expectations within expected costs. MSTS completed all 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 of 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. Also under COVID-19, the MSTS SPP/SIPP program saw many cancellations or postponements of customer activities. MSTS continually searched for additional SPP/SIPP work to mitigate the impacts. The MSTS SPP/SIPP work found and executed leveraged activities/operations to sustain NNS's unique science and engineering capabilities for the NNSA. The MSTS support provided many SPP/SIPP customers with products of far reaching national security impact.

In a strong partnership, MSTS leveraged successful practiced SPP/SIPP work into NNSA missions. For example, MSTS developed an effective resilience/optimization/improvement (ROI) training program for a SPP OGA that is now expanding into NNSA programs and provided outstanding support to Antelope Ridge Experiment Phase 1. MSTS' execution of work in support of Department of Defense (DoD), Department of Homeland Security (DHS), and Defense Threat Reduction Agency (DTRA) 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 NNS, mobile training teams that visit requesting jurisdictions, web based training, and train-the-trainer programs. During the COVID-19, MSTS conducted 125% of stated certifications within 75% of the allotted time and increased online courses by over 50% of the targeted CTOS scope. The CTOS program trained a record 21,375 first responders. For SPP, timely and high quality cost estimates and critical procurements for OGA sponsors continued to be a challenge

MSTS supported the national security complex and legacy cleanup waste disposal through successful operation of the Radioactive Waste Management (RWM) Complex and continued support of environmental characterization activities at the NNS. For RWM, MSTS completed construction of the permanent closure cover for Cell 18 and completed installation of monitoring well #4; provided project planning and integrational support for complex waste activities (i.e., French Radioisotope Thermal Generators and the transuranic legacy spheres); and provided excellent support and coordination of the simultaneous DOE Office of Enterprise Assessments (DOE/EA-31) assessment of NNS radioactive waste assessment processes and practices and the NNSA radiological waste peer review. Waste disposal operations at the NNS were praised as being a model in DOE for NNSA and DOE-Environmental Management (EM) collaboration. Waste volumes received were ~50 percent of the forecast, predominately from reduced shipping from offsite generators due to COVID-19. No accidents or operational waste issues occurred during the period. The NNS received two notices of noncompliance: a US Environmental Protection Agency (EPA) Notice of Violation and a state of Nevada Finding of Alleged Violation for alleged noncompliances on waste characterization, environmental monitoring and reporting, the receipt and disposal of the Y-12 wastes at the NNS. MSTS supported the interactive process of response development. MSTS provided excellent integrational support for the planned transfer of legacy cleanup sites at the Tonopah Test Range, including radiological survey and record disposition efforts. For RWM, MSTS had operational issues on compliance requirements for disposition of classified weapons related material from Pantex, as well as disposal requirements for polychlorinated biphenyl waste.

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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 almost all of the Objectives, earning a rating of Excellent and 100% of the award fee allocated to this goal, as evidenced by several significant accomplishments with no issues in performance. MSTS is generally meeting performance expectations within expected costs. MSTS completed most planned activities, as well as met overall cost, schedule, and technical performance requirements for the successful management and execution of Site Directed Research and Development (SDRD) and Technology Transfer programs to advance national security missions and the frontiers of ST&E. MSTS continually worked to minimize SDRD project impacts due to COVID-19 and continue operations. On a very limited budget, MSTS continued emphasis on high-quality and high-impact publications, lending credence to ST&E performance and enhancing 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. This is helping MSTS to create pipelines for attracting scientists and engineers to support a next generation Science, Technology, Engineering, and Mathematics (STEM) workforce. The efforts to attract new scientists and engineers were also furthered through the programmatic support of more than 40 summer student virtual interns and 2 post-docs throughout the year. MSTS conducted their first ever virtual SDRD proposal process and seminar, with outstanding participation seeing more than 150 proposals submitted. In addition, MSTS created quarterly Science and Technology seminars to educate and excite the scientific workforce; to date more than 250 participants took part.

The MSTS SDRD is working to advance NNSA technology streams. For example, a SDRD project with LANL on the powder gun demonstrated the re-compaction of ejecta. This project has the potential to enhance fundamental understanding of material mix (for materials of interest at JASPER and U1a) for improved hydrocode development. MSTS SDRD also provided new technologies that demonstrated a millimeter-wave imaging of high explosives for fireball and munition characterization; provided a first-ever imaging of high-flux neutron sources that will be used on future SCEs; and measured the dynamical structure evolution of material defects at the mesoscale supporting physics modeling. Looking into the future, MSTS SDRD launched a project that is enabling autonomous unmanned aircraft system sensor development to map legacy sites with extreme-fidelity imaging of previous radiological signatures. This has the potential to create a UAS mission-capable solution ready for emergency response and consequence management for the NNSA CTCP program

MSTS submitted two new technologies in FY2020 – ICARUS and the X-Ray Polarizing Beam Splitter. MSTS received a 2020 R&D 100 award for the X-ray Polarizing Beam Splitter. In addition, MSTS received a 2019 R&D 100 Finalist Award for Falcon, first “man” portable, easy to deploy, DPF based compact neutron source.

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MSTS published 14 new journal articles. Of specific note, the MSTS article on high-pressure melt curves that was published in the Journal of Applied Science received numerous reviewer accolades. MSTS also submitted two R&D 100 applications on Unmanned Aerial System (UAS) and high-energy density (HED), one provisional patent on portable DPF, and two new SDRD Feasibility Study efforts on warfighter performance and COVID-19 bio-decontamination. Additionally, four new technology abstracts (invention disclosures) were developed.

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 exceeded many of the Objectives earning a rating of Very Good and 85% of the award fee allocated to this goal, as evidenced by accomplishments that greatly outweighed issues. MSTS is generally meeting performance expectations with performance tracking above expected costs in some areas. Except for the items noted below, MSTS completed most assigned milestones as well as met overall schedule, and technical performance requirements related to the safe, secure and effective execution of program and site operations, as well as infrastructure sustainment and improvements. Daily, MSTS addressed COVID-19 changes to minimize impacts to the safety of personnel as well as COVID-19 requirements for mission and support for the achievement of the NNSS actions on the *Office of Safety, Infrastructure, and Operations FY2020 Make It Happen List* and the assigned Infrastructure Level-2 national milestones.

MSTS acted quickly to safely and expeditiously curtail activities at the NNSS with the US Federal Government decisions to shutdown operations due to the COVID-19 pandemic. COVID-19 protocols were successfully developed for the NvE community by the MSTS Site Occupational Medical Director (SOMD) before MSTS deliberately resumed operations. This process had minimal impact on operations, allowed activities to be resumed safely and deliberately, and avoided spikes in COVID-19 infections and associated quarantines. MSTS successfully established a multi-disciplinary COVID-19 Monitoring Team (MT) responsible for all related planning, data collection and information distribution (management calls, daily situation reports, NvE communications, etc.). The MT carried out all functions of a traditional Emergency Operations Center (EOC). MSTS demonstrated adaptability and effective leadership for the NNSS in shifting from COVID-19 response planning to long-term recovery. MSTS developed a return to work plan that was well coordinated with the NFO and NNSS users to ensure readiness of NvE personnel to resume operations in a safe, effective, and efficient manner. MSTS led the transition of the NNSS to Phase 1 and Phase 2 using the Return to Normal Operations plan. The transition was accomplished in a smooth and seamless manner supporting continued successful mission operations. In addition, the MSTS SOMD was proactive and provided outstanding support for all actions related to COVID-19, researching constantly, completing contract tracing, visiting site operations and personnel at least weekly to answer questions and concerns, and providing the most up to date data available to the NvE community workforce.

MSTS executed infrastructure and mission critical facility projects to address mission requirements, risk reduction, workforce safety and site user services at Mercury, U1a, DAF, NNSS Area 6 and NLV. MSTS

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completed electrical line maintenance at DAF, U1a Air Supply Borehole (below budget) project, area planning for U1a, Mercury Building 2 design and Phase 1 Campus integration, U1a.03 Drift Expansion Project, U1a.05 infrastructure for Nightshade, U1a hoist maintenance during COVID, gap analysis for retrofit of NLV A-01 for the Integrated Test Stand (ITS) for ASD, 50% of electrical substation upgrades to improve power reliability, emergency 138KV line and pole repair before imminent failure, stabilized power at DAF by installing two new UPS, D&D planned activities, and initiated area planning for the DAF and Forward Areas, as well as the NLV relocation real estate study. MSTs brought DAF Downdraft Table systems up to operational and successfully completed readiness activities (1st time done virtually) while simultaneously supporting ARGUS LI cutover, electrical system upgrades, HVAC replacement, maintenance, National Criticality Experimental Research Center operations, nuclear material management staging activities, and JASPER glovebox work at DAF. MSTs executed 20% more direct maintenance than in FY19. MSTs led an NSE-wide common building design strategy team that turned into the NA-50 Standard Acquisition and Recapitalization (STAR) initiative and successfully repackaged and shipped feedstock material to LANL TA-55 to support mission activities. MSTs needs to significantly improve recapitalization planning, estimating, and execution. Very little progress was made on new FY2020 infrastructure recapitalization projects. MSTs submitted multiple revisions to planned FY2020 projects and delivered less scope or significantly increased costs on active infrastructure projects. New General Plant Project construction projects continued to lag; acquisition and design challenges did not progress per their baseline; and active projects in their portfolio continued to exceed cost & schedule baseline.

For Capital Projects, MSTs' performance was below expectations on line item projects. MSTs was above expectations on the DAF ARGUS Interior Protection (IP) Project, and below expectations on the 138 kV Power Transmission System Replacement (PTSR) project, U1a Complex Enhancements Project (UCEP) 010 Subproject, UCEP 020 Subproject, Advanced Sources and Detectors (ASD) project, and its Earned Value Management System (EVMS) efforts. The DAF ARGUS IP project received CD-4 approval finishing 136 days ahead of schedule and \$4.3M under budget with no lost workdays, no incidents of safety or security concerns. MSTs is on schedule with SUB-CLIN procurement activities for the Firm Fixed Price (FFP) Design Build 138 kV PTSR Project. However, MSTs experienced quality problems, late actions required by technical direction, was not fully responsive to the Government RFP, and submitted the subcontract solicitation package with the FFP MSTs proposal instead of ahead of time, per the schedule, causing NNSA to perform parallel reviews to compensate to hold project schedule. The UCEP Subproject 010 is \$6M over budget and 15 days behind schedule. The UCEP 020 project is under budget by \$1.6M and behind schedule. MSTs Engineering failed to deliver a complete quality design which increases the risk of meeting CD-2/3. The ASD Project is over budget by \$4.5M and only has ten days of schedule contingency remaining to meet CD-2/3. MSTs continues to struggle providing accurate and consistent EVM data. After two years of working towards EVMS certification, the initial evaluation of the DOE certification reviewed, determined that MSTs was unable to demonstrate EVM. This increases the risk that certification may not be achieved prior to the required UCEP 020 CD 2/3 date.

MSTs met several sustainability goals. Energy intensity was reduced by 3% meeting the 1% reduction goal. MSTs implemented a best practice by immediately adjusting building occupancy schedules after COVID-19 which contributed to the reduction. Due to increased construction activities and a water line break, water intensity increased ~5%. MSTs developed a water asset management plan and water conservation plan to identify water reduction opportunities. MSTs purchased renewable energy credits totaling 18.5% of total energy which contributed to the renewable energy goal of 30.5%. NNSA exceed

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the HPSB goal. The Mercury Building #1 achieved Leadership in Energy and Environmental Design (LEED) Gold status and became the site's 2nd Net Zero Energy Facility. NNSS won a DOE Sustainability Award for Strategic Partnership in e-recycling efforts with the Blind Center of Nevada.

MSTS looked to improve mission enablement in the areas of Environment, Safety, and Health & Quality management. MSTS' BeyondZero[®] Program continued driving NNSS safety culture and results with the deployment of monthly safety culture surveys and institutionalization of employee-led safety committees. MSTS' Total Recordable Incident Rate (TRIR) and Days Away, Restricted and Transfer Rate (DART) remained below industry average. MSTS successfully assisted NNSA Pantex with thermoluminescent dosimeter (TLD) reader issues to keep Pantex operating and meeting Defense Programs mission deliverables by processing more than 10,000 TLDs in less than two months. Additionally, MSTS realized an earned mitigation strategy to receive recognition for desert tortoise conservation and protection efforts for 200 acres of the 450-acre Area 5 RWMC expansion, resulting in a \$185K mitigation credit. Public concern from two RSL-Andrews helicopter proficiency flights revealed opportunities for improvement in planning and execution standards.

For Safeguards & Security (S&S), MSTS was the first NNSA site to successfully integrate DBT requirements into Emergency Planning Hazard Assessments and performed extremely well during a DOE/EA-31 limited-notice performance test for MC&A. As part of the DAF Argus project completion, MSTS provided managerial oversight for the DAF Activation, Validation, and Cutover and Video Image Control and Display Systems certification process, which was the first to go through this newly developed certification process that is consistent with the Design Base Threat (DBT) implementation. In addition, MSTS completed the required Design Basis Threat security analysis several months ahead of the required NNSA timeline. MSTS also completed updates to several critical documents including the NNSS Site Security Plan and the U1a Facility Security Plan. MSTS very successfully integrated security analysis into the hazard planning processes resulting in enhanced analysis supporting security and emergency response. MSTS also employed a Security Authorization Basis approach to security streamlining the security analysis and approval process. MSTS is also actively working updates for remaining security plans that have not been updated since 2015. MSTS met all Performance Assurance Program essential element testing requirements for FY20 and enhanced the program with implementation of a comprehensive matrix tracking system despite complications from the COVID-19 pandemic. MSTS MC&A worked quickly to ensure that the accountable nuclear material at the NNSS was in a safe and secure posture and all inventories were completed prior to the site switching to minimum operations mode for COVID-19. MSTS successfully updated all Unclassified Foreign Visits and Assignments Security Plans to include COVID-19 protection protocols and mitigation measures. MSTS made improvements to the Future-Years Nuclear Security Program and Annual Operating Plan development processes improving accuracy and integration of S&S budget submittals. MSTS CUAS project management made good strides recently in resolving project cost and construction challenges to deliver an initial operating capability at the end of FY20.

MSTS Fire and Rescue response to the Mt. Charleston Mahogany, NNSS Area 16, and Timber Mountain firefighting efforts was exceptional. Direct engagement in operations at Desert Rock Airport, teaming with Bureau of Land Management Nevada Fire and Aviation operations, and strong knowledgeable leadership contributed to mission success on all three wildland fires resulting in no injuries, radiological exposures or damage to NNSS infrastructure.

MSTS delivered effective legal risk & practices, business operations and systems, and financial

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management practices. MSTS received an “Excellent” on NNSA financial performance metrics for the fiscal year. MSTS effectively implemented COVID-19 accounting and reporting processes. Of the six small business (SB) goals, MSTS exceeded the overall SB goal, significantly exceeding the Service Disabled Veteran Own Small Business goal. MSTS did not achieve the goals in two categories; however, these goals are historically difficult to achieve. MSTS provided exceptional support to the NSE Workforce Strategy Group. Human Resources (HR) successfully launched a virtual internship program (over 70 in STEM and business) to create a pipeline for high quality, potential future employees. Additionally, HR put new processes in place to foster recruitment and strengthen employee development; however continued focus on technical and scientific hiring/retention/ replacement for programs is required. Labor Relations received approval to initiate negotiations on 20 expiring bargaining contracts and effectively managed the labor negotiations to avoid any work stoppages. MSTS addressed training qualifications during the COVID-19 shutdown by conducting training through Skype and WebEx, whenever possible, and extending training due dates.

MSTS’ cybersecurity program met or exceeded expectations. MSTS successfully moved authorization of hosting EPIC-Red on ESN, positioning NNSA for story mapping EMAC content in FY21. MSTS information technology programs quickly doubled Virtual Desktop Infrastructure at the COVID-19 onset, successfully enabling NNSA max-telework; however, MSTS improvement is needed program patching, vulnerability reporting, helpdesk practices, updates of software at end of life, inadequate telephone services, as well as Virtual Desktop Infrastructure. MSTS experienced a lingering issue with the phone system. These issues resulted in unacceptable outages throughout the NNSA that still continue in certain areas today.

While improvement was seen in some areas, continued MSTS’ focus on work planning and conduct of operations is required (*National Environmental Policy Act* (NEPA) compliance and documentation, environmental permitting, electrical safety NFPA 70E compliance, DOE O 420 compliance fire protection assessments, and vital safety system assessments, etc.). Improvements were also seen in specific areas, but poor quality and timeliness of document submissions required rework on the part of MSTS and NNSA (classification reviews, public releases, RCRA permit, NEPA, REOP, safety basis, conops matrices, updates to fire hazards analysis, procurement subcontract packages, data calls etc.). In addition, MSTS has not completed a substantial number of immediate and short-term actions to improve underground facility safety that were due in FY19.

Operational upsets occurred that were preventable (re-occurring DPF operational issues, TSR violation of DAF highly enriched uranium inventory, silica exposure event at U1a, Cygnus electrical, thallium contamination in aircraft, misplaced sources, JASPER launch tube drop, vessel gouges, etc.). In this area, MSTS processes to identify and implement corrective actions prior to return to operations were developed, but did not consistently identify actions to address causal factors to help preclude recurrence or were not followed.

Improvements in project management are still required to include: planning, cost estimation work breakdown structure development, design engineering planning, work execution and tracking thereof (issued are identified in each PER Goal). Integration across MSTS is still lacking relative to using the appropriate subject matter experts in the project cycle (security, industrial hygiene, radiation protection, procurement, permitting, etc.).

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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 NNS and the Enterprise.

MSTS Amount of At-Risk Fee Allocation: \$3.717M

MSTS Leadership exceeded many of the Objectives earning a rating of Very Good and 88% of the award fee allocated to this goal, as evidenced by accomplishments that greatly outweighed issues. MSTS is generally meeting performance expectations within expected costs. MSTS leadership was outstanding during the unprecedented period of uncertainty for the COVID-19 pandemic as they continuously worked to minimize impacts to the safety of their workers as well as mission execution. MSTS met planned safety, security, and mission requirements including overall cost, schedule, and technical performance by providing leadership support for DOE/NNSA missions and cultivating a Performance Excellence Culture that encompassed a commitment to safe and secure enterprise mission execution.

MSTS leadership acted promptly and decisively in the early stages of the COVID-19 pandemic establishing a multi-disciplinary team to ensure development and execution of planning documentation, safety protocols and communications strategies. MSTS provided COVID-19 outstanding leadership across all of the NvE. MSTS implemented alternate work arrangements to maximize the safety of personnel while continuing to support Department PMEFs, MEFs and NNSA high-priority mission activities. MSTS leadership demonstrated adaptability in shifting from response to long term recovery and continuously engaged NNS users and stakeholders to ensure integration of planning efforts to effectively execute NNSA's missions. To keep the workforce informed throughout the COVID-19 pandemic, the MSTS President sent a daily video as well as written messages to help alleviate worker concerns. The SOMD made a minimum of weekly (sometimes daily) trips to the NNS to discuss COVID concerns with the entire NvE community of contractors. MSTS leadership led the NvE community in maintenance of critical operations for mission work to keep facilities and operations open and ready for NSEL work.

MSTS leadership continued to take strong ownership of the NvE integration role to enhance communications supporting the safe, secure, efficient and effective mission execution. MSTS leadership continued to proactively seek out and meet with NNSA/NFO, National Laboratory partners, and OGA sponsors to discuss their strategies and goals for operating at the NNS and to understand individual program expectations, issues, and requirements, opening communication pathways between all of the partners of the NNS and NvE. MSTS implemented a Voice of the Customer (VOC) to provide feedback on issues, integration, and execution. Data from this program was used by MSTS leadership to develop corrective actions for better enable of collaboration and integration for mission execution. MSTS leadership engaged positively to respond to the large increase in mission requirements at U1a and implemented an U1a Integrated Schedule for mission, LI construction, maintenance and mining as well as developed an integrated strategy for addressing daily personnel limits underground. Additionally, a NNSA HQ sponsored Radioactive Waste Peer Review evaluated NNS waste management assurance systems and governance interactions and identified MSTS contractor assurance systems as robust and well-practiced. The review also commented on the excellent relationship between MSTS, other contractors as well as the NNSA and DOE federal staff.

MSTS' CAS implementation continued to mature. MSTS' Risk and Issue Board performed at a self-critical level

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as it reviewed both issues and risks, including reviews of new issues and new enterprise risks, Corrective Action Plans and closure for higher significance issues and associated burndown plans, as well as identified potential systemic issues. A recent EA-30 Assessment of Issues Management found that the MSTS Issues Management program was healthy overall; however, the EA-30 review also identified a number of potential weaknesses and opportunities for improvement. Both the EA-30 review and a separate NFO review highlighted similar related concerns with MSTS review of issues management data for potential trends, including trending issues found in the FY18/19 MSTS PERs. Additional reviews found significant issues are often closed without evidence of effectiveness of the actions taken or justification for the appropriate closure. MSTS key Governance attributes improved as exemplified by the comprehensive analysis of relevant performance data in monthly Senior Management meetings and the implementation of a new CAS Maturity Model for both self-assessments and independent assessments to be performed by the Operating Experience (OPEX) group on behalf of the MSTS Board of Managers' CAS Committee. In addition, MSTS proactively engaged with the Protective Force contractor to move them to multiple MSTS-administered CAS tools, which provides benefits to NNSS such as moving toward an integrated CAS NvE system with reduced databases required for federal/contractor review and cost avoidance of additional license fees/administrative costs associated with maintaining individual systems.

MSTS supported NNSA's efforts on the Nuclear Security Enterprise (NSE) Recruitment Strategy Group and are leading a team that will provide better metrics for the NSE. MSTS also served as a member on the Governance Peer Review.

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. MSTS donated \$40K to Clark County School District (CCSD) and \$34K to Nye County School District to provide iPads and connectivity for on-line classes during COVID-19 school closures. MSTS also provided \$50K to the FIRST Robotics supporting 107 Nevada student teams and funded CCSD field trips to the National Atomic Testing Museum (NATM). MSTS is the Nevada Science Bowl sponsor as well as a Future City sponsor. MSTS paired NNSS scientific staff principal investigators with university faculty members to attract PhD students and post-docs and provided judges for CCSD STEM competitions. MSTS was actively involved in many community outreach programs. MSTS received the "Above and Beyond" Examiner Award from the Southwest Alliance for Excellence for performance excellence across Nevada, Arizona and Utah.

MSTS continued to use parent company reachback for expertise in safety, design engineering, water distribution, asset management, mining and external assessments to improve processes. These resources are proving extremely successful in solving NNSS issues and potential issues. Although now resolved with the addition of the VP, several KPs and the reorganization, MSTS parent corporations were slow in filling a number of key positions under the contract and enacting the reorganization to provide more efficient and effective operations and breakdown stovepipes; therefore, it is too soon to determine if the change will be effective. MSTS parent organizations do not appropriately contribute to the teaming relationship expected from leaders of Management and Operating (M&O) contractor partners. The parent organizations were not proactive and were slow to provide support to the on-site M&O team when they were not meeting NNSA expectations, and are involved in decisions that should be made by the M&O contractor. MSTS and its parent organizations should be mindful of the special trust and responsibility invested in them as a partner in the NNSA National Security Enterprise, and continue to expand their role in bolstering the team when resources or specialized expertise is required.

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While the UCEP and ASD Projects are behind schedule and over budget, all organizations are working together to improve performance. Following the identification of significant increases in requirements and costs on UCEP Subproject 020, personnel from all four organizations participated in multiple activities to define, refine, and control requirements and scope within the UCEP project. The ASD Annual Project Review identified that ASD and UCEP are adequately integrated and all four sites are effectively integrating on the ASD Project. MSTS needs to continue regular senior management engagement on the UCEP/ASD Project.

Although much improved, continued MSTS leadership focus is necessary on MSTS' programmatic interface, communications, and transparency with the individual NNSA federal programs especially as changes occur, so the federal program office can understand impacts, redefine scope and set priorities. In addition, many of the systems/culture improvements made by MSTS leadership still need to be flowed down as they have not yet flowed down past the senior leadership.

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