



National Nuclear Security
Administration

National Technology and
Engineering Solutions of
Sandia, LLC

Performance Evaluation
Report (PER)

NNSA Sandia Field Office (SFO)

Evaluation Period:
October 1, 2018 -
September 30, 2019

December 2, 2019

Executive Summary

This Performance Evaluation Report (PER) provides the National Nuclear Security Administration (NNSA) assessment of the National Technology and Engineering Solutions of Sandia, LLC (NTESS) performance of the contract requirements for the period of October 1, 2018 - September 30, 2019, as evaluated against the Goals defined in the Performance Evaluation and Measurement Plan (PEMP). NNSA took into consideration all input provided (e.g. CAS, Program Reviews, etc.) from NTESS and NNSA Program and Functional Offices both at Headquarters and in the field.

NTESS earned an overall rating of Very Good during this performance period. NTESS earned Excellent ratings for Goals 2, 3, and 4, and Very Good ratings for Goals 1, 5, and 6. Specific observations for each goal are provided in the following pages.

Goal 1: Mission Execution: Nuclear Weapons -- Successfully execute 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.
NTESS Amount of At-Risk Fee Allocation: \$3.07M

Under this Goal the contractor earned a rating of Very Good with a percentage of 85%. NTESS accomplishments greatly outweigh issues, and there were no significant issues in performance.

Accomplishments:

NTESS successfully executed nuclear stockpile system surveillance, maintenance, disposition, and limited-life component deliveries for Defense Programs. NTESS stockpile systems engineering teams completed the Cycle 23 Annual Assessment Report to sustain the stockpile per the NNSA Office of Defense Programs Getting the Job Done List (GTJDL).

NTESS applied innovative science and engineering capabilities to increase confidence in performance and survivability of nuclear weapon systems. NTESS strengthened technical capabilities in the areas of experimental sciences, material diagnostics, radiation effects, advanced simulation and computing, and validation of performance predictions. NTESS obtained important experimental nuclear sciences data by advancing pulsed power experimental capabilities, enabling higher pressure plutonium and tritium tests to increase yield and validate computer modeling codes that increase confidence in stockpile qualification. In addition, NTESS designed new instrumentation systems to provide real-time in-flight experimental payload data for the NNSA-sponsored High Operational Tempo flight test. These flight tests provided a lower-risk experimental alternative for NNSA laboratories to encourage research exploration and further augment NNSA's ability to adapt weapon systems to meet urgent needs.

NTESS addressed an immediate national security imperative by rapidly responding to an urgent operational need to enhance safeguards outside the continental United States by executing a project in a highly compressed timeline. NTESS partnered with NNSA and the U.S. Air Force (USAF) to complete critical design reviews, qualification, production, testing, and acceptance activities to meet First Production Unit (FPU) milestones.¹

NTESS successfully met the accelerated schedule for the FPU and Initial Operational Capability for the W76-2 program. NTESS completed all required design and qualification activities three months ahead of schedule, enabling early delivery of the FPU to meet an NNSA goal.

NTESS effectively responded to Commercial-off-the-Shelf (COTS) part qualification failures affecting weapon modernization programs. NTESS rapidly mobilized resources across multiple disciplines to characterize impacts; developed recovery options; procured required parts; and created a testing infrastructure to qualify replacement COTS parts. In addition, NTESS partnered with the Kansas City Nuclear Security Complex to expedite production of other major components by reexamining and improving producibility while retaining required functionality.

NTESS achieved W80-4 Phase 6.3 and mitigated schedule risk through implementation of New Product Introduction (NPI) and weapon system design simplification efforts. NTESS achieved significant progress in establishing an earned value management system and developing the Milestone Alignment Tool to track the program critical path schedule. In addition, NTESS' extensive interactions with two competing USAF missile contractors supported seamless warhead-to-missile integration.

NTESS restarted the W87-1 Phase 6.2 per the GTJDL. NTESS analyzed and refined key aspects of non-nuclear component design to improve weapon surety and support technologies to streamline engineering and production development. NTESS utilized lessons learned from the W80-4 NPI initiatives to mitigate schedule risk for the W87-1 program.

NTESS successfully completed the Mobile Guardian Transporter (MGT) Test Article 1 assembly per the GTJDL. NTESS reactivated and validated a testing facility to conduct full-scale testing of the MGT in FY20.

NTESS proficiently managed and operated Production Support capability to meet multiple NNSA mission needs. NTESS completed the first electronic neutron generator designed and produced at SNL for the B83 and B61. NTESS completed the FPU for the W88 Neutron Generator, supporting the new Limited-Life Component Exchange requirements for the W88 Program. Additionally, NTESS took on new power source production requirements and started production of thermal batteries.

¹ This information was not considered for the award fee for this goal because the Contract has a separate Strategic Partnership Project fixed fee.

NTESS provided critical expertise to expedite schedule recovery and meet B83 Issues Resolution Group priorities. This enabled NNSA to deliver the Joint Test Assembly to the Department of Defense on schedule. NTESS supported disassembly restart operations required to complete vital surveillance testing that contributes to the annual assessment.

NTESS successfully completed all scheduled activities for the Silicon Fabrication Facility conversion from 6" to 8" wafer size, maintaining NNSA's critical capability of producing strategic, radiation-hardened microelectronics and micro-systems.

Issues:

NTESS inconsistently managed the weapon modernization programs (i.e., B61-12, W88 ALT 370/940, W80-4), impacting the cost, schedule, or performance of these programs.

NTESS did not meet NNSA schedule expectations for development of the Microsystems Engineering, Science and Applications (MESA) Complex Extended Life Program, affecting NNSA's ability to incorporate MESA funding needs in future budget requests.

Goal 2: Mission Execution: Global Nuclear Security -- Successfully execute 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.

NTESS Amount of At-Risk Fee Allocation: \$0.77M

Under this Goal the contractor earned a rating of Excellent with a percentage of 95%. NTESS accomplishments significantly outweigh very minor issues, and there were no significant performance issues.

Accomplishments:

NTESS provided unique analytical expertise to secure buildings with nuclear and radiological materials both domestically and internationally. NTESS' support included: leading physical security workshops; developing security communication systems and insider threat mitigation training material; and conducting vulnerability analyses and assessments. NTESS provided critical physical protection expertise in executing the Cesium Irradiator Replacement Project and Global Cesium Security Initiative. For example, NTESS successfully collaborated with one of the largest blood suppliers in the U.S. and multiple high priority international partners to replace cesium irradiators. NTESS provided expert support to NNSA's efforts to strengthen relationships between radioactive material licensees and law enforcement officers in major U.S. metropolitan areas.

NTESS provided key technical support to the launches of the GPS III-1 and III-2 satellites containing the Global Burst Detector (GBD) III-1 and III-2 payloads, respectively, and supported early on-orbit testing. NTESS also received approval for the GBD IIIF system

Critical Design Review. NTESS developed a risk mitigation strategy for the design and fabrication of the microelectronics layout of the next-generation optical sensor for space-based monitoring. NTESS provided critical support for the proliferation detection mission by designing and installing accelerometers that exceeded performance expectations for the Source Physics Experiment. NTESS provided technical and project management leadership for a DNN R&D multi-laboratory material properties research venture. In addition, NTESS developed and tested a unique high hazard material containment system at the Z Pulsed Power Facility that paved the way for future experiments on high-priority materials to validate modeling efforts.

NTESS demonstrated leadership in serving as the lead laboratory for the quality assurance audit and surveillance of the U.S. High Performance Research Reactor Project. NTESS also provided strong technical support to the Surplus Plutonium Disposition Program to assess the long-term performance of the Waste Isolation Pilot Plant.

NTESS provided valuable contributions to projects for the NNSA Office of Nuclear Verification's Warhead Verification Program, including support for the Comprehensive Nuclear Test Ban Treaty Organization's International Data Centre Re-engineering initiative.

NTESS successfully responded to the contamination incident at the Harborview Medical Center in Seattle, WA, and supported the radiological survey at Piketon, OH. NTESS provided expertise to support the Donald C. Cook Nuclear Power Plant Federal Outreach for Michigan and Indiana in preparation for a graded exercise required by the Nuclear Regulatory Commission. NTESS participated in the Reachback Discovery Workshop and led associated interagency working groups that defined operational coordination and technical assessments for incident response methodologies employed by the Federal Radiological Monitoring and Assessment Center. NTESS supported the Stabilization program and the Joint Technical Operations Team in designing a contamination training block with the Idaho National Laboratory.

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.

NTESS Amount of At-Risk Fee Allocation: \$0.0M

Under this Goal the contractor earned a rating of Excellent with a percentage of 100%. NTESS accomplishments significantly outweigh very minor issues, and there were no significant performance issues.

Accomplishments:

NTESS delivered innovative and transformative scientific and technological solutions that directly supported DOE missions for energy, science, nuclear, economic, and environmental

stewardship programs. NTESS' grid modernization expertise helped strengthen grid resiliency and security, and advanced physical and cyber protection of the nation's energy infrastructure. NTESS completed, ahead of schedule, the implementation of the new DOE-sponsored data preservation project for high-level waste repository science, which included a new cloud-based storage system for DOE. NTESS successfully completed and delivered the Waste Isolation Pilot Plant (WIPP) Compliance Recertification Application to DOE Environmental Management for the timely submission to the Environmental Protection Agency for continued operations of WIPP. NTESS successfully delivered the Mars 2020 Final Safety Analysis Report to DOE Nuclear Energy and the National Aeronautics and Space Administration, which provided the science basis and risk assessment for use of a Radio-isotopic Thermoelectric Generator power source on the future Mars 2020 mission.

NTESS sustained and strengthened core capabilities for the DOE/NNSA mission work in several areas. NTESS worked to facilitate the development and production of a common hypersonic glide body based on previous hypersonic flight successes; provided advanced radio frequency technologies for situational awareness; enhanced physical and border security; and worked to reduce chemical/biological dangers. In addition, NTESS upgraded the Kauai Test Facility Missile Support Tower and developed an innovative, mobile Remote Launch Operations Center to address national security threats. NTESS also applied core capabilities relevant to DOE/NNSA mission areas, such as sensor development, autonomy, microelectronics, cybersecurity, physical security, directed-energy, proliferation, and threat assessments.

NTESS successfully supported various nuclear weapons SPP such as the B61-12 Tail Kit and Mk21 Fuze. For example, NTESS demonstrated tremendous agility in meeting customer needs for the Mk21 Fuze program by adjusting to reduce project funding and responding to new work scope that aligned with the Ground Based Strategic Deterrent Program.

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

Successfully advance national security missions and advance the frontiers of ST&E. Effectively manage Laboratory Directed Research and Development (LDRD) and Technology Transfer, etc. in a safe and secure manner in accordance with DOE/NNSA priorities, Work Authorizations, and Execution/Implementation Plans.

NTESS Amount of At-Risk Fee Allocation: \$0.0M (Fixed Fee Only)

Under this Goal the contractor earned a rating of Excellent with a percentage of 100%. NTESS accomplishments significantly outweigh very minor issues, and there were no significant performance issues.

Accomplishments:

NTESS focused its research strategy and investments on current national security applications as well as future technology needs that are complementary to DOE/NNSA

missions. ST&E capabilities contributed directly to NNSA mission priorities to support Research, Development, Testing, and Evaluation for science-based stockpile stewardship, and these capabilities were leveraged to support DOE and other federal agency missions. NTESS completed its second cycle of LDRD mission campaign investment area selection and chose two new campaigns to develop key capabilities and overcome high-risk technical hurdles associated with future mission needs. NTESS received a Secretary of Energy Achievement Award for a chamber-contained tritium experiment enabled by a LDRD Grand Challenge project. NTESS piloted a new LDRD program called ACORN (Accelerated Collaborative Research Nucleus) to connect early career principle investigators with early career faculty.

NTESS achieved many ST&E accomplishments that directly benefited stockpile modernization and improved capabilities for weapons applications, qualification, and validation. For example, NTESS completed the first temperature measurement for a plutonium (Pu) shock-ramp experiment at Z Facility. NTESS advanced nuclear deterrence digital system designs to ensure safety, security, and reliability of the W80-4. NTESS developed a high-speed focal plane array capable of capturing eight frames of data with 100-nanosecond shutter times for the Nevada National Security Site that significantly enhanced fidelity of data acquisition and analysis. In partnership with Los Alamos National Laboratory and Lawrence Livermore National Laboratory, NTESS installed and benchmarked Astra, the world's largest ARM-based supercomputer for enhanced High Performance Computing capabilities.

NTESS successfully maintained a healthy, vibrant research environment that enhanced technical workforce competencies and research capabilities. NTESS actively recruited top-level talent through the FY20 Truman Fellowship and Hruby Fellowship solicitations. NTESS also hosted and participated in multiple university partnership and academic alliance events to help build the Laboratories' workforce pipeline.

NTESS successfully managed the largest Technology Partnerships and Technology Transfer Programs in the NSE, transferring numerous impactful technologies to the public and private sectors. NTESS established a royalty-funded Technology Maturation Program to accelerate the commercialization of NTESS technologies by increasing the technology readiness level. NTESS generated eleven Technology Maturation proposals, and selected two for funding. In addition, NTESS established a new National Laboratory Entrepreneur Accelerator Pipeline to help programs successfully mature technology readiness levels. NTESS submitted 210 technical advances, filed 185 patent applications, issued 134 patents, initiated 97 copyright assertions, issued 158 government use notices, signed 10 commercial licenses, and executed 28 new Cooperative Research and Development Agreements.

Goal 5: Mission Enablement -- Effectively and efficiently manage the safe and secure operations of the Sandia National Laboratories while maintaining an NNSA enterprise-wide focus; demonstrating accountability for mission performance and management controls; successfully executing cyber 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.

NTESS Amount of At-Risk Fee Allocation: \$2.30M

Under this Goal the contractor earned a rating of Very Good with a percentage of 85%. NTESS accomplishments greatly outweigh issues, and there were no significant issues in performance.

Accomplishments:

NTESS enhanced Environmental, Safety and Health (ES&H) training to improve knowledge of safety policies and procedures for approximately 160 ES&H coordinators embedded in line organizations. NTESS developed an ES&H qualification program consisting of 20 courses and 21 required readings (approximately 160 hours) to ensure consistency in ES&H coordinator roles and responsibilities. NTESS also improved timeliness and consistency of event categorization for ES&H reporting by centralizing event categorization authority. NTESS demonstrated an improved reporting culture as evidenced by a 58% increase in Management Concern and Issues occurrence reporting.

NTESS partnered with the USAF and NNSA to facilitate communications to support the Eubank Gate Improvement Project, which will result in meeting USAF security requirements and providing access to the new NNSA Albuquerque Complex.

NTESS was the first NNSA site to successfully complete the Computer Maintenance Management System (CMMS) integration into NNSA's BUILDER software. NTESS shared its integration software code with other NNSA sites (including the Albuquerque Complex) and assisted the sites with their CMMS integration efforts. In addition, NTESS played a significant role in the Mission Dependency Index 2.0 initiative by piloting a new methodology that will enable users across the enterprise to holistically evaluate capabilities to improve decision making for future infrastructure investments.

NTESS significantly improved its Nuclear Criticality Safety Program as evidenced by being the first NNSA site to implement DOE O 420.1C CN2 and supporting other DOE and non-DOE organizations in Nuclear Criticality Safety Programs.

NTESS implemented the Sandia Waste Accountability System to comply with New Generator Regulations adopted by the State of New Mexico, reducing the number of waste generation sites by 20 percent.

NTESS adapted security operations to effectively meet the surge in mission-related work by embedding security professionals in line organizations, increasing the number of security briefings, and developing the Sandia Total Access Request Tool for clearance processing and access control. Additionally, NTESS successfully passed, with no findings or deficiencies, the Enterprise Assessments' Limited Notice Performance Test for the preparedness of the protective force, physical security, and material control and accountability system. NTESS was recognized for several noteworthy practices, such as random monthly firearms inspections and protective force performance testing preparation.

NTESS participated in the Office of Emergency Operations initiative to develop metrics that indicate a site's level of readiness to respond to emergency events. NTESS provided insightful feedback and metric examples that shaped the development of a working-level system that will be tested throughout the NNSA emergency management community.

In Strategic Sourcing, NTESS achieved the highest total strategic cost savings in the NSE at 9.6%, exceeding its goal of 4%. Valued at \$138M, the cost savings represent 48.8% of NNSA's total strategic cost savings, enabling NNSA to exceed its goal.

NTESS exceeded its overall Small Business goal as well as goals in all five categories (Small Disadvantaged Business, Woman Owned Small Business, Historically Underutilized Business Zone, Veteran-Owned Small Business, and Service-Disabled Veteran-Owned Small Business).²

NTESS successfully completed the NNSA Command Cybersecurity Readiness Inspection of the Sandia Partnering Network (SPN) with an "Excellent" rating. By maintaining a high level of security on the SPN, NTESS helped ensure the overall protection of the interconnected NNSA Secure Network, which provides classified mission support for both DOE and NNSA. NTESS also exceeded expectations on six deliverables associated with FY19 Cyber Security Implementation Factors (IFs) by either satisfying the objectives ahead of schedule or scoring above the established thresholds for metrics. These efforts helped enable NNSA to achieve objectives identified as essential for the NSE.

NTESS volunteered to lead a collaborative effort to develop an enterprise-wide approach to managing fraud risk. NTESS developed a charter and working group comprised of representatives from DOE and six Management and Operating contractors.

Issues:

NTESS did not resolve long-standing operational issues related to the lack of formality and rigor of TA-V processes. While NTESS approved the TA-V Continuous Improvement Plan, no significant progress was achieved, delaying implementation of NQA-1 quality requirements. The lack of progress was evidenced by continued problems with the TA-V

² This information was not considered for the award fee for this goal because the Contract has a separate Small Business performance incentive fee.

fire alarm system and corrective actions from the 2018 Technical Safety Requirement violations related to the system. NTESS also experienced inconsistent formality of operations in other areas as evidenced by numerous issues associated with electrical work and Z Facility operations.

NTESS organizations did not consistently ensure mission support requirements were being met early in the facility planning process. Several examples include the lack of As Low As Reasonably Achievable (ALARA) review of the Z support facility, delayed completion of the Sulfur Hexafluoride Gas Implementation Plan, and insufficient identification of explosive safety and safety basis requirements for the New Transshipment Facility.

Though six corrective action plans were developed to resolve fire protection issues, NTESS experienced issues with managing and executing the corrective actions.

NTESS experienced environmental planning issues at Tonopah Test Range, requiring NNSA to notify the Nevada State Historic Preservation Officer and the Advisory Council on Historic Preservation of non-compliance. Though NTESS developed and implemented corrective actions, improvements have not been realized. NTESS also experienced issues with planning that required multiple project reviews by the New Mexico and Nevada State Historic Preservation Officers, causing significant project delays and rework. Several examples include building roof replacements, modifications, and fire riser addition.

NTESS experienced issues in the emergency management readiness assurance program as evidenced by poor performance during two annual emergency management exercises and a recent real-world event. Several examples include: inadequate exercise planning, control, and evaluation; lack of self-assessments; unclear roles and responsibilities between response, line, and support organizations; lack of formality of operations in response functions; and lack of rigor in training and drills.

NTESS did not meet the following cyber security requirements: remediating vulnerabilities in accordance with NNSA established time thresholds; ensuring Sandia-furnished endpoints meet malware protection requirements; and completing milestones for enhancing alert and intelligence sharing capabilities across the NSE.

NTESS submitted contract documents that contained significant legal issues requiring multiple review iterations. These issues could impact NTESS' ability to adequately capture customer requirements, issue procurements on schedule, and ensure subcontractor performance.

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 NTESS 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 Sandia National Laboratories and the Enterprise.

NTESS Amount of At-Risk Fee Allocation: \$1.54M

Under this Goal the contractor earned a rating of Very Good with a percentage of 76%. NTESS accomplishments greatly outweigh issues, and there were no significant issues in performance.

Accomplishments:

NTESS demonstrated strong leadership engagement in overcoming significant challenges to an immediate national security imperative by providing extensive resources and expertise from across the Laboratories that enabled an integrated engineering solution, resulting in the on-schedule and within-budget delivery and installation of a product for this critical national security project.

NTESS demonstrated leadership in improving attraction and retention of high caliber and diverse talent to carry out the NNSA mission. NTESS achieved a new hiring record with over 1,900 employees hired in a single fiscal year while simultaneously improving hiring processes to enhance the overall candidate experience. NTESS also co-led the NSE Recruitment Strategy Group and was instrumental in facilitating successful “NSE Days” at three universities and a “Lab Day” at one university.

NTESS co-led the NPI initiative to apply industry best practices and lessons learned from past programs in implementing systemic changes to improve product development and production, and increase design and production integration. The cross-NSE effort accelerated progress on the W80-4 LEP by reducing time and risk to acquire parts; developing an enhanced preparation process to produce more informative technical and programmatic reviews; and rolling out a Design Failure Mode Effects Analysis to develop designs with higher producibility and lower risk, a first for weapon programs. NTESS introduced these new methods earlier on the W87-1 where they will be more impactful in the development process.

NTESS launched Sage, a new integrated Labs-wide performance assurance system designed to improve management of risks, issues, and corrective actions and provide enhanced capability for managing integrated assessments, lessons learned, and Prime Contract requirements. NTESS shared its performance assurance system best practices and lessons learned with DOE/NNSA sites. NTESS also piloted an Issue and Risk Governance Committee designed to provide executive-level engagement to ensure risks are effectively mitigated and issues are properly addressed through corrective action plans.

NTESS demonstrated commitment in continuous improvement across the NSE by hosting the NSE Operating System Working Group and sharing Laboratory Operating System approaches and practices with representatives from six NNSA sites.

The NTESS leadership took immediate actions to address significant issues identified during two emergency management full-scale annual exercises. Actions taken include: conducting a full internal review of the program to identify gaps and deficiencies; incorporating the review recommendations into the DOE O 151.1D project plan; and conducting multiple tabletop drills to improve integration between internal and external response organizations.

Forbes magazine recognized NTESS as one of the Best Employers for Diversity, and one of the top 500 Best Large Employers.

Issues:

NTESS senior leadership did not provide proactive engagement and leadership in support of on-going warhead modernization activities, in particular the coordination and collaboration required on the B61-12 LEP and W88 Alt 370 with senior leadership from the Production Agency. Management and technical issues persisted for longer than optimal versus escalating and bringing forward solutions. Additionally, NTESS senior leadership was slow to account for DoD delivery schedules as part of the warhead requirements. As a result, NNSA was limited in providing options that optimize meeting schedule and warhead requirements for consideration by the DoD and ultimately the Nuclear Weapons Council for down select to proceed with development and production. NNSA acknowledges that there were recent signs of increased engagement and management improvements that can benefit the upcoming W80-4 LEP and W87-1 Modification Program, and NNSA will monitor continuous improvement efforts to reduce costs and schedule risk in these programs.

NTESS experienced a high volume of Category A security incidents. NTESS leadership initiated a Security Improvement Plan to reduce the numbers and types of security incidents, though improvements have yet to be realized. In addition, NTESS did not consistently follow its classification policy that requires Derivative Classifier reviews to be performed prior to creation, transmittal, or publishing documents, increasing risk of security incidents.

NTESS began implementing a key Organizational Conflict of Interest (OCI) mitigation plan addressing nuclear weapons OCI-related production risk. The need for interim risk reduction measures continues until NTESS provides evidence of the effectiveness of the planned mitigations.