National Nuclear Security Administration

National Security Technologies, LLC

Fiscal Year 2015 Performance Evaluation Report (PER)

NNSA Nevada Field Office

Performance Period:
October 1, 2014 – September 30, 2015

January 4, 2016

Executive Summary

This Performance Evaluation Report (PER) provides the assessment of National Security Technologies, LLC (NSTec) performance for the period of October 1, 2014 through September 30, 2015, as evaluated against the objectives defined in the Fiscal Year (FY) 2015 Strategic Performance Evaluation Plan (PEP). The National Nuclear Security Administration (NNSA) took into consideration and consolidated all input provided (e.g., Contractor Assurance System (CAS), Program Reviews, etc.) from NNSA Program and Functional Offices both at Headquarters and in the field. The six Performance Objectives (POs) in the PEP were graded using adjectival ratings as described in the Federal Acquisition Regulation (FAR) against the Contributing Factors and Site Specific Outcomes identified in the PEP.

NSTec submitted a Performance Self-Assessment Report that covered the rating period. NSTec is to be commended for the thoroughness of their report which highlighted their major accomplishments. FY 2015 was a very good year for NSTec, highlighted by significant contributions to the enterprise by effectively performing across all of their mission lines including Stockpile Stewardship, Nuclear Non-proliferation, and Environmental Management.

While the balance of NSTec's performance during the fiscal year was excellent, there were some challenges during this period that did not reflect the operational excellence expected from a Management and Operating (M&O) contractor. Opportunities for improvement still exist in the areas of: nuclear safety basis development, configuration management, lack of proactively handling the internal radiological exposure issues at Godiva, and chemical chain of custody issues associated with the fire at the Non-Proliferation Test and Evaluation Complex satellite accumulation area. As a result of the various issues experienced during FY 2014 and early FY 2015, NSTec responded with the identification and initial implementation of five pillars of operational excellence. This management initiative focused attention on key areas. While many of the pillar efforts are recent, there have been significant cultural changes demonstrated in pausing work when employees identify circumstances that are not expected. There also has been excellent parent corporation support that provides critical self-reflection. The response provided was above and beyond what was anticipated and is clearly driving towards enhanced safety culture that is focused on efficient and predictable mission outcomes.

PO-1: Manage the Nuclear Weapons Mission (32% of At-risk fee) was rated as VERY GOOD. Overall, NSTec's performance exceeded expectations in the management and execution of the Nuclear Weapons Mission for Nevada National Security Site (NNSS) activities. NSTec completed on time/schedule/budget all 20 of their Level 2 national milestones. NSTec developed, implemented and expanded the use of revolutionary diagnostics beyond the NNSS to National Security Laboratory sites to capture unprecedented data for the US nuclear stockpile. In addition, NSTec delivered 100% data on the successful U1a experiment, Orpheus, and implemented two new diagnostics high dynamic range Photon Doppler Velocimetry (PDV) and dynamic stereo surface imaging. NSTec delivered an integrated logic-linked schedule for out-year Subcritical Experiments (SCEs) with the National Laboratories and elements of the Enhanced Capability for Subcritical Experiments (ECSE) SCE along with the Project Data Sheets for the ECSE Line Item project for U1a. In addition, NSTec successfully supported the Lawrence Livermore National Laboratory (LLNL) completion of the Hugoniot series for plutonium with the Joint Actinide Shock Physics Experiment Research (JASPER) experiments. NSTec

also successfully managed critical nuclear facilities and supported the National Laboratories for the U1a Complex, JASPER, Device Assembly Facility (DAF), National Criticality Experiment Research Center (NCERC), Godiva re-start, the Advanced Radiography project. There were some areas identified as opportunities for improvement. Notable being the loss of a server at the NSTec office in Los Alamos impacting the analysis of valuable historic underground test data. NSTec's self-assessment rating was EXCELLENT.

PO-2: Reduce Global Nuclear Security Threats Mission (15% of At-risk fee) was rated as VERY GOOD. Overall, NSTec's performance exceeded expectations in the management of the Global Nuclear Security Threats Mission. NSTec's highlights included: work for the GMS program with the project's two largest recoveries and the 1st orphan source recovery in Armenia; a significantly increased operational tempo to national incident response activities at home and abroad (i.e. Papal visit) for the National Emergency Response program; receipt of the GSA Award for Aviation Safety across the federal government; improvements to the ECN "anytime, anywhere" communications for both CONUS and OCONUS operations of NNSA counterterrorism responders and on the next generation satellite kits for KLAS Voyager. In addition, NSTec successfully integrated multi-agency, one of a kind non-proliferation experiments to support the national security programs. NNSA agrees with NSTec's self-assessment rating of VERY GOOD.

PO-3: Department of Energy (DOE) and Strategic Partnership Project (SPP) Mission Objectives (5% of At-risk fee) were rated as EXCELLENT. Overall, NSTec's performance significantly exceeded expectations in the management of the DOE and SPP Mission Objectives. NSTec's scientific laboratory facilities were highly effective in the execution of high impact strategic programs that benefitted both DOE/NNSA mission and national security interests. NSTec scientists and engineers delivered technical services and products to multiple government agencies with a focus on technologies which complement the DOE/NNSA mission. NSTec was effective in the execution of high hazard experiments at the NNSS. While multiple government agencies benefitted from these experiments, NSTec efforts to improve the initial planning, hazard identification, scope, and schedule requirements to ensure that NNSS activities are conducted in a safe, secure, and efficient manner continue to improve. NSTec's Environmental Management performance also significantly exceeded expectations. NSTec worked with a range of internal and external stakeholders insuring effective program execution and program integration support to the DOE Office of Environmental Management. NNSA agrees with NSTec's self-assessment rating of EXCELLENT.

PO-4: Science, Technology, and Engineering (ST&E) (3% of At-risk fee) was rated as EXCELLENT. Overall, NSTec's performance significantly exceeded expectations in its ability to manage Science, Technology, and Engineering. NSTec's Site Directed Research and Development (SDRD) Program grew in FY 2015 in participation as well as results of prototype sensors and diagnostic systems that were picked up by national security programs (~40% versus the national average of ~30%). The diagnostic systems being developed through the SDRD program revolutionized data capture and collection. NSTec was able to demonstrate sending data collection from the 100s of data points to the tens of thousands of data points in the same experiment. NNSA agrees with NSTec's self-assessment rating of EXCELLENT.

PO-5: Operations and Infrastructure (35% of At-risk fee) was rated as VERY GOOD. Overall, NSTec's performance exceeded expectations meeting the DOE/NNSA mission of ensuring Site Operations and

Infrastructure are maintained. NSTec demonstrated strong progressive improvements in calling work pauses/safety stand downs and conducting management reviews/critiques. Other important accomplishments included: superior performance in all areas during the Headquarters Safeguards & Security Inspection with no major deficiencies identified, development of a prototype situational awareness tool for site access control and monitoring, proactive approach to address wildland fire concerns, increasing senior management presence in the field, development and implementation of an accelerated strategy to excess facilities, meeting water reduction metrics, and successful renegotiation of the thirty union contracts. NNSA agrees with NSTec's self-assessment rating of VERY GOOD.

PO-6: Leadership (10% of At-risk fee) was rated as VERY GOOD. Overall, NSTec's performance significantly exceeded expectations in meeting the DOE/NNSA mission by ensuring Leadership is effectively managing programmatic concerns. NSTec's key achievements included: outstanding leadership with a range of internal and external stakeholders insuring effective program execution and program integration support to the DOE Office of Environmental Management; use of the Highland Group to perform an in-depth analysis to achieve significant improvements in work planning; implementation of the Comprehensive Workforce Management Project that redesigned NSTec salary structures, job families, compensation, etc.; utilization of the Parent Organization Oversight Committee to perform in-depth comprehensive reviews of recent incidents and weaknesses; and development and progress of a management initiative (five Pillars of Operational Excellence). NSTec's self-assessment rating was EXCELLENT.

Specific observations for each of the Performance Objectives are provided in the following pages.

Performance Objective 1: Manage the Nuclear Weapons Mission

Summary

Manage the Nuclear Weapons Mission (32% of At-risk fee) was rated as VERY GOOD. Overall, NSTec's performance exceeded expectations in the management and execution of the Nuclear Weapons Mission for NNSS activities. NSTec completed on time/schedule/budget all 20 of their Level 2 national milestones. NSTec developed, implemented and expanded the use of revolutionary diagnostics beyond the NNSS to National Security Laboratory sites to capture unprecedented data for the US nuclear stockpile. In addition, NSTec delivered 100% data on the successful U1a experiment, Orpheus, and implemented two new diagnostics high dynamic range PDV and dynamic stereo surface imaging. NSTec delivered an integrated logic linked schedule for out-year SCEs with the National Laboratories and elements of the ECSE SCE along with the Project Data Sheets for the ECSE Line Item project for U1a. In addition, NSTec successfully supported LLNL completion of the Hugoniot series for plutonium with the JASPER experiments. NSTec also successfully managed critical nuclear facilities and support the National Laboratories for the U1a Complex, JASPER, DAF, NCERC, Godiva re-start, the Advanced Radiography project. Opportunities for improvement were identified in relation to the loss of a classified server at the NSTec Los Alamos office, impacting our historic nuclear weapons test data analysis. Also, NSTec experimental data on dense plasma focus experiments was incomplete and they did not reveal this until late in the year. Fortunately, they did turn this around and are now being forthcoming with the data and are participating fully in planning discussions. NSTec's self-assessment rating was EXCELLENT.

NSTec achieved two stretch goals by successfully designing, implementing and capturing unprecedented data on a high dynamic range PDV (enabling better resolution of velocities of inner shell structures under shock) and a stereo surface imaging diagnostic that were both successfully fielded on Orpheus.

NSTec received a nomination for a Research and Development (R&D 100) Award for the Argus Fisheye Velocimetry Probe, a technology that opens new paradigms for critical national security experiments and enables data collection on an unprecedented scale, not only at NNSS but other national security sites.

NSTec delivered to Los Alamos National Laboratory (LANL) the first version of software to automatically measure the distance from the Multiplexed Photon Doppler Velocimetry (MPDV) probe to the target surface rather than manually performing data analysis to the 10 micron level. This new software enables time-saving in analysis and experiment setup time (~20% saving), higher accuracy, automated analysis for devices in the Lyra series of experiments, as well as for devices in the hydro experiment program ongoing at LANL.

At the request of the National Security Laboratories, NSTec successfully designed, improved, implemented, and increased dramatically the diagnostics systems developed for NNSS facilities to achieve unprecedented data recovery for the Stockpile Stewardship program for transfer to the Laboratories. Examples include:

- joint fielding of a record 184 channels of optical velocimetry at Dual-Axis Radiographic Hydrodynamic Test (DARHT);
- a Gas Gun Differential Amplifier (GGCDA) designed for JASPER successfully bench tested at the High Explosives Application Facility (HEAF) allowing 25 times more data collected using the GGCDA than with the previous Tektronix scope-based set up, allowing experimenters to witness never before seen post shot activity;
- the new TA-55 "Compact 6" pyrometer confirming desired sensitivity, linearity, and preparation for use in an initial set of dynamic experiments reducing the footprint to around 1/10 of the old system with great performance;
- a completed radio frequency (RF) velocity detection system to LLNL to characterize detonations of high explosives (HE) and for ion investigation as a diagnostic for LLNL SCEs measuring the velocity of an HE detonation inside the HE; whereas PDV only measures the velocity of the surface;
- PDV probes on the outer and inner surface of a uranium cylinder shot on Sandia National Laboratory's (SNL) Z Machine first cylindrical uranium equation of state (EOS) containment experiment that obtained very high pressures compared to typical planar EOS platforms.

NSTec continues showing world class leadership in improving the MPDV demonstrating a more efficient multi-chassis modular MPDV, a high dynamic range PDV (HDRPDV), by designing and building the MPDV3. This improved the fidelity of DARHT and SCEs (U1a). Performance improvements (i.e., spot size enhancement) also continue on the Dense Plasma Focus (DPF) in support of the Neutron Diagnosed Subcritical Experiments (NDSE) and the dynamic surface stereoscopic imaging (DSSI) system as a Tier-1 diagnostic fielded on Orpheus. These new capabilities can be used in conjunction with PDV data to correlate anomalies and key features of the imploding system.

NSTec designed a new HDRPDV, an improved MPDV that is multiplexed in the time domain and will be able to better resolve velocities of the real-time motion of inner shell structures under shock. The system was successfully fielded on Orpheus, the Lyra confirmatory, and achieved unprecedented data return for the Stockpile Stewardship Program.

NSTec delivered a newly designed 3-frame camera to Photon Radiograph (pRAD) facility at LANL after failure of an existing 3-frame camera in the prime experiment imaging location. The new camera captured 100% of the experimental data and performed well in the radiation environment precluding any facility delays and loss of data. A lost day at pRAD costs more than $100K, and a pRAD shot costs up to $500K, so the first time success of the camera was an important result. A second 3-frame camera is nearing delivery as a potential imaging camera to support future multi-pulse radiography. This camera may be fielded on experiments at Cygnus or Flash x-ray (FXR).

NSTec continued breakthrough advances in optical velocimetry probe development with a new NX3 probe that shrinks in diameter from 18 to 9 millimeters, enabling capture of later hydrodynamic data for SCEs and above ground hydros.

NSTec demonstrated a strong nuclear safety culture, which goes beyond routine compliance with Mine Safety and Health Administration rules, for safe nuclear operations of the U1A complex as noted during the DOE/EM-40 lessons learned visit.

NSTec successfully collaborated with LANL to execute the Lyra confirmatory Orpheus experiment in September 2015. This scaled, integral hydro experiment provides data for NNSA (LANL) to predictively model and assess weapon performance by exploring options for pit reuse and stockpile modernization, including the effect of changes in HE. Two new stretch diagnostic systems: HDRPDV and DSSI were successfully developed and first deployed on this experiment to continue the trend of unprecedented data collection. The Orpheus SCE returned 100% data, including never before seen imagery on the DSSI, to the Stockpile Stewardship Program.

NSTec facilitated the formation of an SCE Integrated Fielding and Execution Operating Model (with LANL and LLNL) that was endorsed by NA-10 and the Lab Science Executives. Major objectives included: effective governance of SCE planning, capability development, and operations; common transparent processes, minimization of duplication – all to enable execution of safe, secure and appropriately authorized experiments of increasing sophistication from the National Security Laboratories commensurate with an increased cadence of 2-3 SCEs per FY compared to the current rate of ~one every 18 months. This effort required delicate negotiations between multiple organizations and levels of management.

NSTec generated a Mat Lab routine to automatically evaluate the Cygnus zoom lens camera focusing targets, which sped up focusing and indicated problems with tilt across the field of view and in the depth of the lutetium-yttrium oxyorthosilicate volume-emitting scintillator.

NSTec replaced the cameras and zoom lens with upgraded hardware to include anti-reflective coating and cryo camera. Prior system characterizations demonstrated ~ 30% percent improvement in scintillator light collection efficiency. The lenses were optimized to obtain unprecedented quality radiographs on the Lyra SCE series Orpheus experiment.

NSTec successfully and efficiently optimized the Cygnus sources and imaging system showing they are now capable of radiographing low-areal density material and are suitable for use on the Red Sage series of experiments. This optimization enabled~$30M of savings for out-year SCE experiments by being able to use Cygnus in additional applications.

NSTec successfully executed seven JASPER actinide and three surrogate experiments in FY 2015, including a first ever top hat encapsulated alpha (THEA) target using encapsulated alpha plutonium. JASPER exceeded the projected total of experiments even after an extended delay due to an aging triggering system failure.

NSTec completed all 20 Level 2 national milestones for FY 2015. These milestones were achieved despite receiving late funding (specifically for Enhanced Capability for Subcritical experiments), delays in material receipt from TA-55, aging infrastructure and aging components.

NSTec achieved agreement with NA-19 and NA-50 to secure funding within FY 2017–FY 2021 programming to support NNSS Nuclear Materials Management within the Storage and Container subprograms, allowing the NNSS to be properly represented in the NNSA budget request for these programs for the first time. This effort will help to alleviate the decade old issue of consolidating NNSA nuclear materials at DAF without funding a nuclear materials management program.

Additional programmatic successes include execution of the Lyra Orpheus experiment as well as exceeding the JASPER experiment baseline by completing the Hugoniot series for plutonium.

NSTec continues to successfully manage critical nuclear facilities and support the National Laboratories for the Godiva re-start, JASPER, and the Advanced Radiography project. NSTec continued to be the integrator of the overall U1a experimental national level program/SCE frame work. In addition, NSTec effectively managed the operation of these key nuclear facilities with focus on safe, secure, compliant, and efficient operations making adjustments as necessary as driven by budget fluctuations and workforce restructuring issues. NSTec proactively re-scoped the NNSS experimental profile to add two additional SCE projects: the LANL series Red Sage and the LLNL series Sierra Nevada. This effort required implementation of prudent but difficult zero-summing of existing program support in order to mobilize these new projects to execute Programmatic priorities.

NSTec met expectations for Stockpile Services' Project Realization Integrated Digital Enterprise (PRIDE) and Enterprise Modeling Assessment Consortium (EMAC) programs throughout FY 2015. NSTec provided support on Scope Comparison of Options, Risks and Excursions (SCORE) for the FY 2016 Stockpile Stewardship and Management Plan (SSMP). One area of concern is NSTec not clearly identifying and providing program or a council member to EMAC.

NSTec met expectations by completing one FY 2015 NA-15 Task Agreement at the Meets Expectations level.

NSTec successfully supported operations for the DAF glovebox that included JASPER target assemblies and the new coring project. In addition, at DAF, NSTec successfully supported Computed Tomography scanning of Sierra Nevada Test Article and the Orpheus assembly measurements and activities.

NSTec re-analyzed underground test (UGT) data for the validation suite of weapon modeling for assessment of the nuclear weapon stockpile. In addition, NSTec continued algorithm development and improved the Statistical Based Spline Fitting (SBSF) analysis software's performance, readability, appearance, and graphical user interface. This work directly supported the stockpile baseline models of the National Security Laboratories. In addition, NSTec expeditiously resolved a data reconstruction anomaly for LLNL.

The A-1 Machine Shop fabricated, inspected, and delivered classified Research & Development (R&D)/Prototype parts supporting the B61, W88 and the Weapon Surety Programs for LANL. The A-1 Machine Shop fabricated numerous classified parts supporting B61 and W88 programs. The Machine Shop also fabricated parts necessary for the conduct of Orpheus and JASPER.

Work in the Advanced Certification Campaign (ACC) is proceeding according to expectations, with the exception of the nuclear event re-analysis work.

NSTec continued development of a DPF machine that will enable precise and efficient NDSE that will enable measurement of the decay of neutron-induced radiation emitted by a test assembly, the first such measurements since underground testing. Planning began for a future static experiment in U1a.

NSTec completed pre-conceptual project scope and cost range definition for a proposed NNSS Consolidated Mission Support Facility (supports future CD-0 development).

NSTec implemented a comprehensive evaluation of site infrastructure focused on consolidation and recapitalization to efficiently meet mission needs, reduce operating costs and risks, streamline operations, consolidate and modernize facilities, improve working conditions, and restore and sustain NNSS infrastructure, including Area 6, Control Point-1, Mercury, and the North Las Vegas Facility (NLVF).

NSTec developed and implemented a construction program to enable long-term, successful execution of recapitalization projects at the NNSS. NSTec proactively coordinated recapitalization requirements and programming with the NNSA Nevada Field Office (NFO) and NNSA HQ to ensure program viability and funding commensurate with needs, which is pivotal for continuing support of mission priorities, retaining core capabilities, and arresting the decline of vital infrastructure at the NNSS. NSTec established an ongoing pipeline of infrastructure investments that enable continued mission support and sustainment of the construction capability required for continued modernization to optimize NNSS as a vital national asset.

NSTec conducted an evaluation of the physical infrastructure portfolio, management execution strategy, and associated workforce as a result of current and out-year budget projections to ensure the structure and organization will successfully support ongoing and future mission objectives.

NSTec contributed to national-level efforts, along with the Laboratories, for operational improvements for U1a, and the development of ECSE concepts. NSTec successfully issued the preliminary design for ECSE this year given a very limited schedule.

NSTec, in a supporting role to LANL, provided operations support for the NCERC housed at the DAF. In particular, NSTec supported LANL for resumption activities of Flattop and Godiva Restart activities.

NSTec completed design and began fabricating and testing detector components for Neutron Diagnosed Subcritical experiments. NSTec optimized Cygnus for reuse on SCE and focused SCE series. NSTec also developed post-processing algorithms for next-generation shock and hydro experiments.

NSTec made progress on implementation of a multi-year strategy to drive better utilization/optimization of space within the DAF. Work scope was reprioritized consistent with funding reductions and risk-informed evaluation/de-confliction of mission execution/support activities. Relocation/co-location of the Full Scale Capability (FSC) project and Container Management Project within DAF was developed and implemented with contingency planning options to minimize program impacts and progress mission execution requiring detailed

coordination co-locate the SCE Program/Device build activities into the Nuclear Explosives Operations (NEO).

NSTec improved efforts to strategically integrate programming direction across the NA-10/50/70 activities that impacted current and future operations at the NNSS, including program and institutional planning/risks.

NSTec executed the EMAC program site-based activities in accordance with the approved EMAC Program Plan. NSTec was also assigned two site-based activities in the areas of Geographic Information System (GIS) and Validation and Verification (V&V). FY 2015 activities included development of baseline activities and participating in a quarterly performance review.

NSTec, in a leadership role, supported the ECSE evaluation panel with NNSA HQ support driving the momentum for ECSE at NA-10's direction. NSTec presented the latest infrastructure cost estimates to the panel, which included a breakdown of the various elements of cost, including the various National Security Laboratory options for radiographic sources. NSTec met an aggressive NNSA HQ delivery schedule for an infrastructure conceptual description document enabling the future submittal of an ECSE Project Data Sheet. NSTec's strong integration with the Labs permitted this timely support.

NSTec developed an integrated, logic-linked schedule for out-year SCEs and elements of the ECSE initiative for National Security Laboratories and NNSA HQ endorsement. The schedule captured U1a experiments (hydros, SCEs, and NDSE proof-of-principle), infrastructure enhancements for increased capabilities, operations, Readiness in Technical Base and Facilities (RTBF) projects, and maintenance using project management tools to provide a baseline schedule. The schedule was placed under change control, which is essential for depicting a program of record and offering management decision options based on realistic assessment of critical paths. NSTec applied non-intuitive, long-lead-time items, such as early pursuit of the U1a safety basis for various classes of out-year SCEs, after analyzing logic ties and estimated durations. This effort required delicate negotiations between multiple organizations and levels of management.

NSTec optimized the Lyra diagnostic feed-through designs and applied lessons learned with LANL input. Diagnostic feed throughs played a critical role in confinement of explosives and Special Nuclear Material (SNM) and represented some of the highest design risk. NSTec's robust design and testing process has been one of the keys to the success of each SCE.

NSTec worked to improve the JASPER infrastructure including the implementation of advanced diagnostics with a new, continuous wave x-ray (CXR). JASPER continued preparations for adding supplemental infrastructure to support more sophisticated dynamic materials experiments. JASPER executed 10 shots in FY 2015 including seven actinide and three surrogate experiments.

On January 26, 2015, the main classified server at NSTec's Los Alamos Office (LAO) went down without backup impacting the Nuclear Event Analysis. The eight-year old server could not be restored. Forensic processes were pursued in an attempt to recover lost data analysis, but were not successful. NSTec has identified a private company with appropriate clearances that may be able to

recover some or all of the data. Without the recovery of the drive, only partial data analysis recovery is anticipated.

Although the DPF has been proceeding as planned and the most probable regimes for success were identified with others less promising being eliminated, full experimental data was not shared with the community until late in the NDSE planning process which impacted planning and budgeting scenarios.

Performance Objective 2: Reduce Global Nuclear Security Threats Mission

Summary

Reduce Global Nuclear Security Threats Mission (15% of At-risk fee) was rated as VERY GOOD. Overall, NSTec's performance exceeded expectations in the management of the Global Nuclear Security Threats Mission. NSTec's highlights included: work for the GMS program with the project's two largest recoveries and the 1st orphan source recovery in Armenia; a significantly increased operational tempo to national incident response activities at home and abroad (i.e. Papal visit) for the National Emergency Response program; receipt of the GSA Award for Aviation Safety across the federal government; improvements to the ECN "anytime, anywhere" communications for both CONUS and OCONUS operations of NNSA counterterrorism responders and on the next generation satellite kits for KLAS Voyager. In addition, NSTec successfully integrated multi-agency, one-of-a-kind non-proliferation experiments to support the national security programs. NNSA agrees with NSTec's self-assessment rating of VERY GOOD.

NSTec successfully awarded physical protection enhancements for four medical sites in Belarus of 12 radiological sources totaling 12,000 curies while adhering to all US-Russian policy requirements for the GMS Program.

NSTec provided effective and efficient support for the "Remove" portion of the GMS program in Armenia and Russia, despite a diplomatically challenging year for U.S.-Russia relations. For GMS, NSTec served as a team member with the National Laboratories, as well as a lead in Armenia, successfully initiating the project's two largest recoveries and the first orphan source recovery in Armenia.

NSTec, in cooperation with Pacific Northwest National Laboratory (PNNL), conducted a first of a kind, pilot course for Sustaining Radiological Material Security & Transition Training at two sites in Belarus for the GMS Program. This collaboration could lead to future training in other countries. Physical protection enhancements were completed ahead of schedule and sustainability acceptance testing requirements were completed at two medical sites in Belarus.

NSTec successfully supported the execution of Vittorio remote sensing test for the Uranium Conversion Venture by planning the test event, establishing a test bed, constructing three new test bed articles and meeting all project test objectives within tight budget and schedule constraints.

NSTec achieved all national incident response activities at home and abroad with a significantly increased operational tempo for FY2015, including the eight real-world responses, 19 exercises, seven drills, and 45 training events, five of which were outside the US.

NSTec exceeded expectations to the ECN by:

- Installing and testing ECN nodes to improve "anytime, anywhere" communications for both CONUS and OCONUS operations of NNSA counterterrorism responders and working on the next generation satellite kits for KLAS Voyager.

- Completing a prototype of a new mobile ECN kit that greatly reduced the physical size and bulk of the mobile ECN kit. The prototype was demonstrated to various NA-42 response teams in Albuquerque, New Mexico and then based on a last minute request, deployed the prototype system to the NUWAIX exercise with a response asset, and operated the system for the entire exercise. The overall size and effectiveness of the new system resulted in numerous positive comments from the responders using the system in the field during the exercise; and
- Applying expert management and innovative techniques to improve the ECN and correct a backlog of deficiencies that existed for many years, including: close out of the Continuous Monitoring Corrective Action Plan (CAP); update of core servers and routers; upgrade/refresh of over 600 laptop computers; upgrade to state-of-the-art firewalls; completion of the ECN Business Impact Analysis, Risk Management Framework, and Disaster Recovery Process; Daily Task Tracking; and automated password reset. All of these actions had a direct and measureable impact on the health, safety, security, or performance of the ECN as well as the human component of the ECN Team. The outstanding results are evidenced by implemented new hardware, improved communication pathways, improved system reliability, and streamlined many processes that corrected many of the system deficiencies thus improving the overall system readiness of this essential DOE and NNSA emergency communication asset.

NSTec instituted proactive steps dedicated to manage and respond effectively to NNSS wildland fire activities over the summer. Working with other organizations, NSTec Fire and Rescue implemented ground and airborne vegetation assessments and deployment of fire watch teams during adverse weather conditions to prevent and address wildland fire concerns. As a result, NNSA/NFO had a successful NNSS fire season with no impacts to facility operations.

NSTec increased cost savings through the establishment of procurement relationships with the Kansas City Plant by locating and securing a facility to support Pre-Detonation Device operations. This business relationship will save the taxpayers significant resources and allow for quicker delivery of critical components.

NSTec provided exceptional support for International Radiological Assistant Program Training for Emergency Responders (IRAPTER), International Consequence Management (ICM), Geographic Information System (GIS), Global Initiative to Combat Nuclear Terrorism (GICNT) and other outreach/training programs and for support to major public events. This included providing exceptional support for emergency management infrastructure, and program development support associated with international emergency preparedness and response (e.g., World Ice Hockey Championship, World Cup, and Super Bowl). In addition, NSTec exceeded expectations by developing and implementing outreach and training in support of the NA-46 international missions including: Vilnius, Lithuania; Panama City, Panama; International Emergency Management and Cooperation (IEMC) training in Yerevan, Armenia; the Philippines; and Vienna, Austria.

DOE Office of Aviation Management (OAM) commended NSTec on completing a comprehensive and well written joint self-assessment report utilizing the International Standard – Business Aircraft Operations (IS-BAO) and DOE O 440.2C HQ Criteria and Review Approach Documents (CRADs). No significant issues were identified and the report was accepted by NNSA/NFO, DOE OAM, and NA-1

without comment. The results demonstrated strong leadership and an effective Aviation Safety Program posture and culture at Remote Sensing Laboratory (RSL) Nellis and Andrews.

NSTec provided excellent integration, management and execution of the Seismic Hammer Project (Thor II) by completing the planning and field execution for the east/west line. Excellent coordination was conducted with Desert Research Institute and SNL. Lessons Learned from Thor I were applied. The seismic and infrasound objectives were accomplished in 10 days (ahead of schedule) at 58 different strike points. NSTec support also included operations for an infrasound sensor on a drone Octocopter to image, for the first time, the 3D characteristics of the hammer acoustic wave front. This entire effort will increase fidelity of characterization of geophysical resolution for Source Physics Experiment (SPE) Phase 2.

For State Fair, NSTec campaign field support was excellent throughout the entire FY, including exceeding expectations in responding to power outages and security alarms during off hours and ensuring the facility was restored in a timely and secure manner.

For the End-to-End Project, NSTec successfully completed Exercise Zero and Multiple Technologies Experiment Number One (EX-0/MTE-1) at both the U25x Tunnel and the Baker site in Area 27 with excellent data collection by the participating Labs.

Within the Nuclear Forensics program, NSTec successfully completed the Skyshine II experiments. NSTec conducted all of the high explosives handling and detonations. The first four experiments were executed with no operational/safety issues and provided excellent data for SNL. The fifth test resulted in two unexploded charges (out of 25 total). NSTec quickly responded by placing the remaining charges in a safe and stable configuration and safely detonating these charges the next work day. NSTec Facility, HE, and diagnostics support ensured that the program data collection was outstanding.

Throughout FY 2015, NSTec National Emergency Response Assets (Nuclear Radiological Advisory Teams (NRAT), Radiological Assistance Programs (RAP), Aerial Measurements System (AMS) program, Consequence Management (CM) program, Disposition Forensics Evidence Analysis Team (DFEAT) and International programs), conducted Enhanced Special Weapons and Tactics (ESWAT), Mobile Technical Training (MTT) with the Federal Bureau of Investigation (FBI) in multiple cities; Preventative Radiological/Nuclear Detection activities for the Chicago Marathon; World Series games in San Francisco; Rose Bowl Tournament of Roses Parade; New Year's Eve Celebration in Las Vegas, NV; Concert for Valor; Aviation Nation; State of the Union; Boston Marathon; US Air Force Academy Graduation; Prominent Hunt Exercise with Department of Homeland Security/Domestic Nuclear Detection Office (DHS/DNDO); and Superbowl XLIX. NSTec also supported Marble Challenge 15-01 and the Boston Harbor Aerial radiological survey; participated in the Dairy Industry Food Safety Crisis Drill; supported the International Atomic Energy Agency (IAEA) - European Commission (EC) Operational Training Course – Response to a Radiological Emergency resulting from a Nuclear Security Event in Lisbon, Portugal; and hosted and supported the International Radiological Assistance Program Training for Emergency Response – Port/Customs (IRAPTER-PC) course in Las Vegas, Nevada. The course was conducted in cooperation with the IAEA, Incident and Emergency Center. NSTec conducted a CM drill with RAP regions 6, 7, and 8 in Hanford, WA and the multi-agency CAPSTONE exercise receiving high marks from the states of Washington, Idaho, and South

Carolina. NSTec successfully conducted AMS no-notice drills in Las Vegas, Nevada and Washington DC to measure asset readiness. NSTec successfully supported the national level drills and exercises of Marble Challenge, Join Drill, Vital Archer, and NUWAIX Home Teams, Vibrant Response 15, and many other no-notice and notice drills and exercises.

On behalf of NNSA, NSTec successfully conducted WINGS 15, an Aerial Measurement Interoperability Exercise sponsored by the DHS. The design, planning, and exercise management was recognized as outstanding by DHS. Nine aircraft and personnel from four Federal Agencies, and three State agencies participated in this exercise.

NSTec Aviation won the DOE Federal Aviation Professional Award for Aviation Safety and the Federal Aviation Professional Award for Operational/Support.

NSTec Aviation Section pilot won the GSA Award for Aviation Safety chosen from across the entire Federal government.

The aircraft owned by DOE and operated by NSTec are beyond the expected operational life of these assets. The average age of the NSTec operated fixed wing aircraft is 34 years and 25 years for the rotor wing aircraft. NSTec maintained these aircraft in accordance with the manufacturer's inspection programs and requirements. The excellent maintenance accomplished by NSTec personnel demonstrated an impressive and consistent Aircraft Reliability Rating at or above 87%.

Although not planned for in FY 2015, NSTec was asked to support the FBI, United States Secret Service (USSS), and other entities to assist in planning for the safety of Pope Francis during his visit to the U.S. (Washington, DC; Philadelphia, PA; and New York, NY) in September 2015 in the area of Preventative Radiological/Nuclear Detection (PRND). NSTec participated in multiple planning meetings in all three cities providing expert level advice in implementation of PRND functions appropriate for the visit. Additionally, NSTec deployed significant equipment and personnel to the venues to conduct those PRND activities in conjunction with other federal, state, and local authorities during the entire visit. NSTec received numerous commendations from lead agency officials on their proactive planning and execution of activities for the event.

NSTec served as the integration lead for the Underground Nuclear Explosion Signatures Experiment (UNESE). NSTec led the new 3.5-year R&D project to enhance U.S. capabilities in detecting, locating, and identifying underground nuclear explosions. Challenges in drilling angled boreholes to support planned experiments compromised the initial schedule and budget. However, the NSTec UNESE team developed and implemented a plan to return to successful execution. A procurement effort led to a small business subcontractor that came to the NNSS in July 2015 and finished all three holes at reduced cost to the program. Experimentation is being successfully executed.

NSTec provided good support for the execution of SPE-4 Prime to validate complex computer models supporting non-proliferation and treaty verification objectives. NSTec integrated onsite activities, supported the timing and firing, and provided key diagnostics and instrumentation support. NSTec's design of the grout compound performed as expected demonstrating an advance in capabilities. Flawless shot execution led to 100% data recovery from 395 channels, and over 98% of the data supported high-fidelity analysis and computational modeling. Partnerships with the laboratories,

Defense Threat Reduction Agency (DTRA), and the University of Nevada, Reno (UNR) led to successful achievement in shot leadership roles, canister engineering, and explosive operations.

NSTec has met or exceeded some program and technical requirements in advancing U.S. capabilities for monitoring foreign nuclear weapons development activities. NSTec demonstrated areas of good experiment support in providing R&D technology solutions, such as with Thor II. Execution remains a general issue.

NSTec developed the Defense Nuclear Facilities Safety Board (DNFSB) Rec. 2014-1 Emergency Preparedness and Response product on short notice while executing the Area 5 exercise concurrently. NSTec overcame limited personnel availability and still delivered a quality product on time.

NSTec successfully conducted an NNSA/NFO Continuity of Operation Program (COOP) collaborative tabletop readiness activity that involved NNSA/NFO and Nevada Enterprise Management in response to a pandemic scenario. NSTec also successfully conducted three exercises scheduled on the NNSA/NFO FY2015 Drills/Exercises Calendar in meeting DOE O 151.1C requirements.

NSTec met expectations in support of the Render Safe Program and Stabilization programs. NSTec provided good support in the redesign of the jolt system. NSTec met expectations for National Technical Nuclear Forensics/Pre-Det Program by maintaining operational readiness for DFEAT.

NSTec conducted readiness Snapshots/drills on a monthly basis. NSTec attended several meetings and chaired working groups to support the planning of the national level exercise, Southern Exposure in South Carolina and Vibrant Response 15. NSTec continued to support the RAPTER sessions and worked to rotate personnel in the positions during the final exercise to give them more exposure to how RAP teams and CMAC would interact during the initial phase of a response.

NSTec successfully conducted AMS aerial surveys for the National Emergency Response mission, including such cities and activities as: Hanford, Boston Harbor, and Super Bowl XLIX.

NSTec continued to effectively implement the Site's Emergency Management Program by demonstrating broad response capabilities, and operating NNSA/NFO facilities & equipment in an effective and energy efficient manner. NSTec successfully executed one full-scale exercise and two functional exercises in early FY 2015. Identified issues were captured and worked to resolution.

In preparation for the shutdown of Control Point-1 (CP-1) in Area 6 of the NNSS, NSTec located an alternative secure location for the NA-45 DFEAT activities that were previously conducted in CP-1, negotiated shared use of the new location (building 12-928) with DTRA, and worked with NNSA/NFO, NA-45, other NNSA partners in the program, and DTRA to modify building 12-928 appropriately to conduct the DFEAT program in the new location prior to the shutdown of CP-1. These actions were fundamental to maintaining program readiness requirements for the DFEAT Program.

The nose wheel of a King Air ran over a sealed radioactive check source inside a small plastic container during routine aircraft push-back operations at the RSL Andrews hangar. NSTec

immediately instituted a series of actions to avoid future occurrences to include towing policy changes, implementing a Tow Driver Supervisor concept of operations, and training all affected personnel at both bases of operations.

NSTec initially overlooked the safety requirement for an emergency egress door for the State Fair Sunroom design. NSTec had to redesign an egress solution as a retrofit. The customer had to place the effort on hold pending input from the end users. The egress door was installed.

NSTec experienced issues with the preparation and use of a Real Estate/Operations Permits (REOP), National Environmental Policy Act (NEPA) checklists, and inter-organizational coordination exhibiting a deficiency of attention in project planning and execution. For example, during the Seismic Hammer Project (Thor II) grading activities, NSTec did not utilize the required REOP process but rather used a Support Execution Plan under balance of plant. This contributed to minimal or no review by other NSTec organizations, including environmental protection, and other REOP holders. As a result, it was later discovered that during the execution of work, a road was graded within two use-restricted areas.

NSTec experienced difficulties in retaining valuable, fully trained scientists at off-site locations, which is leading to an increase in training and administrative costs as new scientists need to be hired.

NSTec did not perform timely reviews and implementation of the NNSA/NFO Comprehensive Emergency Management Plan and several facilities emergency planning hazard surveys (EPHSs) as required by DOE O 151.1C. NSTec's non action to complete required reviews and renewals led to the expiration of the Site Plan and high hazard facilities EPHSs. As a result, several operations were suspended until the EPHSs could be updated. In one case, the additional cost to the program at that facility was ~$60K.

NSTec exhibited some issues with executing scope of work. Specifically, lack of issue resolution associated with restarting GODIVA reactor operations at NCERC in the DAF resulted in negative impacts to planned experiments including National Center for Nuclear Security (NCNS) Nuclear Forensics irradiation experiments.

During the investigation of a cyber-security attack on an Emergency Response server, it was discovered that the cyber security plan for the system, authorized by NNSA/NFO on 11/1/2007, expired on 4/1/2009. The system was taken off line at the direction of the NNSA HQ Office of the Chief Information Officer (CIO) and a list of corrective actions was required to be completed before interim authority to operate was granted by the NNSA HQ CIO. Taking the system off line could have impacted the ability of the NA-42 Emergency Response teams to execute their mission successfully in the event of a radiological or nuclear emergency. After several weeks off-line, a CAP was completed and an interim plan was approved by NNSA HQ CIO in early FY 2015. The cost incurred from the work required to complete the CAP was estimated by the contractor to be several hundred thousand dollars.

During recent AMS drills and exercises, NSTec had difficulty providing initial data interpretations in a timely manner (within 1 hour) after completion of aerial data acquisition. Once operational

rhythms are established in the drill or exercise, the aerial data product development time is reduced, allowing response management to more efficiently incorporate the data into protective action decisions.

NSTec had several significant performance issues related to the Federal Radiological Monitoring and Assessment Center (FRMAC) Southern Exposure 15 National Level Exercise. For example, a significant weakness during the exercise was the failure to implement timely key response actions such as development of a coordinated (with the State) monitoring and sampling plan, which delayed deployment of field measurement personnel and the subsequent delivery of measurement data (which is required by the State of South Carolina to make decisions for protective action implementation). This could have been accomplished by the Consequence Management Home Team (CMHT) before the arrival of the FRMAC, but was not. NSTec also failed to adequately integrate aerial monitoring into the monitoring and sampling plan or provide simulated aerial data for analysis by assessment scientists. In addition multiple locations (Consequence Management Home Team, Nuclear Incident Team, and FRMAC) had too few or no exercise controllers to provide appropriate control of the exercise play throughout the exercise event. This negatively impacted the realism of the play and hampered player efforts to respond.

Performance Objective 3: DOE and Strategic Partnership Project Mission Objectives

Summary

DOE and SPP Mission Objectives (5% of At-risk fee) were rated as EXCELLENT. Overall, NSTec's performance significantly exceeded expectations in the management of the DOE and SPP Mission Objectives. NSTec's scientific laboratory facilities were highly effective in the execution of high impact strategic programs that benefitted both the DOE/NNSA mission and national security interests. NSTec scientists and engineers delivered technical services and products to multiple government agencies with a focus on technologies which complement the DOE/NNSA mission. NSTec was effective in the execution of high hazard experiments at the NNSS. While multiple government agencies benefitted from these experiments, NSTec efforts to improve the initial planning, hazard identification, scope, and schedule requirements to ensure that NNSS activities are conducted in a safe, secure, and efficient manner continue to improve. NSTec's Environmental Management performance also significantly exceeded expectations. NSTec worked with a range of internal and external stakeholders insuring effective program execution and program integration support to the DOE Office of Environmental Management. NNSA agrees with NSTec's self-assessment rating of EXCELLENT.

In support of the DOE Office of Security Assistance, NSTec provided improved physical security at remote locations related to energy infrastructure (i.e., WAPA). This effort included field sensors at sites with extreme temperatures and was completed in a very short time frame.

NSTec provided high-impact R&D for custom communication systems, Weapons of Mass Destruction (WMD) sensors, Unmanned Aerial Vehicle (UAV) integration, and C4ISR applications. By leveraging software-defined radio work to design, build, and deliver a prototype communications system to an SPP customer, NSTec's capability was significantly strengthened in engineering and essential skills. In addition, NSTec brought together two agencies to share the technology and its development.

NSTec successfully completed design and field testing on an electronic device tracking system and a complex chemical sensor system. NSTec also integrated an RF sensing device into a UAV, including the command and control via RAPTOR, a C4ISR platform. NSTec continued to extend RAPTOR capabilities in tagging and tracking, sensor command and control, and signal analysis and piloted a demonstration to track emergency response vehicles.

Technical RF equipment that was developed for SPP customers and RF expertise was heavily leveraged in order for NSTec to successfully conduct RF emanation measurements of screen rooms at U1A Complex for NNSA in a short time response.

NSTec successfully developed and signed its first Cooperative Research & Development Agreement (CRADA) which is a partnership with Global Medical Isotope Systems, LLC that supports the technology transfer mission and provides benefits from federal research to industrial competition.

NSTec supported DTRA on the Tumbleweed Test Range to execute the first outdoor test using beam operations with category one SNM. This unprecedented event produced invaluable comparisons for

passive and active radiation detectors against real-world sources allowing for a comprehensive, side-by-side analysis between active and passive beam operations. The sensor development work expertise fed into NSTec sensor work for defense programs, national emergency response, and defense nuclear non-proliferation.

NSTec was sought after to provide operational testing and evaluation expertise for emerging technology development projects such as the Wearable Intelligent Nuclear Detection system, stand-off mobile technology, human machine interfaces for the wide-area search mission, and feedback on consequence management requirements for DHS/DNDO-sponsored search technology. These successful initiatives allowed NSTec to provide and facilitate key first responder input to create better radiological/nuclear counter-terrorism technology solutions for national security operations.

NSTec exceeded expectations in support of the DOE-IN mission and are highly valued for their input and contributions to the mission of DOE-IN and the greater Intelligence Community (IC). Accomplishments included:

- NSTec performed at a high level in all categories of its established performance measures pertaining to its interagency intelligence work. The accessibility of NSTec's Field Intelligence Element leadership, principal investigators, and Strategic Intelligence Partnership Program (SIPP) coordinator for addressing SIPP issues is impressive, and demonstrates a dedication that they are mission focused, and highly prioritize its customer's needs.
- NSTec was selected to serve as one of the key DOE Laboratories to participate in the Director of National Intelligence (DNI) Technology Exposition. This event was well-attended and considered by many, including DNI Director Clapper, to be a huge success. NSTec did a superb job in representing DOE at the Tech Expo.
- NSTec displayed aggressiveness in pursuing challenging Science and Technology (S&T) partnerships with IC agencies. This aggressiveness has proven successful in recruiting IC work. However, to avoid conflicts in DOE's approval of these partnerships, better coordination is required between DOE-IN and NSTec in the pre-development of interagency agreements with the sponsor agencies.
- NSTec supported the Intelligence Advanced Research Projects Activity (IARPA) Knowledge, Discovery and Dissemination (KDD) Program that enables analysts to quickly produce actionable intelligence from multiple, disparate data sources, including new unanticipated data sets that become available to analysts. KDD is being prepared for potential transition to a U.S. Government agency in FY 2016.
- NSTec supported DOE-IN in the DOE National Laboratory S&T capabilities briefings to multiple IC Agencies.

NSTec provided excellent support to NNSA/NFO EM in discussions with DOE/EM HQ and Spain on a high profile potential environmental restoration and waste management activity (Palomares) including professional subject matter expertise to the DOE delegation that travelled to Spain, the Spanish delegation visit to Nevada, and ongoing technical discussions on waste certification. Additionally, NSTec organized weekly meetings to status action items and ensure transparent and complete communication across all groups

NSTec continued to maintain the Radioactive Waste Management Complex (RWMC) and its supporting infrastructure in a safe, compliant manner. Over 1.2 M cubic feet (ft^3) of low-level waste (LLW) and mixed low-level waste (MLLW) were received in 1,221 shipments. Waste receipts significantly exceeded the baseline in several months during the FY and the number of packages received increased by 65% over the prior year. Also, at no additional cost, construction of two new shallow cells is nearing completion. These cells are being constructed through efficiencies by using them as burrow areas of native soil for routine waste covering activities.

NSTec completed the shipping campaign for transfer of LLNL special items from the RWMC. The containers were over-packed into a 10-160B Cask owned by Idaho National laboratory (INL). The project required a Documented Safety Analysis (DSA) revision, a Federal Readiness Assessment, and a new Offsite Transportation Certificate. Work was accomplished under cost and within a compressed five-week shipping window. As a result, the Material-at-Risk (MAR) at the RWMC was reduced by over 90%, decreasing the RWMC security posture and inspections. Due to the success of this campaign, NSTec initiated an effort to obtain a revised Certificate of Compliance (CoC) to use the 10-160B Cask to transport transuranic experimental spheres currently stored at the RWMC to an active recovery project at LANL. This effort has the potential to avoid a conservative out-year NNSA/NFO estimate of $8–12M that would be required for onsite processing and disposal of the waste.

NSTec worked with a range of internal and external stakeholders insuring effective program execution and program integration support to the Office of Environmental Management.

NSTec continued receipt and disposal of radioactive and non-radioactive classified components at the RWMC from DOE and U.S. Department of Defense (DOD) generators. Forty five thousand ft^3 of classified components were disposed at the RWMC in FY 2015, bringing the total classified component disposal volume to date to 188,000 ft^3. The cost avoidance for disposal at the NNSS has exceeded 95% for some generators. One generator realized a total cost avoidance of $218M in the last two years.

NSTec successfully completed disposal of three Husman irradiators. NSTec led the integrated project team meetings for the disposal portion of this multi-site project involving NNSA/NFO and NA-212, EM-33 Packaging and Transportation, Offsite Source Recovery Program (OSRP), LLNL, INL, and NSTec Environmental and Waste Management (E&WM) organizations. Despite numerous challenges, the NSTec-led team kept the mission on track and achieved success. Working closely with a wide range of international partners and key U.S. federal agencies, NSTec played a key role in the safe and secure disposition of dangerous radiological material.

NSTec successfully completed the disposal of 10 Sentinel radioisotope thermoelectric generators (RTGs) from Burnt Mountain, Alaska. NSTec led the integrated project team meetings for the disposal portion of this multi-site multi-agency project involving NNSA/NFO and NA-212, EM-33 Packaging and Transportation, the U.S. Air Force, OSRP, SNL, and NSTec's E&WM organizations. NSTec has the singular ability to accept relatively high levels of radioactive waste safely and effectively, and has exhibited this capability with acceptance and disposal of the RTGs.

NSTec provided exceptional support in submitting the Part B permit renewal application. The application had five individual standalone volumes that contained several hundred pages of technical information, along with 20-30 design and engineering drawings. NSTec provided excellent technical editing, document improvement and response to regulator comments. The final regulatory submittal and public review and comment process would not have been so transparent without NSTec's high level of expertise.

In FY 2015, 9,824 responders from 69 cities were trained under the Counter Terrorism Operations Support (CTOS) program. This program ensured that in the event of an emergency, over 160,000 domestic first responders have experience operating in a safe radiation environment at the NNSS. This training effort continued to grow with increased work with support to the National Guard and a potential to support INTERPOL.

NSTec successfully continued to collaborate with University of California Santa Barbara (UCSB) to support technical development for analytical capabilities measuring high speed dispersion of chemical materials associated with WMD.

NSTec experts on CTOS successfully participated in activities such as Las Vegas National Night Out, which provided an opportunity for law enforcement and first responders to display their assets and capabilities to the public. Defense Advanced Research Project Agency (DARPA) requested CTOS staff consultation services and radioactive source support for detection and deterrent capabilities in countering nuclear terrorism.

NSTec met expectations regarding the support of groundwater and soil characterization and remediation activities in accordance with the Federal Facility Agreement and Consent Order and other applicable requirements.

NSTec began the planning for construction of a new Resource Conservation and Recovery Act (RCRA)-permitted disposal cell at the RWMC. The NNSS currently has a RCRA-permitted disposal cell for onsite and offsite-generated MLLW that was put into service in January 2011. Preliminary planning took place in FY 2015, and design work will take place in FY 2016, with construction planned for FY 2017, one year ahead of the current baseline schedule. Completion of this waste cell will allow NSTec to continue to receive MLLW from generators across the U.S. for safe and compliant disposal.

NSTec prepared a Consolidated Post-Closure Plan as part of an improved strategy for management of more than 200 Environmental Restoration sites on the NNSS and the Tonopah Test Range that have been closed. Post-closure requirements are currently found in hundreds of closure documents, permit modifications, correspondence, etc. This document will serve as the single platform for documenting and modifying post-closure requirements, eliminating the uncertainty associated with obtaining requirements from multiple sources, increasing effective management of the program, and ensuring that all commitments are being met.

Although NSTec performed most SPP work well, NSTec struggled on several projects:

- Performance of work on the Area 25 water tank was not completed and the project is still not scheduled for completion;
- Several pieces of correspondence from DHS/DNDO outlining concerns relative to Radiological/Nuclear Countermeasures Test and Evaluation Complex (RNCTEC) deliverables committed to in their portfolio were received, including concerns with the Linear Motion System (LMS); and
- Slow progress on the P Tunnel power upgrades did not meet customer expectations. However, P Tunnel power upgrades field work was accelerated to compensate for the issues with the initial planning efforts.

As a result of the removable contamination of several NCERC buildings, there was an impact to the NCERC mission in both schedule and cost including the Flattop building which was not operational from October 21, 2014 to January 12, 2015.

Performance Objective 4: Science, Technology, and Engineering (ST&E)

Summary

Science, Technology, and Engineering (ST&E) (3% of At-risk fee) was rated as EXCELLENT. Overall, NSTec's performance significantly exceeded expectations in its ability to manage ST&E. NSTec's SDRD Program grew in FY 2015 in participation as well as results of prototype sensors and diagnostic systems that were picked up by national security programs (~40% vs the national average of ~30%). The diagnostic systems being developed through the SDRD program revolutionized data capture and collection. Sending data collection from the 100s of data points to the tens of thousands of data points in the same experiment. NNSA agrees with NSTec's self-assessment rating of EXCELLENT.

In FY 2015, NSTec implemented a long-term research and investment strategy including a first ever increase in funding for a new class of strategic directed research. This decision was an important step in leveraging SDRD to maximize outcomes in support of NNSA priorities. NSTec successfully launched NSTechipedia which enabled centralized access to information for scientist separated geographically. NSTec also implemented a two-stage SDRD proposal process with initial pre-proposal followed by invited full proposals. The new process increased proposal submissions by 15% over the last year and allowed more effective guidance for desired R&D outcomes.

NSTec received acceptance for and began implementation of a strategic SDRD proposal for study of materials under extreme states that are compressed or shocked by a small launcher. The material science component of this research will be integrated with a discretionary experimental program initiative to build a Dynamic Science platform, sited either in NLV/C3 or at the University of Nevada, Las Vegas (UNLV). This will be a developmental test bed for diagnostic concept fielding and characterization/optimization and for proof-of-principle design of experiment series. This facility will provide a high turnaround and data rate facility and ease of access to experimenters from multiple organizations, potentially including students and academia. The design and procurement package for the small launcher platform was completed.

A relatively high percentage of NSTec SDRD projects, roughly 40%, created technology that is adopted by a direct NNSS mission based program.

The science, technology and analytical projects accomplished by NSTec have a significant impact throughout the IC. NSTec displayed a keen customer-focused business acumen, and was consistently responsive to IC sponsors' requirements.

NSTec submitted a FY 2015 R&D100 award application for the Urchin device which is an integrated Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) platform offering unmatched flexibility at extreme low power. This effort is the first solely NSTec SDRD innovation supporting the broader global security mission and specialized intelligence work. This project represents a significant achievement in independent development of critical technology for national security.

A new NSTec collaboration with Colorado State University on advanced laser driven neutron sources demonstrated for the first time that a deuterated polyethylene nanowire forest can produce significant neutron fluxes. This SDRD project based on work published in *Nature* on ultra-high temperature plasmas from carbon nanowire targets.

NSTec developed a Dynamic Stereoscopic Surface Imaging (DSSI) system, the first of a kind for capturing a (9-frame) movie of the imploding surface of a weapon material at weapon scale. This diagnostic will image key features on the inside of an imploding device a predetermined times. The images can be used in conjunction with PDV data to correlate anomalies and key features of the imploding system. The stereo system was fielded on the Lyra Orpheus experiment.

NSTec hired their first ever post-doc and thus took a giant leap forward in technical workforce competency. This effort was nearly six years in the making and garnered praise from NA-114.

NSTec successfully transferred JOLT II technology to the private sector. The technology and transfer was jointly sponsored and requested by NNSA and DTRA. One private company (WMD Tech) manufactured 100 units and sold 30 as of this date. Sales have been to Federal, State, and Local Bomb Squads.

NSTec successfully transferred NSTec copyrighted Multi-Photon Doppler Velocimetry (MPDV) software to five Federal entities through royalty-free licenses.

In an FY 2014 feasibility study, NSTec researchers at the Special Technologies Laboratory (STL) developed a fiber-optic-based system that simultaneously measured position and velocity of a dynamically moving target. Although PDV systems have become a vital tool in shock wave experiments, there are many instances where position data are needed but cannot be obtained directly by PDV, a significant weakness. This is presently one of the most urgent issues being discussed in the shock compression community, especially for experiments where material position is critical. A first-ever dynamic experiment demonstrating this technique was just completed with compelling success. An article was published in the *Review of Scientific Instruments* publication and describes the innovation in detail (La Lone, et al RSI, 86, 023112 (2015)). The technology is now on accelerated development for fielding in an upcoming hydrodynamic experiment at LLNL and is being considered as a key diagnostic for the LANL Red Sage experiment series.

NSTec received U.S. Patent No.: 8,970,724 Title: MACH-ZEHNDER Based Optical Maker/Comb Generator for Streak Camera Calibration.

NSTec continued an excellent partnership with UNLV that started in FY 2013 and continued through FY 2015 with the SDRD plastic deformation study of dynamic materials and light gas gun. Research in dynamic material properties is creating better understanding of how complex materials behave under extreme conditions. SDRD is providing NNSS a new fundamental role in future subcritical experiments highly relevant to NNSA by conducting an FY 2015 project, “Development of a Hybrid Magneto-Hydrodynamic Particle-In-Cell Modeling Technique Applicable to High Plasmas Densities and Long Time Scales.”

NSTec published the most technically challenging, and technically superior, SDRD annual report to date with 25 exemplary full length articles highlighting the past year innovations and new knowledge gained. NSTec is consistently the only site to publish full length articles and is aligned with the OSTI strategic plan for more effective access to DOE research.

An NSTec SDRD project developed an optical ranging diagnostic able to measure the position of ejecta off a shocked surface. Position-time measurement needs for dynamic experiments are unique and are not met by existing systems. This new, unique system is compatible with existing MPDV probes, capable of simultaneous detection of multiple targets (ejecta), and able to share probes with MPDV for simultaneous velocity and position measurements.

An NSTec SDRD project in its third year, "Solid-State Neutron Detectors Using Uranium Oxides" is a collaboration with the University of Tennessee-Knoxville and Caruso (Missouri), designed to advance the radiation detection community with a new class of detector. DTRA invited a full proposal from NSTec and their collaborators partially based on results of this project, which was transformative, innovative, leading edge, high quality, and advances the frontiers of ST&E.

Performance Objective 5: Operations and Infrastructure

Summary

Operations and Infrastructure (35% of At-risk fee) was rated as VERY GOOD. Overall, NSTec's performance exceeded expectations meeting the DOE/NNSA mission of ensuring Site Operations and Infrastructure are maintained. NSTec demonstrated strong progressive improvements in calling work pauses/safety stand downs and conducting management reviews/critiques. Other important accomplishments included: superior performance in all areas during the Headquarters Safeguards & Security Inspection with no major deficiencies identified, development of a prototype situational awareness tool for site access control and monitoring; proactive approach to address wildland fire concerns; increasing senior management presence in the field; development and implementation of an accelerated strategy to excess facilities; meeting water reduction metrics; and successful renegotiation of the thirty union contracts. Opportunities for improvement still exist in the areas of: nuclear safety basis development, configuration management, lack of proactively handling the internal radiological exposure issues at Godiva, and chemical chain of custody issues associated with the fire at the Non-Proliferation Test and Evaluation Complex satellite accumulation area. NNSA agrees with NSTec's self-assessment rating of VERY GOOD.

Throughout the performance period, NSTec showed progressively improving and outstanding leadership in both calling for work pause/safety stand downs and conducting management reviews/critiques. Of note, over 60 time outs/work pauses were called in FY 2015. This included a work pause based on the LANS electrical sub-station event. Using lessons learned, NSTec recognized that the hazard identification control set could be improved and implemented. This action received recognition from the DOE Office of Analysis (AU-23). While a safety incident leading to a work stoppage is not desirable, the management reaction following the incident was particularly important as an indicator of both safety culture and ability to learn and improve.

NSTec enhanced the Pre-Job Briefing process which resulted in greater worker involvement in the final work preparation and encouraged resolution of conflicts or problems before they become issues during work execution.

NSTec successfully prepared a comprehensive justification to address elevated flow at the DAF sewage lagoons that resulted in the Nevada Department of Environmental Protection (NDEP) approving a waiver that allows the flow to exceed the original permitted limit. Without this waiver, the lagoon system would have been required to be expanded at an estimated cost of $3.5–$4M.

NSTec received recertification as DOE Voluntary Protection Program (VPP) Star Sites at the Nevada, Livermore, and Los Alamos locations based upon the results of DOE HQ VPP Recertification On-Site Reviews. The recertification recognized NSTec's ongoing commitment to safety, including management commitment and employee involvement.

NSTec planned the capital project, ECSE, for U1a including radiography and neutron diagnostics. The project used a phased approach to implement infrastructure construction and enhancements to experiments with a schedule that matches the anticipated funding profile. With no increase in

funding for the first half of FY 2015, NSTec proceeded at risk in mobilizing ECSE initiatives and providing optimal support to ensure momentum of the Analysis of Alternatives process was completed per the schedule. In April 2015, after receiving funding and formal tasking, NSTec refined projects contributing both to the line item for the U1a infrastructure and several Major Items of Equipment (MIE) for the ECSE project. NSTec met an aggressive NNSA HQ delivery schedule for an Infrastructure Conceptual Description document enabling the future submittal of an ECSE Project Data Sheet.

NSTec coordinated and led the development of a united Nevada Enterprise (NvE) Incidents of Security Concern Program Plan which received very positive feedback from NA-71 and the DOE Office of Enforcement. The development of this plan ensures consistent identification of security incidents and application of the Incidents of Security Concern (IOSC) Program across all NvE participants. The NvE consists of all major contractors doing business in Nevada to include NSTec, LANL, LLNL, Centerra (Pro Force) Tech Source (Security Services), Navarro Research Engineering (Environmental Management) as well as the NNSA/NFO.

NSTec developed and demonstrated a prototype situational awareness tool called the NNSS Site Access Control and Monitoring System. As part of the Control and Monitoring System, the RAPTOR X tool allows monitoring location of vehicles or other defined objects. The objective of this system is to integrate command and control data with near real-time operations information. An emergency response drill conducted in Area 5 that incorporated fire & rescue, geo-location information, and weather data successfully demonstrated proof of concept.

Tasked on short notice, NSTec successfully led and worked with other NvE partners to develop and complete the NNSA/NFO Security Conditions plan (SECON). The plan establishes a uniform approach when responding to conditions that may affect facilities under the purview of the NNSA/NFO and COOP activities. The implementation of this SECON plan was recognized as a "Best Practice" by the EA-22 Inspection Team.

NSTec used a proactive approach to address wildland fire concerns and effectively manage and respond to NNSS wildfires, including conducting ground and airborne vegetation assessments, coordinating and leading the first multi-agency (United States Air Form (USAF), Bureau of Land Management (BLM), Clark County, etc.) orientation of NNSS wildland fire areas of concern, and deployment of fire watch teams during adverse weather conditions. This process enhancement situated fire teams for faster engagement, reducing risk of large uncontrolled wildland fires. As a result of the implementation of this approach, NNSA/NFO had a successful NNSS fire season with no impact to facility operations.

NSTec's commitment to support NNSA/NFO's energy program exceeded expectations as demonstrated by awards presented by DOE/Federal Energy Management Program (FEMP), DOE/Sustainability Performance Office (SPO), and NNSA. The awards recognized NSTec achievements in the areas of fleet management, green buildings, and contributions made toward DOE energy goal accomplishment including:

- NSTec exceeded all the Fleet sustainability metrics for alternative fuel consumption, petroleum fuel use reduction, and alternative fuel vehicle purchases;

- NSTec received the 2014 Federal Energy and Water Management Award for accomplishment in fleet sustainability in FY 2015;
- The NSTec Fuel Lockout Program increased alternative fuel use by 35% and decreased petroleum use by 18%;
- Alternative fuel consumption at the NNSS increased by approximately 195% compared to the FY 2005 baseline; and
- NSTec received a "Green-Green" rating in the Facilities Information Management System (FIMS) validation by NNSA HQ. The rating was for both procedural compliance and data accuracy. NSTec was the only site in the complex to receive this rating.

NSTec's excellent performance towards meeting the water reduction metrics (46.3% reduction potable and 65.8% reduction non-potable) put them well ahead of the FY 2020 goal and positions NSTec to achieve the new targets.

NSTec consolidated the warehouse footprint, reduced inventories, and improved supply visibility while improving service to warehouse customers with the closure of Warehouse 6-914. This effort allowed a facility and labor cost savings of over $928K per year.

NSTec developed and implemented the Consolidated Maintenance Program (CMP) in response to budget reductions and NNSA HQ direction. NSTec integrated direct and indirect infrastructure within a single portfolio to provide a single, combined infrastructure maintenance portfolio that is sustainable and fully aligned in support of mission execution. NSTec conducted a comprehensive assessment of current plant conditions to prioritize needs and align investments with mission objectives; established a baseline dedicated to addressing high priority corrective maintenance/ recapitalization requirements in indirect support facilities and integrated funding of indirect facilities into portfolio programming processes. The CMP maintenance activity completion has improved by 17%.

NSTec proposed a pilot project to demonstrate the viability of an Asset Management Program (AMP) for HVAC systems across NNSA to NNSA HQ. The pilot project addressed efficiencies of concurrent roof and HVAC system replacement and was successfully executed on time and on budget. NSTec "fast tracked" the AMP project with planning and design beginning in May 2015 and construction in August 2015. This project was on the NA-50 FY 2015 "Make It Happen" list and serves as a foundation for further development of the AMP program by NNSA HQ.

After years of trying, NSTec sold the Atlas Pulsed Power Facility (APPF) oil through an excess sale. The sale of approximately 150,000 gallons of high-quality dielectric oil is the first step in readying the facility for next phase of transition and disposition actions.

DNFSB provided positive input on the NNSS switching/distribution system which included NSTec removal of the legacy cables at U1a thereby reducing combustible loading at the complex.

NSTec received a rating of "Outstanding" as a result of the review the NNSA Personal Property Branch performed on NSTec's FY 2015 Protocol Document and Property System. The review resulted in a recommendation for CO re-approval of NSTec's Property System. For FY 2015, NSTec

accounted for 100% of High Risk Items, 99.99% of Sensitive Items, and 99.93% of Equipment item and processed $23,208,148.30 of excess property.

NSTec Asset and Material Management significantly exceeded its excess sales revenue year-end goal of $300K and stretch goal of $700K by bringing in excess sales revenue of just over $1.0M in FY 2015.

NSTec significantly exceeded five of the six FY 2015 Small Business (SB) goals and moderately exceeded the sixth goal. For the overall SB goal, NSTec achieved 72.89% versus a goal of 59%. For the five SB categories, NSTec performed as follows: the Small-Disadvantaged Business subcategory was 10.99% against a Goal of 6%; the Woman-Owned Small Business subcategory was 12.99% against a goal of 6%; the HUB Zone Small Business subcategory was 2.15% against a goal of 2%; the Veteran-Owned Small Business subcategory was 14.45% against a goal of 10%; and the Service Disabled Veteran-Owned Small Business subcategory was 4.64% against a goal of 2%.

NSTec exceeded expectations by successfully completing the negotiation of thirty union contracts including; construction workers, tunnel and tunnel-shaft construction, culinary workers, firefighters paramedics, and maintenance engineers. Of the thirty contracts, twenty-eight were extended to September 30, 2020 and two others were extended until September 30, 2017. Completion of these agreements will enable continued efficiencies in maintaining harmonious worker relations and eliminate any potential delays in work undertaken.

NSTec continued to enhance internal efforts to improve communication throughout the NvE. They increased public awareness and favorable exposure of NSTec NNSS activities through media news releases on subjects such as Scholarships for Los Alamos and Livermore students, NNSS Fire and Rescue services, community outreach, and the new Cooperative Research and Development Agreement (CRADA) on isotope development. NSTec received prominent coverage in the media including a front-page Las Vegas Review Journal article with photos covering their first CRADA, NSTec scholarships, and the donation to the Mt. Charleston Cold War Memorial. The positive coverage in the media generated good will in the community and the workforce. NSTec also continued to maintain and advance the NNSS Emergency Public Information Program which now rates among the leaders in the NNSA complex.

NSTec proactively developed and implemented an accelerated strategy to excess facilities that are no longer viable in support of mission objectives. NSTec objectives addressed excess and deactivated facilities as an integral component of the NNSS strategy to validate, status, project, and reduce Deferred Maintenance (DM) in a strategic, integrated manner. A list of 64 buildings were identified for excess prior to FY 2017, with 38 of these buildings presently being staged for immediate excess approval actions.

NSTec's Cyber Security exceeded expectations by implementing a new technology that installs and runs all files downloaded through the perimeter firewall into a sandbox. This technology includes files sent via email such as Office documents, executables, PDFs, and others. By opening each file and installing them in a secure and isolated environment any potential malware can be detected and deleted before reaching the intended recipient.

NSTec exceeded expectations by responding to the OMB data breach with staff working nights and weekends conducting vulnerability assessments searching for specially crafted indicators of compromise used in the OMB breach and completing data calls to meet DHS/Whitehouse reporting requirements. None of the indicators of compromise used to breach OMB were found at the NNSS.

NSTec implemented a Senior Management Observation Program to strengthen and maintain senior management presence in the field. The program increases direct Senior Management interface with the workforce at the job site. Worker and supervisor feedback has been positive.

NSTec proactively addressed and recommended viable alternatives with respect to local and complex-wide management of DM. As part of the FY 2017–2021 programming effort, numerous scenarios addressing the treatment of DM were requested that evaluated options to redirect funding from operations and other priorities toward DM reduction. In addition to providing the requested analysis and impacts, NSTec developed an integrated DM reduction approach as a third option. Through application of this approach, NSTec demonstrated a conservative reduction to DM totaling approximately $75 million – achievable without any impact to operating, maintenance, and mission support funding/activities. The proposal submitted by NSTec was favorably received and has been influential in shaping how NNSA/NA-50 will approach the DM reduction objectives

NSTec updated its engineering capacity by acquiring state-of-the-art 3D laser scanning equipment, software, and workstations. NSTec developed the scanning and modeling capability for utilization of the detailed information in current and future projects. Cost avoidance was realized in applying this new capability.

NSTec actively supported implementation of Integrated Safety Management (ISM) and Integrated Safeguards and Security Management (ISSM) principles within the Nevada Enterprise (NvE) through their active participation in, and co-chairing of, the NvE Integrated Management Council (IMC). The IMC has been repeatedly recognized as a best practice in multiple external assessments, brings together the various NvE partners to examine challenges in the NvE implementation of ISM/ISSM in a partnering environment, and champions initiatives and/or process improvements in support of long-term ISM/ISSM institutionalization across activities under the purview of NNSA/NFO.

NSTec developed three proposed Line Item capital projects (138kV Power Transmission Line, Water Supply and Distribution Upgrades, and Consolidate Mission Support Facility) which represent critical mission corridor infrastructure components. These projects, submitted to the FY 2015 Construction Working Group, are foundational improvements that directly target risk reduction and consolidation within the mission corridor of the NNSS.

NSTec analyzed and extensively revised the issues management system to improve performance and effectiveness of the process, and elevate visibility of issue management to the Executive Management level of NSTec. NSTec developed, approved, and implemented a new internal NSTec directive which clearly delineates the roles, responsibilities, authorities, and accountabilities of three NSTec directorates with intermingled (and sometimes conflicting) responsibilities. NSTec improved CAS dashboard effectiveness, demonstrated increased executive level attention to CAS information and signals, and improved the rigor of implementation of CAS systems. NSTec successfully demonstrated

the use of CAS (and other) information to conduct analyses to identify systemic organizational weakness and develop more effective corrective actions.

NSTec continued to implement effective and efficient Material Control and Accountability (MC&A), Personnel Security, and Information (Classified Matter Protection and Control and Classification) programs. NSTec is meeting expectations with implementation of the Incidents of Security Concern Program.

NSTec appropriately managed and accounted for the significant SNM inventory at the NNSS supporting the NCERC and Stockpile Stewardship Programs. NNSS houses a significant SNM inventory supporting the NCERC and Stockpile Stewardship Programs. A robust Nuclear Materials Management (NMM) program assures appropriate lifecycle planning is developed and implemented for the safe, compliant, and effective management of accountable Nuclear Material (NM) at the NNSS.

NSTec met expectations and deadlines for Operations, Maintenance and Recapitalization program areas, consistent with the NNSA Infrastructure Program Management Plan guidance issued September 2014, and proactively communicated issues with NNSA HQ. By integrating project, design and facilities management efforts into maintenance planning, NSTec avoided configuration conflicts in the repair and replacement of major components. Additionally, NSTec met expectations in support of NA-50 program management initiatives, such as participating in the newly established NNSS/NA-522 Site Portfolio Manager interface meetings, and continuing to improve its real estate program. NSTec support for BUILDER and Mission Dependency Index (MDI) was drastically reduced in the second phase of implementation and fell behind schedule. However, NSTec worked with NNSA to establish a path forward for implementation and identifying additional resources and/or alternatives to fully support BUILDER and MDI implementation.

NSTec is limited in planning and engineering resources that have resulted in slow progress in recapitalization projects.

NSTec continued construction on the DAF Lead-In Lines Replacement project. The DAF Lead-In Lines Replacement Project is the highest priority infrastructure improvement project under execution at the NNSS and represents key scope to reduce operations risk at DAF, bolster primary safety systems, and upgrade infrastructure in support of current and projected mission execution. The project encountered unexpected field conditions while excavating on the two “front yard” underground lines. This caused work to be halted to evaluate potential new design options for eight of the “front yard” lines. Alternatives have been evaluated and a new path forward developed.

NSTec designed and implemented an authorization basis process for non-nuclear facilities as a result of the event that occurred at Nonproliferation Test and Evaluation Complex (NPTEC) in June 2014. This is a permanent mechanism by which NSTec will evaluate and authorize work scope. The authorization basis process provides a clearly defined safety envelope that includes a description of capabilities and appropriate controls for expected hazards to safely conduct work.

NSTec met the High Performance Sustainable Building (HPSB) goal, by square footage. NSTec did not achieve the energy intensity, metering, greenhouse gases, waste diversion, and data center power utilization effectiveness goals. The energy and scope 1&2 greenhouse gas goals would have

benefitted from an ESPC, which was explored in 2013, however, the NNSS has a long term power contract that provides $0.065/kWh power, making an ESPC cost ineffective until at least 2022. Funding shortfalls in FY 2015 prohibited the installation of meters and Energy Conservation Measures (ECMs) that would have benefitted energy intensity and scope 2 greenhouse gas reductions. Along with funding, energy intensity was negatively impacted by record temperatures in Nevada and increased mission tempo, both of which were beyond NSTec's control. The Scope 3 greenhouse gas goal has been a particular challenge with no reduction in FY 2015.

NSTec continued to deliver efficient and effective information technology systems. NSTec developed and implemented a solution to Electronic Classified Spillage for documents sent to the NSTec Classification Office.

NSTec met expectations in the Human Resource (HR) area. In January 2015 NSTec implemented the Comprehensive Workforce Management Project (CWMP) which was a redesign of NSTec's salary structures, job families and job descriptions to better align with market and current compensation practices. The CWMP was instrumental in setting the foundation to identify, attract and retain needed talent to complete mission requirements and to identify critical skills needs and gaps.

NSTec met the objective of avoiding involuntary separations and used a phased approach to execute the Self-Select Voluntary Separation action that was implemented in April 2015. In order to affect the largest reduction with the minimum impact, NSTec developed a plan to retain needed skills for varying periods of time to ensure adequate coverage to support on-going mission activities and to ensure the appropriate turn-over of critical technical information.

NSTec received an overall rating of "Good" from the Office of Field Financial Management (OFFM) for FY 2015. NSTec passed all of OFFM's Core Financial Measures and did not receive any notable negative feedback from OFFM during the first and second quarters. In the third quarter, however, NSTec did not communicate with OFFM in a timely manner on a financial matter that required sensitive analysis in the areas of CAS compliance. In the fourth quarter, OFFM noted a timekeeping finding during their SDRD review and some input errors that required prior period adjustments to the Financial Statement Environmental Liability estimates.

NSTec's Legal Organization exceeded expectations. NSTec provided cost-effective legal management with use of in-house counsel and alternative dispute resolution where appropriate, and diligent oversight of outside counsel. NSTec legal proactively revised company policies on discipline for non-bargaining employees resulting in increased consistency of actions. NSTec legal continued to advise senior staff and the Employee Relations Department, particularly in the area of Employment Law, with the intent of achieving better decision-making and reduced risk of liability.

NSTec met or exceeded 11 of the 12 Implementation Factors (IFs) listed in the "Cybersecurity Goals, Objectives, and Implementation Factors"; with the exception of IF1. NSTec Cyber Security demonstrated significant progress increasing from a score of 55% in the second quarter to 75% compliance for the year; however, NSTec failed to meet the target score of 90%.

Although NSTec management has not provided funding for the NNSS Underground Facility Safety and Health Program Description, PD-P200.002 gap analysis at U12p, the Facility Manager and craft

workers (miners) at underground operations at the U12p tunnel (and the U1a Complex) were still able to maintain successful mission outcomes by promoting and encouraging a self-critical, learning organization at their level. As a result, NSTec has been able to maintain a strong safety and security culture at the facility manager and worker levels at U1a and U12p.

NSTec implemented an Enterprise Risk Management (ERM) tool across three Directorates. Fifty-two infrastructure risks and their associated consequences were defined and quantified. Mitigations to include completing specific projects and actions were defined and their costs estimated. The ERM tool allows for risk informed budget decisions.

The unanticipated internal exposures at Godiva, while low, were not handled proactively by NSTec. Roles and responsibilities were not well defined at the facility and NSTec did not proactively take responsibility for the coordination of radiological safety at NCERC. The Godiva Readiness Assessment, pre-start issues, (especially known issues associated with the HEPA Filtered Ventilation System) and development of associated CAPs resulted in delayed authorization to resume operations which impacted Comet operations. The effort to return Godiva to operations caused a delay to the Rapid Sample Transfer System (Rabbit) project resulting in the project safety basis to slip into FY 2016. As a consequence of these inadequacies, an investigation by the Nuclear Safety Enforcement Office was conducted which resulted in a proposed request for settlement from NSTec on July 13, 2015.

NSTec did not adequately demonstrate they can routinely develop and submit safety basis documents that meet the requirements of 10 CFR 830 and DOE STD 3009. NSTec Senior Management has not adequately taken effective actions to correct this recurring issue. NSTec submitted the DAF DSA Change Notice 4 to NNSA/NFO for approval on October 30, 2014. On December 12, 2014, NSTec formally requested that NNSA/NFO suspend review of the document as NSTec failed to conduct the Criticality Control Review to support the development of the DSA. In addition, the Safety Basis review team identified a number of other issues that would have either resulted in Conditions of Approval or disapproval of the Change Notice. The approval of the final document, which was resubmitted in March, contained four conditions of approval. NSTec did not meet the annual update submittal requirement for the Area 3/5 Radioactive Waste Facilities and Onsite Transportation DSAs. After missing the update requirement, NSTec submitted letters for each of these DSAs stating that no annual update was needed. However, NSTec continued to expend efforts in developing annual updates for both DSAs. NSTec submitted the U1a Drift Extension Addendum on September 16, 2015. The Safety Basis Review Team identified that this addendum did not meet the requirements of DOE STD 3009 and could not be approved. In addition, the 30% DAF DSA Rewrite contained fundamental errors that did not meet DOE STD 3009 requirements. The examples listed above for the DAF Change Notice 4 and the U1a Addendum have significantly impacted mission schedule and cost.

NSTec Cognizant System Engineers (CSE) are not ensuring system design documents are kept current (i.e., system drawings, configuration management plan, System Design descriptions). NSTec CSEs are also not performing in-depth system assessments of system operability, reliability, and material condition. NSTec CSEs are not remaining cognizant of system specific maintenance and operational history of related systems structures and components.

NSTec did not consistently implement ISM as evidenced by several incidences associated with hazards identification/control and work control during the year. A radiation check source was run over by an aircraft in the hanger at RSL Andrews. A degreaser was being used at RSL Nellis without appropriate PPE due to the fact that the hazards analysis was conducted. A welding operation was conducted at the RNCTEC facility and the NSTec personnel did not follow the quality control (QC) requirements in the work package or the Toxic Hazard Work Permit issued by NSTec Industrial Hygiene (IH). Both NSTec QC and IH requested a Management Review. However, NSTec management only conducted an informal fact finding which was not documented. In addition, NSTec conducted a review of completed work packages and identified that proper hazardous energy control processes (i.e., Lockout/Tagout (LO/TO)) had not been put into place for the removal of a boiler in Building 2211.

On June 24, 2015, several drums of hazardous waste caught fire at the 90-day hazardous waste accumulation area adjacent to the Non-Proliferation Test and Evaluation Complex. As a result of this fire and subsequent actions to render safe and dispose of the remaining material, on August 27, 2015, NDEP issued a Finding of Alleged Violation (FOAV). This FOAV cited violations under four hazardous waste regulatory requirements. The NSTec investigation of the fire identified failures in hazard identification and control and container/waste management.

During construction of the access road and pad at environmental management drill site ER-20-12, two vehicle roll-over incidents occurred with a water truck, and a scraper. While NSTec conducted separate "time outs" and management reviews to identify the cause and appropriate corrective actions, failures in work planning and control and work execution were evident. Collectively, these incidents led to a substantial delay in start of drilling activities at ER-20-12.

NSTec did not maintain several permits in accordance with environmental protection standards. For example, NSTec did not maintain permit compliance with some of the generators listed on the NNSS Air Quality Permit or the NNSS wastewater discharge. In addition, an ORPS reportable condition resulted from the Notice of Violation for exceeding the Secondary Maximum Contaminant Level for Iron (MCL) at the J-14 Water Supply Well in Area 25. By the fourth quarter, NSTec had implemented adequate corrective actions for the wastewater discharge and water supply well permits. However, compliance issues with the Air Quality Permit are still ongoing.

NSTec did not meet the requirements or intent of the NNSS Underground Facility Safety and Health Program Description, PD-P200.002, at underground facilities other than U1a. Basic requirements gap analyses were not completed at three other underground facilities that have operations occurring (U25x, U12p, and U12u). Without the completed gap analyses, programmatic plans to reach full compliance with the Program Description cannot be developed.

NSTec continues to make slower than expected progress on the radio project, partially due to issues in procurement that resulted in delays in getting the RFP finalized and on the street for bids. In addition, lack of project documentation showed that the activity was not being managed as a project in accordance with NSTec CD requirements.

NSTec Procurement's contract administration performance did not meet expectations for awarding a contract to a vendor for DAF Backup Power Systems major component (ATS). The selected vendor

did not meet and lacked the ability to meet factory acceptance requirements stated in the contract delaying the acceptance of the equipment. The alternate vendor also was found to not to have the capability to fulfill the factory acceptance requirement.

NSTec continued to have some difficulty with refinement of scope of work and estimate development to support project initiation. NSTec performed below expectations in the initial planning phases resulting in schedule impacts for some customers.

NSTec met 13 of the 16 Information Technology Implementation Factors. Two of the unmet factors (HSPD-12 and IPv6) are awaiting funding and, therefore, are out of NSTec's control.

NSTec did not meet expectations by failing to have a classified development network which resulted in multiple instances of down-time for NvSN users as NSTec upgraded users' workstations to Windows 7.

NSTec completed a total of 113 eSourcing events. These eSourcing events totaled $45.2M worth of spend. The NNSS drove $4.9M worth of commodity agreement spending resulting in 11.4% savings. Along with this, 2,502 eStores transactions were completed which is a year over year improvement of 31%. This level of tool usage by NNSS yields $2.2M of strategic tool enabled savings to date. However, NSTec failed to achieve the 4% goal in strategic savings through the SCMC for the second year in row, reporting strategic site savings of $1.2M for a total Strategic Savings of $3.4M (2.8% Strategic Savings rate & 2% of overall program total) against a total invoice spending of $117M.

Performance Objective 6: Leadership

Summary

Leadership (10% of At-risk fee) was rated as VERY GOOD. Overall, NSTec's performance significantly exceeded expectations in meeting the DOE/NNSA mission by ensuring Leadership is effectively managing programmatic concerns. NSTec's key achievements included the following: outstanding leadership with a range of internal and external stakeholders insuring effective program execution and program integration support to the DOE Office of Environmental Management; use of the Highland Group to perform an in-depth analysis to achieve significant improvements in work planning; implementation of the Comprehensive Workforce Management Project that redesigned NSTec salary structures, job families, compensation, etc.; utilization of the Parent Organization Oversight Committee (POOC) to perform in-depth comprehensive reviews of recent incidents and weaknesses; and development and progress of a management initiative (five Pillars of Operational Excellence). NSTec's self-assessment rating was EXCELLENT.

NSTec's POOC provided enhanced support throughout FY 2015 to address recent incidents and weaknesses in operations and oversight. NSTec proactively engaged the POOC external corporate resources to assist in local effectiveness and internal reviews in multiple functional areas and facilities. The results of three POOC assessments assisted NSTec in recognizing unidentified deficiencies and allowed for corrective actions through further trending and analysis. The POOC interactions also enabled NSTec to gain an outside SME perspective that was not available internally and assisted NSTec management in achieving an industry wide perspective that is global and broad reaching for the mission critical areas under their purview.

Throughout the performance period, NSTec showed progressively improving and outstanding leadership in both calling for work pause/safety stand downs and conducting management reviews/critiques. Of note, over 60 time outs/work pauses were called in FY 2015. This included a work pause based on the LANS electrical sub-station event. Using lessons learned, NSTec recognized that the hazard identification control set could be improved and implemented. This action received recognition from the DOE Office of Analysis (AU-23). While a safety incident leading to a work stoppage is not desirable, the management reaction following the incident was particularly important as an indicator of both safety culture and ability to learn and improve.

Based on recurring operational issues, NSTec subcontracted with The Highland Group (THG) to perform an in-depth analysis of areas of improvement and metrics to drive improved work planning, cost of poor quality, and issues management effectiveness. Through this activity, NSTec piloted a new architecture and scheduling of preventative maintenance at the DAF that included the institution of key project metrics, data sources, and baselines. Based on the success of this pilot, NSTec Management decided to continue the effort at the JASPER facility using the lessons learned from DAF. In addition, NSTec resources were trained on maintenance sustainability reviews, to begin implementing the System of Managing Construction.

NSTec showed outstanding leadership in coordination with multiple field offices and Programs on several Environmental Management issues. NSTec management provided key integrational

leadership in working with DOE/EM Headquarters, NNSA Office of Secure Transportation, and the DOE/EM Oak Ridge Office. Further, NSTec management demonstrated similar leadership in integration of activities for disposition of the U.S. Air Force's Burnt Mountain RTGs, NA-20 Husman Irradiators, and other DOD components. These activities have achieved cost avoidance of over $200M.

NSTec worked cooperatively with multiple sites and organizations including the Livermore Field Office, NNSA Office of Packaging and Transportation, Office of Security Transportation, INL, etc., to support the packaging and transportation of special items. This activity was a national security milestone for the NNSA and achieved cost avoidance of over $600M. NSTec demonstrated strong leadership in developing approaches that planned for the safe and secure completion of this key mission activity.

NSTec achieved agreement with NA-10 and NA-50 to secure funding within FY 2017–FY 2021 programming to support NNSS Nuclear Materials Management within the Storage and Container subprograms, allowing the NNSS to be properly represented in the NNSA budget request for these programs for the first time. This agreement will help to fix the decade old issue of consolidating NNSA nuclear materials at DAF without funding a nuclear materials management program.

NSTec proactively addressed and recommended viable alternatives with respect to local and complex-wide management of DM. As part of the FY 2017–2021 programming effort, numerous scenarios addressing the treatment of DM were requested that evaluated options to redirect funding from operations and other priorities toward DM reduction. In addition to providing the requested analysis and impacts, NSTec developed an integrated DM reduction approach as a third option. Through application of this approach, NNSS demonstrated a conservative reduction to DM totaling approximately $75 million is achievable without any impact to operating, maintenance, and mission support funding/activities. The proposal submitted by NSTec was favorably received and has been influential in shaping how NNSA/NA-50 will approach the DM reduction objectives for the NNSA.

By combining SDRD diagnostic breakthroughs and the procurement of two small UAVs with the newly implemented CRADA agreements with industry, NSTec strategically positioned the NNSS into technologies of the future. Working with industry to reduce payloads of sensors and power requirements to fit onto a UAV that can be tested at the NNSS restricted air space, will bolster aerial platform sensing for NNSA and national security use.

NSTec Project, Program and Engineering management invested in 3-D surveying techniques that have the potential to save resources in design, design changes, and configuration management. NSTec management recognized the potential of the technology and took action to demonstrate it in the design of the DAF Lead-in lines, the automatic transfer switch replacement, and the Advanced Radiograph Project. These efforts showed leadership to address the ongoing rework issues.

In January 2015, NSTec implemented the Comprehensive Workforce Management Project (CWMP) which was a redesign of NSTec's salary structures, job families and job descriptions to better align with market and current compensation practices. The CWMP was instrumental in setting the

foundation to identify, attract and retain needed talent to complete mission requirements and to identify critical skills needs and gaps.

NSTec enhanced external communication efforts to improve and increase public awareness and favorable exposure of NSTec NNSS activities through media news releases. NSTec received prominent coverage in the media including a front-page Las Vegas Review Journal article with photos covering our first CRADA, NSTec scholarships, and the donation to the Mt. Charleston Cold War Memorial. Their positive coverage in the media generated good will in the community and the workforce. NSTec also continued to maintain and advance the NNSS Emergency Public Information Program which now rates among the leaders in the NNSA complex.

NSTec implemented their newly developed ERM process that includes monthly mission-level risk management meetings with various NSTec organizations. The ERM process is working to communicate program and enterprise risk across NSTec and up and down communication channels within NSTec Directorates.

Throughout the year, NSTec continued to have some difficulty with refinement of scope of work, estimate development and finalization to meet customers' expectations. However, NSTec introduced new cost estimating initiatives to remedy cost estimate development and to dovetail the cost estimating and project management process.

NSTec did not adequately demonstrate that they can develop, implement, and update safety basis documentation in accordance with 10 CFR 830 requirements, despite identification of this as a recurring performance issue. This has resulted in significant mission and cost delays.

NSTec improved Senior Management ownership related to the completeness and quality of the REOPs submitted to NNSA/NFO for approval, but there are still issues with NSTec ensuring that Secondary REOPs are consistent with the safety envelopes established by the Primary REOPs.

NSTec management was not able to adequately estimate their direct spend plan or their projections between labor and non-labor. This resulted in large swings in their indirect variance during the year as demonstrated by an over recovered variance in June of $2.6M to an under recovered variance in July of $5.7M. In addition, management of the forecasted year-end net variance position for all global rates was below expectations. NSTec's goal was to manage the over/under recovery variance within +-$3M at fiscal year-end. The year-end variance was $4.564M under-recovered.

While the local support provided by NSTec's corporate body exceeded expectations, there were concerns about corporate's lack of coordination with NNSA relative to their engagement with the Congressional delegation.

Optimistic planning versus planning to a realistic budget for FY 2015 when large budget reductions had been predicted by NNSA resulted in a great deal of additional work and rework by both NSTec and NNSA. Better communication by NSTec outside of individual program lines (to the Administrator) could have prevented the very late authorization for start on the workforce restructuring effort.

Outcome of Efforts Carried Out in Support of On-going Management Improvement Efforts

Based on a number of operational issues experienced in FY 2014, NSTec developed a Management Plan to address known weaknesses. As part of NSTec's CAP for this purpose, they identified five action areas with desired outcomes and the measures/metrics they would use to measure progress during the year. Overall, NNSA/NFO observed good NSTec senior management engagement and focus on this activity. At the end of FY 2015, NNSA/NFO performed a validation of NSTec's progress against their commitments with the outcomes below:

- Area 1: Management Engagement and Communication

NNSA/NFO validation confirmed that Area 1 met expectations. NSTec piloted and implemented a Management Observation Program (MOP) that met or exceeded most of its goals. In addition, the May 2015 employee survey showed that most employees responded favorably when asked about engagement with management and overwhelmingly thought that engagement was positive. NSTec also adopted and implemented the Gallup Q12 survey.

- Area 2: Safety/Quality Prioritization and Hazard Identification

NNSA/NFO validation confirmed that strong management attention is still needed in this area. Indicators show that the Management Review Board (MRB) and the Executive Review Board (ERB) worked to identify issues prior to project start, but these Boards are catching lack of hazard identification very late in the process. In addition, Extent of Condition reviews did not appear to look "across the board" to address potential issues with hazards identification and mitigation in other work processes not related to a single event (e.g., NPTEC drum explosion). NNSA/NFO was unable to determine effectiveness because new authorization bases (AB) have yet to be developed and the NPTEC AB has not yet been successfully tested.

- Area 3: Management Focus and Integration of Programs and Operations

NNSA/NFO validation confirmed that Area 3 met expectations for process development and documentation but could not confirm effectiveness due to lack of operating time under the new processes. The ERB worked to ensure that projects have put the appropriate controls in place prior to execution, the NSTec Project Management Company Directive (CD) improved, the NSTec Dashboard was redesigned focusing on new metrics to enhance decision making and look more proactively, and the Program/Project Screening and Siting CD improved. These changes look to be positive in improving management focus and program/operations integration, but insufficient time has passed to determine if the changes will be effective in resolving the issues.

- Area 4: Enterprise Work Management, Planning and Control

NNSA/NFO validation confirmed that strong management attention is still needed in this area. Successful changes to the Pre-job briefing process have promoted active worker involvement and encouraged honest discussions among supervisors, foremen, and managers and ensured that information important to safety is addressed/discussed prior to performing activity level work. However, improvements to the Real Estate Operating Permit (REOP) process had not occurred that take into account the recent failures in work authorization and did not correct the issues nor the follow-on issues generated by the actions identified in the Pillar. For work control NSTec made numerous significant changes that should improve performance; however, effectiveness cannot be validated until after the changes have had some run time.

- Area 5: Issues Management and Continuous Improvement

NNSA/NFO validation confirmed that Area 5 met expectations. NSTec changes to the Issue V&V processes appeared reasonable and included process improvements; however, insufficient time has passed to determine if the effectiveness of the implementation of the procedural changes will address the issues identified.