National Nuclear Security Administration

FY 2013 PEP

LOS ALAMOS NATIONAL SECURITY, LLC Performance Evaluation Report

LOS ALAMOS FIELD OFFICE
Performance Period:
October 2012 – September 2013

DECEMBER 16, 2013

Executive Summary

This report was produced by the Department of Energy/National Nuclear Security Administration (DOE/NNSA), Los Alamos Field Office in accordance with guidance from the NNSA Office of Infrastructure and Operations (NA-00). The purpose of this report is to provide the NNSA Fee Determining Official (FDO) with an evaluation of Los Alamos National Security, LLC's performance in operating the Los Alamos National Laboratory (the Laboratory) for all Performance Incentive requirements under contract DE-AC52-06NA25396 against the NNSA Strategic Performance Evaluation Plan (PEP). The Strategic PEP provided expectations for Laboratory performance and promoted a performance-based framework founded on results and informed by prudent management of risk, accountability, and renewed trust.

This evaluation is a collaboration of input from all elements of NNSA. The scope includes adjectival ratings for each of the Performance Objectives based on performance against Contributing Factors, Site Specific Outcomes, and other criteria as set forth in the Strategic PEP. Adjectival ratings are set forth and defined in Federal Acquisition Regulation (FAR) Subpart 16.4, Table 16-1.

As was the case at the inception of this contract, the Laboratory is a world-leader in many areas of scientific discovery, and in the application of science, technology, engineering and computing to the challenges facing the Nuclear Security Enterprise. The Laboratory is taking proactive steps to protect and advance the precious intellectual capital that is the basis of that excellence; and is making efforts to sustain the Laboratory's infrastructure in the face of severe budget pressure.

Security and safety are core values of NNSA, and the Laboratory is effectively fulfilling security responsibilities although some areas of security risk have been identified. While there was significant period progress in key Environment, Safety and Health dimensions, several aspects of safety require additional focus.

Seven years into this contract, while significant gains have been made, challenges still exist in: Criticality Safety, Conduct of Operations, Safety Basis, Project Management, and Weapons and Non-Proliferation Product Quality. Institutionally, the Laboratory faces challenges in maturing the Contractor Assurance System (CAS) that is required for continuous improvement in a 'learning organization', in moving toward an aggressive Cost Management culture; and in achieving a satisfactory Control Environment with the associated rigorous internal controls.

Performance Objective 1 – Nuclear Weapons Mission – Very Good. The overall rating of Very Good for this Performance Objective is the aggregate of several exceptional accomplishments, and the fulfillment of substantially all core expectations. Performance was negatively impacted by interruptions in facility availability, and weapons production quality issues.

As specific positive examples, the conduct of the Gemini subcritical experiments, along with subsequent analysis and interpretation of highly complex data, was a major highlight of the performance period. These efforts enhance stockpile stewardship by demonstrating new diagnostic technologies and experimental designs that have produced expanded data collection for validating nuclear weapons simulations. While the Laboratory initiated a pause in TA-55 operations that delayed milestones, they proactively shipped samples for an experiment at Sandia before the end of the performance year, despite the pause in operations.

The Laboratory has provided very good support to the Advanced Simulation and Computing program, and has been aggressive in effectively utilizing tri-lab special computing resources, as well as managing the Cielo platform for the Capability Computing Campaigns. Further, the Laboratory has made significant improvements in alternative integrated design codes, which are increasing confidence in computing outputs and minimizing rework.

Performance Objective 2 – Broader National Security Programs – Excellent. The overall rating of Excellent for this Performance Objective reflects outstanding performance in the highest priority areas, continued high performance in many legacy programs, and opportunities for improvement in some areas that support mission execution; such as coordination with NNSA programs, the accuracy of cost estimates, and facility availability and reliability. Significant, strategic contributions were made in International Source Recovery; Satellite-based and Land-based Nuclear Detonation Detection; International Nonproliferation Export Control; Nuclear Non-compliance Verification; Second Line of Defense Support; Insider Threat Mitigation; and, Plutonium Oxide Production.

The material contributions to these programs are very positive in themselves; and it is even more noteworthy that the broad array of technological, operational, and training outcomes supporting these disparate programs reflect the tight strategic alignment between the special and often unique capabilities of the Laboratory and the nation's nuclear non-proliferation priorities.

Performance Objective 3 – Science, Technology & Engineering - Excellent. The overall rating of Excellent for this Performance Objective reflects sustained superior performance in several key areas of intellectual inquiry and scientific achievement. The depth and breadth of accomplishments described reflect an institution that is not only pushing the limits of discovery, but which is building a highly capable scientific and technical cadre, which is leveraging broad scientific inquiry for the specific benefit of core NNSA missions, and which is focused on maximizing the return on our national investment. Toward these ends, the Laboratory has tightly coupled the Laboratory Directed Research and Development program to the Laboratory Science Pillars.

The Laboratory has demonstrated the relevance of basic research to national security with advances in simulation codes, the ChemCam fielded on the Curiosity Mars Rover, free-electron laser systems for ship self-defense, energy storage systems for automobiles, and accurate measurements of neutron capture cross-sections in Uranium. The Laboratory has partnered across the Enterprise in

the development of a Plutonium Research Strategy, has received a positive review of the Lujan Center after a difficult recovery from an off-site contamination issue, and has received four R&D 100 Awards demonstrating the continued vibrancy of scientific research at the Laboratory.

The Laboratory demonstrated full engagement in technology transfer; advanced the Chevron-Los Alamos Alliance for Energy Solutions, and developed systems to streamline proposal approval and technology access. Building on these gains, progress has been made in developing a roadmap for future facility investments to position the institution for response to future national security priorities.

Performance Objective 4 – Operations & Mission Excellence - Satisfactory. The overall rating of Satisfactory for this Performance Objective is an aggregate of many noteworthy accomplishments, sustained high performance in many areas, some material shortcomings, and a subjective judgment about the tempo of progress toward several longstanding, well-documented challenges, framed against the high standards of the bilateral Performance Evaluation Plan.

Significant gains included the senior executive involvement in the exercise of Contractor Assurance System tools to promote enhanced Risk Management, which was a major milestone in the maturation of the Laboratory approach to institutional management.

The Environment, Safety and Health (ES&H) program executed a major reengineering and achieved continued reduction in injury rates. The Laboratory rapidly developed a technically defensible path-forward to address the emergent PF-4 seismic-induced collapse scenarios and initiated focused structural enhancements. The CFO effectively managed major budgetary challenges and remediated virtually all the long-standing fiscal deficiencies that had challenged the institution in past years.

The Laboratory sustained high performance in Physical Security, Property Management, Information Technology support, and Legal Management. In some areas with legacy challenges, the tempo of progress has been less than was expected, including: Formality of Operations maturation; Safety Basis maturation; the Earned Value Management System and associated construction performance; the maturation of cyber metrics; Quality Assurance performance; integration of safety into design for the Transuranic Waste Facility; and long term site stewardship efforts needed to sustain an aging infrastructure. For Criticality Safety, management inattention and delay early in the fiscal year resulted in a persistent downward trend in assurance of the program's adequacy and long-term viability; contributed to conditions leading to a Plutonium Facility (FP-4) programmatic pause; and is limiting the rate of PF-4 resumption.

Finally, there have been missteps that have reflected adversely on the institution in the areas of security, contractual propriety, and project completion. In the aggregate, these conditions reflect an institution with broad areas of high performance, substantial success in some areas of concern, and insufficient progress in other key areas of concern.

Performance Objective 5 – Contractor Leadership – Very Good The overall rating of Very Good for this Performance Objective is the result of some very constructive engagement activities, especially with DOE/NNSA leaders locally and at the agency and bureau level. Measurable progress has been made in key areas of Institutional Leadership and Management. Other specific examples include: Engagement with key stakeholders in the Defense Community; Proactive coordination with other elements of the Nuclear Weapons Complex; Engagement with the broader scientific, technical and industrial community; and the sustainment of professional excellence in science and discovery, as well as in many professional and support disciplines. However, entering the eighth year of this contract, several aspects of Institutional Management that were identified as challenges at contract inception require further attention and improvement.

Performance Objective 1: Nuclear Weapons Mission

Narrative Summary

EOY Adjectival

VERY GOOD

The overall rating of Very Good for this Performance Objective is the aggregate of several exceptional accomplishments, and the fulfillment of substantially all core expectations. Performance was negatively impacted by interruptions in facility availability, and weapons production quality issues. As specific positive examples, the conduct of the Pollux subcritical experiments, along with subsequent analysis and interpretation of highly complex data, was a major highlight of the performance period. These efforts enhanced stockpile stewardship by demonstrating new diagnostic technologies and experimental designs that have produced expanded data collection for validating nuclear weapon simulations. While the Laboratory initiated a pause in TA-55 operations that delayed milestones, they have proactively allowed samples for an experiment at Sandia to be shipped before the end of the performance year, despite the pause in operations.

The Laboratory has provided very good support to the Advanced Simulation and Computing program, and has been aggressive in effectively utilizing tri-lab special computing resources, as well as managing the Cielo platform for the Capability Computing Campaigns. Further, the Laboratory has made significant improvements in alternative integrated design codes, which are increasing confidence in computing outputs and minimizing rework.

The Laboratory was effective in meeting Nuclear Weapons Mission work within budget and other agreed upon parameters, and did so in a year in which funding streams were repeatedly delayed and revised. The Laboratory exceeded expectations by building the Engineering Development Unit seven months ahead of schedule, allowing for the fabrication of development pits more rapidly than was expected. The Laboratory again exceeded expectations by providing valuable contributions to Nuclear Weapons Stockpile Management Program including: support for the release of Issues G and H; The completion of all Level 2 maintenance milestones for the W76-1, W76-0, W78, W88, and B61 stockpile systems; Component characterization; and, Component disposition.

Further, the Laboratory met or exceeded deliverable expectations for the B61-12 LEP, the W78/88-1 Study, and the W88 ALT 370; tactical accomplishments that reflect alignment with strategic aims. Of particular note, the Laboratory developed a new gas-transfer system whose performance consistently matched theoretical design calculations; and achieved advances in a new hydrodynamic test configuration. Partnering with the Kansas City Plant, the Laboratory delivered multiple suitable options for a replacement foam stress cushioning material needed for the B61-12.

The Laboratory significantly advanced fundamental knowledge of the Nuclear Weapons Stockpile. As examples, the Defect Induced Mix Experiment (DIME) series was successfully executed, adding to the understanding of mix phenomena. Experiments were executed both at the National Ignition Facility and at the Omega laser facility; and advanced technical basis work supporting re-use of pits.

While outstanding work was done to execute current sub-critical experiments and to prepare for future sub-critical experiments, two red milestones (4523 and 4524) were missed due to a pause in selected activities at Technical Area 55.

The Laboratory's iHATCH test unit was assembled, tested, and documented for Phase 2 Build 1. The Laboratory completed Laboratory Cycle 18 Annual Assessment Reports and the associated letter was completed and distributed to DOE/NNSA and DOD.

The Laboratory delivered high priority W76-1 Surveillance of Arming, Fusing and Firing deliverables, canned subassembly A reacceptance, and Navy deliverables as expected. The Laboratory also met all Level 2 surveillance milestones for the W76-0, W78, W88, and B61 stockpile systems as expected; and completed all directed stockpile R&D work and Engineering subprogram requirements for the enduring and future LEPs.

In terms of Weapons Life Extension Programs, the Laboratory met or exceeded the deliverables for the B61-12 LEP, the W78/88-1 Study, and the W88 ALT 370. The Laboratory's development of a new gas-transfer system, whose performance consistently matched theoretical calculations, was particularly beneficial to a new Hydro test configuration. Partnering with the Kansas City Plant, the Laboratory generated multiple suitable options for a replacement foam stress cushion material for the B61-12; and achieved significant technological maturation for the W78/88-1. The Laboratory also contributed to the numerous key reports, including the Selected Acquisition Reports, schedule and risk information for the Integrated Master Schedule, DOD Cost Assessment and Program Evaluation reviews, Quarterly Program Reviews, and monthly reporting. These examples reflect significant contributions to life extension efforts and to the sustainment of stockpile reliability.

In terms of addressing future nuclear weapons stockpile needs, The Laboratory had a noteworthy accomplishment in presenting a full analysis of an indirectly driven beryllium capsule to the Indirect Drive Ignition (IDI) working group; and also provided engineering and physics-based life-length estimates and aging assessments on nuclear explosive package components and materials in support of weapon refurbishment and replacement. Further, critical aging information on legacy and

potential replacement materials was developed to support informed decision about long-term material/component behaviors and longevity. These advances in cognizance of stockpile aging issues provided insights that will contribute to the economical and efficient stewardship into the future.

In addition to sustaining the weapons stockpile through LEPs and advancing science to identify and support the future needs of the stockpile, the Laboratory also took steps to sustain and build the nuclear weapons capability that will be necessary to meet program expectations in the future. As examples, the Laboratory completed all requirements identified as essential under the Diagnostics Roadmap, and completed a stretch objective with the Gamma to Electron Magnetic Spectrometer (GEMS) Conceptual Design Review. Weapons Surveillance Engineering Assessment Technology activities continued to contribute to strengthening science and engineering capabilities essential to ensure current and future requirements by advancing assessment through accelerated aging tests.

The Laboratory accelerated Technical Area 55 installations that will benefit both the B61 and the W88 ALT. Atomic Weapons Establishment secondment exchanges clearly enhanced operational use in Navy Strategic Systems Program applications and associated work by the (UK) Royal Navy.

To fulfill its obligations, the Laboratory was expected to engage in effective operations, and as the following specific examples reflect, those expectations were met. The Trident laser delivered 623 shots during FY13, significantly exceeding the planned 550 shots. The lab has been capably operating under "Direct Release" for the Mutual Defense Agreement with no transmissibility issues. The Laboratory exceeded expectations by demonstrating the capability to handle more than two Nuclear Explosive Safety Study evaluations concurrently. Although quality issues persist, some actions were taken to address Parts Accepted Trouble Free and other quality issues. The Laboratory contributed to the Requirements Modernization Initiative, helping to drive completion of NNSA gated process requirements in support of weapons Life Extension Programs.

The Laboratory was given the opportunity to lead the maturation of an NNSA Plutonium Strategy, in response to the suspension of the Chemistry and Metallurgy Research Replacement (CMRR) project. Plutonium strategy goals were met despite significant unanticipated, uncontrollable barriers such as reprogramming challenges and frequent delays associated with external inquiries. The delay in the CMRR project had serious implications for stockpile sustainment production and research prospects. Efforts to define a restructured Plutonium Strategy were key to addressing those concerns.

The Laboratory was also expected to exploit Advanced Scientific Computing (ASC). With regard to the computing side of ASC (Computational Systems and Software Environment (CSSE) Facility Operations and User Support (FOUS) subprogram), expectations were exceeded in effectively supporting the Trinity super computer procurement, supporting a successful evaluation of the Trinity proposals in September 2013. The Laboratory was recognized by ASC HQ for their support of the CSSE co-design effort as well as support for FOUS and the Common Computing Environment (CCE) projects. Specifically, work performed through completion of the Tri-Lab L2 Milestone "Tri-Lab Data

Backup and Recovery" #4698 is significant for the ASC Program as it has bolstered capabilities for facilities to support recovery of applications and relocation of operations in the event of a disaster.

For the first time, the Tri-Lab team has developed and exercised Laboratory Disaster Recovery plans, verifying the ability of each lab to backup and recover weapons code applications at remote sites, significantly strengthening program resilience. The Laboratory provided exceptional support in collaborations between NNSA/ASC and DOE Office of Science/ASCR in computing research in the areas of co-design and software environment research.

All ASC milestones were completed. As examples, the Laboratory modified relevant Eulerian integrated codes to support additional hydrodynamics options and made significant improvements in Lagrangian application codes in support of FY14 boost peg post. I the Integrated Codes subprogram, the Laboratory further quantified uncertainty in physics code calculations arising from numerical errors and approximations. For Physics and Engineering Models (PEM) sub-program, the Laboratory furthered inter-lab coordination, engagement with Headquarters, and milestone completion

Some expectations were not met, including non-responsiveness to the Defense Science Board Standing Committee on Survivability engagement and the Air Force Nuclear Weapons Center requests for information to coordinate joint Bluebook investments with NNSA Headquarters.

The Laboratory was specifically tasked with completing the landmark Pollux experiment and advancing research using the Gemini experiment. All associated milestones were completed on time and on budget. Additionally, the laboratories submitted a joint plan for future subcritical experiments at Nevada National Security Site completing that priority deliverable three months early. The Gemini series demonstrated new advanced diagnostic technologies that led to "order of magnitude" increases in data collection for nuclear weapons simulations, and further demonstrated the relevance of scaled experiments to future stockpile stewardship.

The Laboratory completed high priority Joint Integrated Lifecycle Surety (JILS) Phase 1 requirements, which has informed and directed national surety decisions. The JILS program has developed a methodology to evaluate effectiveness of proposed surety solutions for weapons in military custody.

Performance Objective 2: Broader National Security Mission

Narrative Summary

EOY Adjectival

EXCELLENT

The overall rating of Excellent for this Performance Objective reflects outstanding performance in the highest priority areas, continued high performance in many legacy programs, and some opportunities for improvement in some areas that support mission execution; such as coordination with NNSA programs, the accuracy of cost estimates, and facility availability and reliability. Significant, strategic contributions were made in International Source Recovery; Satellite-

based and Land-based Nuclear Detonation Detection; International Nonproliferation Export Control; Nuclear Non-compliance Verification; Second Line of Defense Support; Insider Threat Mitigation; and, Plutonium Oxide Production.

Material contributions to any one of these critically important initiatives would be noteworthy. The broad array of technological, operational, and training outcomes supporting these disparate programs reflect the tight strategic alignment between the special and often unique capabilities of the Laboratory and the nation's nuclear non-proliferation priorities.

As specific examples of effective National Security engagement, serving the Global Threat Reduction Initiative (GTRI) Off Site Recovery Program, the Laboratory exceeded the target quantity of materials recovered; and provided essential technical assistance to address source recovery issues. Likewise, in support of the GTRI Molybdenum-99 (Mo-99) Program, the Laboratory led development of a beneficial Low Enriched Uranium fission technology requiring advances in target geometry optimization, target cooling, reactor vessel design development, chemical separations, and accelerator systems. While the work performed was extremely valuable, improvement in the accuracy of cost estimates for assigned scope is desired.

The Laboratory provided significant support to the Reactor Conversion program for Uranium-Molybdenum (UMo) low enriched uranium (LEU) fuel and to associated fuel fabrication capability development, but failed to meet some of the cost, schedule and technical requirements.

On the U.S. High Performance Research Reactor project, the Laboratory achieved less than was possible due to: limited personnel, space and equipment availability; schedules delays; cost overruns; and communications lapses with DOE program managers, to the extent that equipment and infrastructure failures have been a severe impediment to Reactor Conversion projects.

In both the satellite-based and ground-based nuclear detonation detection arenas, they robustly supported nonproliferation and treaty verification work at the National Center for Nuclear Security. The Laboratory has undertaken efforts to improve project and program outcomes.

Support for programs in the Office of Nuclear Controls is characterized as outstanding, with the Laboratory often acting as the key resource on national and international nonproliferation efforts.

On the International Nonproliferation Export Control Program (INECP), the Laboratory led engagement in Southeast Asia and domestically with the U.S. export control law enforcement community. Specific contributions included: The conduct of capacity-building workshops on export control and nonproliferation with Indonesia, Mexico, and Malaysia; A Commodity Identification Training workshop for Iraqi government representatives; Technical oversight of collaborative R&D projects with former WMD scientists from the former Soviet Union; Technical support to the NIS nuclear forensics program in Japan, South Africa, and the European Union. They also sustained the computer information networks for the Nuclear Suppliers Group, Australia Group multilateral export

control regimes, and the secure PINS network that supports export control by the Departments of Commerce, State and Energy. The special capabilities provided by the Laboratory were critical to sustained superior mission fulfillment by these other Agencies and programs.

The Laboratory also served the Office of Nuclear Verification programs; providing excellent technical support for multi-laboratory nuclear and IAEA verification projects, including UF6 Age Dating, Uranium Sourcing, Mobile Plutonium Facility, Graphite Isotope Ratio Method Steering Committee, and for the verification of U and Pu fuel cycles through Nondestructive Analysis. In response to an IAEA request, the Laboratory performed a complicated explosive test that would have cost several million dollars using traditional methods, but which was creatively built on previous work, completing the job for less than $200K, leveraging scarce program resources and delighting the customer.

In support of the Highly Enriched Uranium (HEU) Transparency Program, the Laboratory supported decommissioning of the Blend Down Monitoring Systems at nuclear facilities in Russia, a key nonproliferation priority. Under the Warhead and Fissile Material Transparency Program (WFMT), there were notable successes in Nuclear Testing Limitations work, in cooperative efforts with the UK, and in the Warhead Measurement Campaign. Some responsiveness issues were noted in WFMT.

The Office of Nuclear Safeguards and Security objected to uncoordinated, independent action taken by the Laboratory in sponsoring a workshop on the Comprehensive Nuclear-Test-Ban Treaty with the Woodrow Wilson Center. This workshop, on an extremely sensitive subject, was not coordinated in advance with NNSA. If it had been, the National Security Staff and NNSA would have directed the Laboratory to cancel the workshop, which created the potential to confuse the Administration's messaging. The action may require Agency remedial/corrective action.

The Laboratory successfully performed acceptance testing on numerous Second Line of Defense installations, contributing expert advice on radiation detection system and Science Team expertise; and was a thought and programmatic leader in IAEA's Insider Threat Mitigation training efforts in support of the International Nuclear Security Engagement Project; another instance of engaging to leverage special or unique capabilities to advance important national or international objectives.

The Weapons Material Protection program was adversely affected by a sharp increase in Laboratory overhead fees in FY13, specifically impacting high-priority national security work with Russia. As a result of the unforeseen cost hike, the program office is disincentivized from maintaining the project work at the laboratory, despite key contributions provided by Laboratory expertise.

In the production of Plutonium Oxide, the Laboratory created additional conversion (oxide production) capacity, executed metal flow sheet development and supported the Plutonium steady state feedstock program. Challenges in obtaining adequate support for the oxide certification effort and the operational pause at Plutonium Facility-4 threatened the milestone 150 kg in production, but the milestone was met. The Laboratory drove cost savings for the Plutonium Oxide Production Program by transitioning analytical chemistry work to the Savannah River National Laboratory.

On behalf of the Offsite Source Recovery Project, the Laboratory recovered 1,303 domestic sealed radioactive sources in FY13, exceeding the goal by 8.5%; and reducing the latent risk that radiological sources pose to national security, public health, and safety.

In the application of National Security strategies and technology, the Laboratory support for the Science and Technology Program was uneven with the Laboratory completing only 86% deliverables, of which only 50% were completed on time. However, on some inter-lab projects, such as the neutron multiplicity and radiofrequency projects, the Laboratory provided key technical leadership.

The Laboratory provided a central capability for the nation's nuclear incident response posture by staffing the Radiological Assistance Program, the DOE Forensics Operations Team, and the Disposition and Forensics Evidence Analysis Team; maintaining equipment and trained staff, with high availability for short notice operational response in the national interest.

Additional high-impact National Security work included warhead verification and monitoring research with the United Kingdom Atomic Weapons Establishment; the conduct of international training through the Nondestructive Assay Inspector Course and the Advanced Plutonium Verification Techniques Course. The Laboratory also supported an investigation by an NNSA Nuclear Noncompliance Verification Team Leader which leveraged a hydrodynamic test observation to resolve a key nonproliferation and verification question.

Effective operations in National Security work were reflected through significant contribution to the U. S. - Japan Permanent Coordinating Group, producing valuable instrumentation developments for the Japanese nuclear fuel cycle. The Laboratory contributed to the development of verification goals for the Fissile Material Cut-Off Treaty; to the IAEA's Standing Advisory Group on Safeguards Implementation; to regional Centers of Nuclear Security Excellence in three key Asian countries; and to NNSA's Second-Line-of-Defense (SLD) program while participating in an exercise in Sochi, Russia; although the impacts of these efforts have not been well defined. With respect to this work, the Laboratory has failed to provide a level of transparency for programmatic planning or reporting that facilitates management of the Contract and oversight of programmatic activities by the NNSA.

With specific regard to Counterterrorism, some Program Managers considered that expectations were met in many cases but repeated the concern about meeting deliverables and the timeliness of deliverables identified above. With specific respect to counterterrorism exercises, Program Managers assess that the Laboratory executed assigned training events and program meetings in a very satisfactory manner; providing required personnel to fill watchbills and rosters when needed. The Laboratory provided planning to minimize impacts of limited funding under sequestration; and exceeded expectations in Home Team support, deployed teams, training aids and planning.

Excellent performance was observed in the tri-lab nuclear counterterrorism High Explosive Roadmap Project, which is now being used to guide a cohesive national program. The Laboratory completed the OPSIS exercise at the Nevada National Security Site (NNSS), hosting an additional non-U.S.

team; however, they did not effectively manage the process to develop and submit a Transportation System Risk Assessment (TSRA) to evaluate the risk associated with the proposed exercise shipments of Nuclear Explosive-like Assemblies. As a result, Laboratory NELAs were not authorized to be shipped to the test site and were not available for the OPSIS exercise. The Laboratory did coordinate the OPSIS exercise blind test After Action Review, involving participants from three nations at a range of classification levels. More successful exercise participation was noted in exercise Marble Challenge, a joint DOE and DOJ post-nuclear detonation nuclear forensics exercise.

In the environmental arena, the Laboratory exceeded the first commitment goal under the 3706 Transuranic (TRU) Waste Campaign agreement with the New Mexico Environment Department (NMED) by disposing of 2754 m3 of TRU waste ahead of schedule, exceeding the period goal of 2600 m3. The Laboratory also met the second Framework Agreement commitment by disposition of 95% of newly generated FY12 waste and 80% of newly generated FY13 waste. This hazardous and technically complex project has been accomplished without major incident.

With regard to production of Plutonium Oxide, the Laboratory achieved the end of the year objective by producing 150 kg of certified product. The milestone completion was scheduled for September 15, 2013; however, credit was provided for the measures taken by the Laboratory to expedite the review and acceptance of the final blend lot, as well as the efforts to authorize the resumption of the remaining operations required to certify 2 additional blend lots on September 27, 2013. This work was completed within the cost estimate established for this work.

The Laboratory met milestone objectives by completing: planned shipments to Savannah River National Laboratory; packaging line glove box atmosphere upgrades; metal development testing and report, highly enriched uranium (HEU) disposition and size reduction demonstration and report; and the Steady State Feedstock Summary Document. The Laboratory exceeded expectations by establishing additional plutonium conversion capability with the dedication of an existing muffle furnace and glove box significantly under budget. Additionally, a major effort and cost savings for the Plutonium Oxide Production Program was achieved by transitioning analytical chemistry work to the Savannah River National Laboratory, which delivered current and future year savings.

In late FY 2012, the Laboratory was tasked to provide a high confidence scope, estimate and schedule for the execution of the Steady State Feedstock Program. In April 2013, revised guidance associated with reduced funding was provided to the Laboratory for this task and a revised list of documents was agreed upon to meet the FY 2013 commitment. The Laboratory completed the scope, cost estimate and schedule based on the information available. Overall, the effort by the Laboratory exceeded expectations and was a great improvement over past estimates. The project structure and discipline applied to develop the scope, estimate, schedule, and risk analysis were commendable. Although, the review team added to the cost estimate contingency based on past performance and lessons learned, the process used to develop the estimate was sound.

At performance period end, Plutonium Facility-4 (PF-4) and plutonium oxide production operations remain paused in order to resolve issues and perform an extent-of-condition review for Criticality Safety and Conduct of Operations. A detailed PF-4 operations resumption schedule from the Laboratory had not been provided to NNSA Program Managers by performance year end. Some progress has been made to allow for the resumption of limited maintenance on equipment and analysis of in-process samples. A direct metal oxidation furnace that was installed in FY12 has not been put into service due to an inadequate nuclear criticality evaluation.

As specifically required, the Foreign Nuclear Weapons Assessment/Capabilities for Nuclear Intelligence Plan is being executed successfully.

As noted above, the environmental remediation framework agreement effort exceeded FY13 Annual Work Plan commitments by removing 2754 m3 of TRU waste, exceeding the annual goal of 2600 m3. The goal was met without a significant injury or event. Multi-shift operations were successfully used for multiple box lines. Success was due to Laboratory attention to assuring conduct of operations maturation at Area G, implementation of an Area G Safety Basis for Interim Operations, and readiness efforts at Area G. Significant strides were also made in meeting the second Framework Agreement commitment by dispositioning a very high percentage of newly generated waste.

Other environmental Consent Order requirements were met including Individual Permit (IP) document requirements. Chromium remediation made significant progress: Well pump testing was properly executed; 1.6 m gallons of groundwater processed resulted in the removal of 7.11 lbs. of chromium; and the associated Sandia Canyon grade-control structures (which eliminates the transportation of contamination downstream and which maintain wetland health) were completed.

At the direction of the New Mexico Environment Department (NMED), the Laboratory moved swiftly to evaluate the need to replace wells R-61, R-54 Screen 1 and R-55i due to a failure involving the introduction of contaminants into wells at installation. Rehabilitation activities did not meet NMED's requirements to recover the wells and a corrective action plan was submitted by the Laboratory and is under review to determine technical acceptability.

Performance Objective 3: Science, Technology & Engineering (ST&E) Mission

Narrative Summary

EOY Adjectival

EXCELLENT

The overall rating of Excellent for this Performance Objective reflects sustained superior performance in several key areas of intellectual inquiry and scientific achievement. The depth and breadth of accomplishments described reflect an institution that is not only pushing the limits of discovery, but which is building a highly capable scientific and technical cadre, which is leveraging broad scientific inquiry for the specific benefit of core NNSA missions, and which is focused on fully exploiting and advancing

the discovery returned on our national investment. Toward these ends, the Laboratory has coupled the Laboratory Directed Research and Development program to the Laboratory Science Pillars.

The Laboratory has demonstrated the relevance of basic research to national security with advancements in simulation codes, the ChemCam fielded on the Curiosity Mars Rover, free-electron laser systems for ship self-defense, energy storage systems for automobiles, and accurate measurements of neutron capture cross-sections in Uranium.

The Laboratory has partnered across the Enterprise with Lawrence Livermore National Security, LLC (LLNS) in development of the Plutonium Research Strategy, received a positive review of the Lujan Center after a difficult recovery from an off-site contamination issue, and received four R&D 100 Awards demonstrating the continued vibrancy of scientific research. The Laboratory demonstrated full engagement in technology transfer; advanced the Chevron-Los Alamos Alliance for Energy Solutions, and developed systems to streamline proposal approval and technology access. To build upon these gains, the Laboratory has made progress in developing a roadmap for future facility investments to position the institution for response to future national security priorities.

The Laboratory has demonstrated exceptional scientific and strategic leadership by developing and sustaining an institutional research strategy that aligns with and promotes Departmental priorities and directly supports NNSA mission goals. The Laboratory has gone above expectations through enhancements to the research strategy and to discretionary investments, developed by the Laboratory Directed Research and Development (LDRD) Program, in response to the critically identified refinements to the five strategic focus areas of the Laboratory's Science & Technology capability. The new Directed Research Strategic Framework consists of five Focus Areas, four of which map directly to the four institutional science pillars, with one additional multi-disciplinary competency, tightly aligned for DOE/NNSA mission success in the long term. In addition, a Risk Management Framework for LDRD project approval was developed, focusing on mission relevance.

Likewise, the Laboratory has effectively focused on mission relevant research, providing R&D solutions that advanced the state of National Security effectiveness at the Laboratory and that directly supported the achievement of DOE and NNSA mission goals. As an example, the Laboratory developed a Godunov-like approximate Riemann solver and incorporated it into an existing Advance Scientific Computing staggered-grid Lagrangian hydrocode which showed significant improvements in accuracy and stability when compared to the previously used algorithm for challenging hydrodynamics test problems. This advance enabled more discrete resolution for hydrodynamic process simulations in support of NNSA's Life Extension Programs.

In another instance, Laboratory researchers have created a high-current electron source called the Normal-Conducting Radio-Frequency (NCRF) Injector for the Office of Naval Research; a source that has unique capabilities to generate and accelerate electrons at high average current using high power radio frequencies, and which is being used in development of ship-based missile defense

systems. The miniaturized sensor technology developed for Curiosity Mars Rover ChemCam is also being used for specialized hand-held detection devices deployed for International Atomic Energy Agency inspections in support of DOE and broader National Security missions.

The Laboratory used the LANSCE/Lujan Center Detector for Advanced Neutron Capture Experiments (DANCE) and two DANCE-specific innovations, to make measurements with very small (2% to 5%) uncertainties. The capture cross section for neutrons reacting with uranium-235 is of fundamental importance for understanding nuclear technology, including criticality, reactor behavior, defense systems, and transmutation technologies. The degree of uncertainty range was reduced from 15% - 30% to 2% - 5%. This dramatic increased accuracy is benefitting both the modeling of nuclear processes in weapons simulations and the design of advanced nuclear reactors.

Laboratory success in Research and Development reflects transformative scientific achievement. Researchers devised a method to use cosmic rays to gather detailed information from inside the damaged cores of the Fukushima Daiichi nuclear reactors. Their goal was to determine the sensitivity of these methods for measuring the amount of melted fuel in the reactor core and the location of the debris. This scattering method for cosmic-ray radiography was far superior to the traditional transmission method in capturing high-resolution image data of latent damage to nuclear materials.

In a medical breakthrough and as part of the multi-institutional Artificial Retina Project, the Laboratory researchers helped develop the first bionic eye. Recently approved by the U.S. Food and Drug Administration, the Argus II will benefit people blinded by the hereditary disease retinitis pigmentosa as well as seniors suffering from severe macular degeneration, further pushing the boundaries of bioengineering. The Laboratory team developed a theory, conducted experiments of activity inside the nerve cells producing polarized light signals, determined the existence of minute swelling due to the electrical excitation, and exploited these discoveries to developed engineered solutions. The Laboratory also developed a computer code predicting the electrical responses of individual optical cells and an overall model of the retina, directly predicting the dynamics of retinal neurons firing as a function of neuron location and the light pattern applied to the retina. This development could lead to patterns of stimulation that are more readily interpreted by the brain.

In research that bolstered the development of a next-generation energy storage device for automotive applications, Laboratory researchers partnered with a University of South Carolina collaborator to develop a new synthesis method that overcomes the electrochemical reaction limitations found in traditional catalysts. The researchers synthesized nitrogen-doped, graphene catalysts in situ. They discovered optimization criteria for temperature application during heat treatment as a means to maximize a high-surface-area catalyst with favorable nitrogen doping. This advance will support the development of next-generation energy storage devices, a key Agency priority.

The Laboratory was highly effective in sustaining Human Intellectual Capital. The DOE Office of Science performed its triennial review of the Laboratory's Lujan Center, with positive conclusions;

reflecting favorably on publication quality and quantity, presentations, and other associated criteria. Significant progress was noted on LINAC (linear particle accelerator) Risk Mitigation activities at LANSCE with tremendous gains in operational availability of critical facilities at the Lujan Center. Working across the Enterprise the Laboratory partnered with others to develop the Integrated Plutonium Science and Research Strategy for NNSA; and, garnered four R&D 100 Awards.

• The KiloPower Space reactor – This power source uses uranium (rather than plutonium) as fuel, can generate 500 – 1500 watts of electricity for 15-30 years, and is self-regulating. The Laboratory, NASA and NSTec were collaborators on this project.

• MiniMAX Portable X-ray Imaging System - The MiniMAX portable X-ray imaging system is a compact, completely self-contained, battery-operated, portable, X-ray imaging system.

• Multi-Mode Passive Detection System (MMPDS) – The MMPDS is a scanning device using naturally occurring muon particles from cosmic rays for rapid detection of unshielded, and even heavily shielded, nuclear and radiological threats, explosives, and other contraband.

• Mantevo Suite 1.0 – The Mantevo Suite 1.0 provides miniapps for computational co-design. It is the first integrated collection of full-featured miniapps to explore complex design spaces.

As discussed above, the Laboratory engaged in focused research with strong links to DOE/NNSA objectives, and to the public good. The Technology Transfer advanced partnerships with U. S. industries that support the Department's energy security and climate change missions. Of particular note is the Chevron-Los Alamos Alliance for Energy Solutions, a flagship partnership, with seven new projects added to the Alliance portfolio, including projects in corrosion modeling, foam breaking in refinery operations, new technologies for seismic testing, energy harvesting, RF fluid separation techniques, and modeling of the impact of socio-economic and political developments on business investments. At the end of the performance period, the Chevron-Los Alamos Alliance had 23 separate projects underway. In addition, two technologies were introduced to the commercial marketplace: down-hole and field wireless communications and well phase characterization.

The Laboratory launched an online Express Licensing program, allowing startup companies and small businesses to access Laboratory-developed technology with less cost and less transactional overhead. The Laboratory successfully completed the first phase of an integration of the Other Federal Agency Program Office and the Non-Federal WFO Program Office within a single organization, resulting in measurable gains in efficiency. Through co-location and cross-training of personnel, and through process standardization with an enhanced electronic WFO tool, the scope of work was achieved with approximately half of the pre-existing number of FTEs.

The Laboratory published *Los Alamos Scientific Capabilities for Mission Excellence,* defining a Future Scientific Capabilities Roadmap as an actionable strategy for developing, maintaining and managing the Laboratory's science, technology, and engineering capabilities in a manner that not only enables

stockpile stewardship and other national security objectives, but also prepares the Laboratory to support emerging national security priorities. The document integrates the on-going long term strategic planning efforts of the Laboratory, building on synergies between the Weapons Program, the Global Security Program, and the Science, Technology and Engineering directorate.

Performance Objective 4: Security, Infrastructure, Environmental Stewardship & Institutional Management

Narrative Summary

EOY Adjectival

SATISFACTORY

The overall rating of SATISFACTORY for this Performance Objective is an aggregate of many noteworthy accomplishments, sustained high performance in many areas, some material shortcomings, and a subjective judgment about the tempo of progress toward several longstanding, well-documented challenges, framed against the high standards of the bilateral Performance Evaluation Plan. Significant gains included the senior executive involvement in the exercise of Contractor Assurance System tools to promote enhanced Risk Management, which was a major milestone in the maturation of an approach to institutional management. The Environment, Safety and Health (ES&H) program executed a major reengineering and achieved continued reduction in injury rates. The Laboratory rapidly developed a technically defensible path forward on emergent PF-4 seismic-induced collapse scenarios and initiated focused structural enhancements. The Laboratory CFO effectively managed major budgetary challenges and remediated virtually all the long-standing fiscal deficiencies that had challenged the institution in past years. High performance was sustained in a number of areas, including Physical Security, Property Management, Information Technology support, and Legal Management. In some areas with legacy challenges, the tempo of progress has been less than was expected, including: Formality of Operations maturation; Safety Basis maturation; the Earned Value Management System and associated construction performance; the maturation of cyber metrics; Quality Assurance performance; integration of safety into design for the Transuranic Waste Facility; and long term site stewardship efforts needed to sustain an aging infrastructure. For Criticality Safety, management inattention and delay early in the fiscal year resulted in a persistent downward trend in assurance of the program's adequacy and long-term viability; contributed to conditions leading to a Plutonium Facility (FP-4) programmatic pause; and is limiting the rate of PF-4 resumption. Finally, there have been missteps that have reflected adversely on the institution in the areas of security, contractual propriety, and project completion. In the aggregate, these conditions reflect an institution with broad areas of excellence, substantial success in some areas of concern, and insufficient progress in other key areas of concern.

The Laboratory met very high Agency standards in the area of managing security risks in many respects. This perspective is supported by two NNSA Operational Security Assessments and by a comprehensive Los Alamos Field Office Survey. The Laboratory performed above expectations in

numerous areas, including training and exercises that created a safer and more secure site in terms of the low spectrum threat, to include active shooter and workplace violence. An initiative to secure the outer perimeter of the Laboratory by proposing a bypass road and through the installation of vehicle barriers exhibited a long term vision for improving depth in security operations. A detailed, deliberate initiative to use Unmanned Aerial Vehicles to support emergency response and security operations reflects an innovative approach to increasing Laboratory security and emergency response capability. A strong and robust Wildland Fire program, which effectively mitigated a major threat to the site during a dangerous fire season, was maintained. The Laboratory also developed a Nuisance Alarm Rate tracking and assessment process that raised leadership awareness of nuisance alarm issues and aided in the reduction of nuisance alarms. Security planning and execution of NMSSUP readiness testing is a noteworthy positive.

Several aspects of security operation were below expectations. Outdoor firing range operations were halted temporarily after range instructors allowed unauthorized personnel to participate in live fire activities. Security processes and procedures relative to waste stream monitoring did not meet acceptable standards, resulting in two findings. Further, NNSA security personnel discovered a discrepancy between a Perimeter, Intrusion and Delay Sensor configuration and Protective Force Post Orders.

With regard to Line Item Construction Projects, the Laboratory performed well in two significant projects but continued to experience challenges in various areas of project management. On the Chemistry and Metallurgical Research Replacement /Radiological Laboratory Equipment Installation, performance improved late in the second quarter and was sustained to achieve the CD-4 ahead of schedule and under projected Total Project Cost by $2.4M. On the Technical Area 55 Reinvestment Project, Phase A was completed ahead of schedule and $1.9M below the Performance Management Baseline, with CD-4 achieved four months ahead of schedule. Phase B of that project was completed three months ahead of schedule and $3.3M below budgeted Total Project Cost.

The Nuclear Materials Safeguards and Security Upgrade Project (NMSSUP) was re-base-lined in December 2012 with an Over-Target Baseline of $244.2M. Since the re-start of the project in December 2012, the project has experienced delays in excess of 45 days in the planned delivery of key design and engineering packages to the construction Subcontractors. The Laboratory will not recover from the delays and has not demonstrated the required construction performance needed to achieve their proposed CD-4 date of December 2013.

The Transuranic Waste Facility (TWF) project baseline schedule has not been aggressively managed and schedule performance has trended down; as evidenced by period schedule variances of 0.41 for July and 0.68 for August. Initiative to recover schedule has been minimal, and forecast dates for key activities leading up to CD-3A and CD-3 are several months beyond the original baseline plan. The Laboratory adjusted the baseline through BCP level 3 without direct involvement of the Federal Project Director. The focus of management activity has been more toward adjusting forecasts and

consuming schedule float, than to restoring project momentum. A specific area of concern, the Laboratory submitted the Preliminary Documented Safety Analysis (PDSA) on the project to the NNSA on schedule, but the quality of the document resulted in a disapproval. Additionally, DOE-HSS performed a Vertical Slice Review of the PDSA and design, and has identified additional concerns. Delays in the PDSA could have a negative impact on final design completion, with likely adverse impacts on schedule and cost. Further, the Laboratory is behind on the deployment of a Commercial Grade Dedication program for the project, which has delayed CD-3A plans for long lead procurement. The Laboratory Earned Value Management System (EVMS) certification came into question after a DOE Office of Acquisition and Procurement Management Review for Cause, which resulted in over 50 Corrective Action Requests. These EVMS framework and discipline weaknesses are below expectations, given the cost and importance of the projects involved.

Business Operations and Systems showed many areas of very strong performance and achievement, and some areas of concern. Excellence was sustained in Property Management, Supply Chain Management Center use exceeded expectations, Small Business subcontracting and purchasing goals were met or exceeded, and Records Management was evaluated very highly. There was noteworthy progress during the performance period in several areas that were key challenges when the contract was initiated. The Laboratory Chief Financial Officer achieved major gains, including a clean Statement of Costs Incurred and Claimed for FY12 and a transition to a Cost Accounting Standards-compliant overhead allocation method, which addressed major longstanding deficiencies; as well as a timely cost-saving IT system upgrade, and enhancements to financial risk management practices. In terms of concerns, there were instances of externally identified improper payments, improper subcontracts, and questioned conduct that reflected challenges in the Control Environment, internal controls, and self-discovery. Identified problems could have been more fully embraced as opportunities for improvement. However, in several of these situations, the Laboratory accepted full or partial responsibility, reimbursed the Treasury for expenses billed, and instituted improved controls and processes; actions that partially mitigate the negative conditions found. In terms of cost savings, a number of actions were taken that delivered savings, including a very favorable overhaul of the employee health care plan, but more comprehensive cost control efforts are needed.

The Laboratory performed well in supporting network and information technology operations; with no major network outages or cyber security incidents. The perspective is supported by a comprehensive Los Alamos Field Office Survey. The Laboratory performed above expectations in several areas, including, when the Laboratory Computer Security Incident Response Team provided key assistance to DOE during network attacks; in conducting valuable risk management and communications activities in executing an Oracle E-Business Suite Upgrade; and in the in implementation of the cyber Risk Management Framework, improving cyber security and saving money. Some network challenges remain. The Laboratory made considerable progress in technical continuous monitoring of unclassified windows systems, but additional work is needed to further improve security configuration management. The Laboratory continues to work on implementing a plan to mitigate a

possible Tempest security issue, and further improvement is needed is the development of meaningful cyber metrics.

The Laboratory continued to manage the infrastructure through footprint reduction, Demolition and Disposal of small structures, and proactively through support to NNSA Facilities Disposition Working Group. Improvements such as on-line management of maintenance subcontractors, the conversion of propane service to natural gas, and additional training are steps in the right direction. The Laboratory developed an enhanced system for managing real property, and dedicated staff was assigned. The Lease Review Board is functioning effectively, with timely, high-quality actions.

The Laboratory continued to support other design elements in special nuclear materials packaging, including storage container safety analysis reports, and by providing technical information/support for the Bulk Tritium Shipping Package. The execution of small (<$10M) construction and improvement projects presented challenges such as insufficient planning to avoid re-work, insufficient integration across functional areas, and challenges working effectively in occupied facilities. These challenges adversely impacted cost and schedule performance in a number of specific cases.

The Laboratory transformed the Environment, Safety and Health (ES&H) organization to strengthen ES&H programs and enable mission success. This transformation included the elimination of 46 management positions and multiple reporting lines, the consolidation of deployed resources, the establishment of core programs, the implementation of a leadership development program, and the development of a data-driven risk management strategy with staffing tied to risk/workscope/mission deliverables. With extensive attention, slip/trip/fall and push/pull/lift injuries are down about a third; government vehicle accidents are down two-thirds; Total Recordable Cases (TRC) and Days Away, Restricted, or Transferred (DART) are trending downward and are down to about one-third of the levels at contract transition in 2006. These are major, demonstrable workplace safety successes.

In August, a DOE Office of Health and Safety assessment concluded that the radiation protection program was sound, after extensive corrective actions from recent events (Eu-152, Tc-99). While the Voluntary Protection Program (VPP) did not achieve Star Status this year, the federal assessment team noted a marked improvement in performance within the last 18 months. National Environmental Policy Act (NEPA) compliance has been sound and preparations for a Supplemental NEPA Analysis are on track. On the negative side, the annual Resource Conservation Recovery Act (RCRA) inspection by the New Mexico Environment Department (NMED) resulted in re-occurring issues at Technical Area 54 that should have been well understood and corrected. Although the NNSA and the Laboratory were able gain NMED acceptance, the Laboratory missed a 45 day notification milestone to NMED on Site Treatment Plan; and in another instance the Laboratory was issued a Corrective Action Request by the Nevada National Security Site for leaving a waste shipment trailer unattended and without the required manifests, a violation of the Nevada Waste Acceptance Criteria.

Laboratory Counsel (LC) is integrated with Laboratory Staff through involvement on cross-discipline and discipline-specific workgroups, and they engaged on day-to-day legal matters as they arose. LC assisted Laboratory Acquisition Management with a planned revision of acquisition guides and practices for subcontract administrators. LC continued to suggest and lead implementation of risk management strategies through policy changes, training, and engagement with lab leadership. LC deliverables met 10 CFR 719 requirements and LC regularly exceeded expectations with regard to communications with and prompt responsiveness to the NNSA Counsel, particularly with regard to the litigation of construction claims.

The Laboratory responded to Quality Assurance issues characterized by unacceptably low Product Accepted Trouble Free (PATF) rates by conducting a Functional Management Review, and subsequently improved many elements of its Quality Management System (e.g. updated and trained to several product certification procedures, drafted ideal build book models, and produced a review of ADPSM's product acceptance process). The Laboratory also initiated a comprehensive Commercial Grade Dedication (CGD) program to meet ASME Nuclear Quality Assurance (NQA-1-2008) requirements. Laboratory employees and subcontractors received CGD training, and several process improvements were implemented to reduce calibration cycle time and unit production backlogs.

Notwithstanding these gains, the Laboratory has several Quality Management System challenges. Implementation of and compliance with the DOE Order on Quality Assurance (DOE O 414.1D) remains weak; Software Quality Assurance (SQA) requirements at low and moderate hazard facilities have not been fully implemented; and FY13 actions regarding Nuclear Weapon PATF have not yet yielded measurable improvements to the downward trend in this key area. NNSA calculates an end of year Weapons Component PATF with Incidental Defects at 57.1%, which is less than satisfactory.

Addressing the Safety Culture, Formality of Operations is implemented at the institutional level with procedures covering core requirements; however, the level of maturity across facilities remains weak, warranting continuing focus on implementation rigor and on the establishment and sustainment of high standards for Formality of Operations. There are several areas of noteworthy strength. For example, passive safety systems are managed with the same rigor as active systems; there has been beneficial attention to cognizant system engineer staffing and qualification; and, the Laboratory achieved overall improvement in implementation and effectiveness of the Nuclear Maintenance Management Program. Further successes include implementation of corrective actions from the 2012 LANSCE contamination event, active tracking of Vital Safety System assessments and effective health reporting. Some areas of weakness remain, including: Slow progress towards managing important Defense in Depth systems; Lack of progress in achieving a compliant HEPA filter management program; Insufficiently rigorous standards for Conduct of Engineering (COE) at WETF; Poor implementation of procedural controls and procedure compliance; Poor implementation and control of training and qualification requirements at the facility level; Inadequate preparation for readiness activities; Challenges with implementation of an effective Fire Protection Program; Inadequate leveraging of causal analysis and extent of condition reviews to target systemic

weaknesses; and, Jointly-recognized needs to improve integrated work management and activity-level work planning and control.

Safety Basis timeliness and quality issues persist overall. While Plutonium Facility seismic issues were thoroughly addressed, the Safety Basis developed for Area G was marginal, and approvable safety bases were not submitted for the Transuranic Waste Facility (TWF), the Radioactive Assay Nondestructive Testing Facility (RANT) or the Waste Characterization Reduction and Repackaging (WCRR) facility. An executable Safety Basis improvement plan is needed to drive required efficiency and effectiveness improvements. For Criticality Safety, the stability and long-term viability of the program is in question, which has adversely impacted Laboratory nuclear operations at Plutonium Facility 4 and at the Chemistry and Metallurgy Research facility; and which could impact Nevada Nuclear Security Site nuclear operations. Management inattention and delay early in the fiscal year contributed to a persistent downward trend in this area and threaten long-term program viability. Weaknesses in the program contributed to conditions leading to the Plutonium Facility 4 (PF-4) pause in programmatic operations and are rate-limiting PF-4 resumption.

Maturation of the Contractor Assurance System had some very positive areas of improvement, some areas of concern, and some areas that require additional attention. In terms of improvements, there has been dramatic improvement in procedures for and senior management attention to Risk Management, including the Executive Performance and Risk Management process. This senior management reliance on the formal CAS system to support institutional decision making is a major accomplishment. The Laboratory has adopted commercial risk management practices and has been a leader in integrating these activities into the required Federal Manager's Financial Integrity Act analysis and reporting process. The Laboratory continues to excel in Lessons Learned, Operational Awareness, and Commitment Management. As an area of concern, while many metrics were improved during the performance period, two metrics that have been the basis of longstanding discussion (Self-Discovery of Issues and Weapons Product Accepted Trouble-Free) were proposed for revision in ways that made performance outcomes less clear, and made it more difficult to evaluate progress in these key areas; changes that are contrary to CAS maturation. Some challenges identified at the beginning of the performance period remain, including uneven discipline in issues management and closure, uneven rigor in corrective actions, Self-Discovery that is less than what is expected, and under-utilization of opportunities for trending and analysis.

In September 2012, the Laboratory identified potential low-probability Plutonium Facility 4 seismic-induced collapse mechanisms. By April 2013, they had developed a technically defensible path-forward to address the issues during the next three years and defended it jointly with NNSA in briefings to the Acting Administrator, the Deputy Secretary, the Secretary (twice), a special expert panel requested by the Secretary, and the Defense Nuclear Facilities Safety Board. The Laboratory completed related seismic/structural analyses and facility upgrades in accordance with an NNSA approved list. Basement column modification design and installation have started and the design to remove interferences is complete. More than three-quarters of the fire suppression seismic upgrades

are complete. Heat-source plutonium fire-rated containers were qualified as safety-class. Further analyses confirmed expected structural behavior for columns under upward loading and for roof girders in bending. UC San Diego testing confirmed the roof slab will develop full capacity of the reinforcement over the service chases. Improved anchorage was designed and/or installed for critical equipment. Refined analyses indicate that the current building configuration would satisfy the new requirements of DOE STD-1020-2012 for conditional probabilities of failure, and that the modifications underway would reduce the annual failure probability to about 0.8 x 10-4. Overall, the Laboratory was deeply challenged and significantly exceeded expectations in this area during FY13.

With respect to long-term site planning, the Laboratory is on track to meet the targets for Greenhouse Gas reduction, metering, fleet, and pollution prevention; however, they are below expectations against the FY13 corporate targets for water intensity reduction and energy intensity reduction. Water intensity increased by ~35% over the baseline in Q3 and did not recover in Q4. While the Sanitary Effluent Reclamation Facility is now fully operational and reducing potable water usage, the water demands for supercomputing facilities overwhelm this reduction. Laboratory performance in energy intensity reduction adversely impacts NNSA's corporate ability to meet the energy intensity goal. Infrastructure planning for the near term has gone well but complex and large facilities and utilities remain risk areas. Deferred maintenance remains high (>$1B) and the FY 2013 Facility Condition Index (FCI) is 7.33%, failing to meet the Departmental goal of 5%; and the Mission Critical (MC) FCI is 4.06%, failing to meet the Departmental goal of 3%.

Performance Objective 5: Contractor Leadership

Narrative Summary

EOY Adjectival

Very Good

The overall rating of Very Good for this Performance Objective is the result of very constructive engagement activities, especially with DOE/NNSA leaders locally and at the agency and bureau level. Measurable progress has been made in key areas of Institutional Leadership and Management. Other specific examples include: Engagement with key stakeholders in the Defense Community; Proactive coordination with other elements of the Nuclear Weapons Complex; Engagement with the broader scientific, technical and industrial community; and the sustainment of professional excellence in science and discovery, as well as in many professional and support disciplines. However, entering the eighth year of this contract, several aspects of Institutional Management that were identified as challenges at contract inception require further attention and improvement.

In terms of Strategic Vision, the Laboratory provided excellent support to and collaboration with the Department of Defense Cost Assessment and Program Evaluation team, resulting in a validation of Nuclear Security Enterprise historical costs and in agreement on projected future costs. Those achievements provide a sound basis for prospective engagement with NNSA's key stakeholders in the Defense Community. Efforts to plan for long-term Site sustainment and long-term environmental

planning reflect instances where the Laboratory has begun to take a systemic, long-term view of sustainability. Further concrete steps in these areas and in Strategic Planning are expected.

The Laboratory proactively stepped beyond its own boundaries and areas of concern to support an effective, integrated Nuclear Weapons Complex. As examples of Enterprise Leadership, they coordinated an integrated Tri-Laboratory approach for Nuclear Stockpile transformation management, updated associated technical planning documents and performed similar functions for the Nuclear Intelligence Program. The Laboratory provided technical support to production facilities and other laboratories to solve important supply chain problems; and worked with Lawrence Livermore National Laboratory to launch a review of possible cross-servicing to identify possible cost savings. The Laboratory also served NNSA in the international arena by continuing its long education and training efforts on behalf of International Atomic Energy Agency (IAEA); by serving as Chairman of the Scenario Development Group for the Comprehensive Nuclear Test Ban Treaty Organization On-Site Inspection Integrated Field Exercise to be conducted in Jordan in 2014; through its membership in IAEA's Standing Advisory Group on Safeguards Implementation activities (normally a government-only position); by hosting a Chinese delegation as part of NNSA's China Center of Excellence project; and, by participating in a successful exercise at Sochi, Russia, the site of the 2014 Olympics.

Long-Term Partnerships were nurtured that benefitted the Laboratory as an institution, the Nuclear Weapons Complex, and more broadly the competitiveness of the national economy. Most noteworthy, the Laboratory's contractual obligation for community commitment has been fulfilled, but during this period they continued a high level of discretionary community commitment activities including Science, Technology Engineering and Math educational outreach and support, economic development support, and augmentation of employee giving. The Laboratory continued to support the New Mexico Citizen's Advisory Board, fostering better communications with the community, strengthening long-term relationships through which the Laboratory is viewed as a safe, beneficial neighbor for Northern New Mexico. The Laboratory continued to foster ties to scientific and technical communities by successfully showcasing achievements via the R&D 100 competition, by focusing on university collaborations, and by building upon successful collaborations with industrial concerns.

With regard to accountability and responsibility, there were instances of externally identified improper payments, improper subcontracts and questioned conduct that reflected challenges in the management Control Environment, internal controls and self-disclosure. In some situations, the Laboratory accepted full or partial responsibility, reimbursed the Treasury for expenses improperly billed, and instituted improved controls. The Laboratory initiated training to improve Project Manager accountability and the efficacy of project controls; longstanding areas of concern.

The Laboratory took concrete steps to cooperatively improve interagency integration and execution of Laboratory Work for Others (WFO) by combining two organizational elements from different Principle Associate Directorates into the Technology Transfer (TT) Office. This action achieved significant efficiencies as the consolidated organization (TT) successfully performed at a reduced staffing level (~ -10%) while meeting customer expectations. Additionally, significant progress was made toward

developing and implementing a risk/complexity-based approach to Quality Assurance for WFO. Finally, the Laboratory streamlined WFO procedures, which are being used by NNSA as an example for the rest of the Enterprise. The Laboratory also created a Strategic Outcomes Office and staffed a Chief Technology Officer position to enhance and strategically align capability support with Laboratory mission needs/requirements. The Strategic Outcomes Office advises national sponsors on strategies and investments in areas at the forefront of national and global security.

The Laboratory performed well in work environment/recruiting, completing an overhaul of the Environmental Safety and Health (ES&H) function that flattened the ES&H organization, putting more professionals in direct contact with the workplace in a risk-based fashion. Further progress was made in the maturation of the Voluntary Protection Program. These efforts yielded marked improvements in key safety metrics. The Laboratory conducted outreach through mainstream media, social media, through campus outreach, through R&D 100 and other recognition activities, and through prominent exposure in professional journals and conference events continued to promote the Laboratory as an attractive employment option for top science and technology talent.

The Laboratory selflessly drove enterprise solutions that made or supported decisions which benefitted the Nuclear Security Enterprise, even when those decisions were locally detrimental. Examples include the transfer of certain weapons hardware production responsibilities to the Kansas City Plant and the transfer of some Analytical Chemistry work to the Savanna River National Laboratory. The Laboratory continues to be a complex leader in Supply Chain Use, and in meeting socio-economic contracting goals. Potential for improvement exists in cross-site coordination.

As reported in Performance Object 3, the Laboratory remains a national and world leader in very many key areas of professional excellence. The Laboratory has sustained a workforce that reflects unquestioned leadership in Science and Technology; and has also exhibited professional excellence in a number of support areas including Property Management, Cyber and Physical Security, Fiscal Operations, Legal Administration, Human Resources Management, in the successful management of the Environmental Framework Agreement which includes the 3706 Transuranic Waste Campaign, and in aspects of Worker Safety. Specifically, the Laboratory was adroit and effective in preparing for and managing the impacts of sequestration, short-term funding measures, and the prospect of an FY14 lapse in appropriations. Excellence was also exhibited in a new and particularly creative Plutonium Strategy for the complex. However, in several areas challenges that existed at the inception of the contract remain challenges today including Criticality Safety, Safety Basis, Formality of Operations, Project Management, aspects of Environmental Management, and Weapons Quality Assurance. In some of these areas, the Laboratory continues to rely on subcontracted expertise or parent organization reach-back to support ongoing institutional needs of the Laboratory.

The Laboratory has effectively partnered with DOE/NNSA's leadership, both locally and on the bureau and agency level. They have made excellent progress in involving senior institutional leaders in risk evaluation and in structured decision making that leveraged the tools of the Contractor Assurance System; and in making these improved practices transparently visible to NNSA. Self-

discovery and self-reporting, as measured by the Laboratory's own metrics remain areas for improvement, notwithstanding changes to the metric which made it less representative. Effective communications on resourcing issues during the start of Fiscal Years 2013 and in preparation for Fiscal Year 2014 were areas of noteworthy success; as were communications on PF-4 Seismic Concerns and the development of a new Plutonium Strategy.

The Laboratory made progress on maturation and use of the Management Assurance System and on appropriate parent organization reach-back. The Laboratory made significant progress in tightening controls and procedures for the use of parent organization reach back during performance year 2013; dropping usage by over two-thirds from FY11-FY12 levels, while still providing critically needed parent organization support for key challenges including the Nuclear Materials Safety and Security Project, the Earned Value Management System, and Weapons Engineering Tritium Facility operations. The Contractor/Management Assurance System (CAS) advanced during the performance period with significant improvement in Risk Management, including heightened senior management involvement in risk awareness and control; as well as heightened senior management involvement with other CAS tools such as performance metrics. Several other aspect of the CAS continued to perform at a high level, including operational awareness, lessons learned, and commitment management. Significant challenges remain in discipline within the Issues Management System with regard to issue closure, uneven rigor in corrective actions, Self-Discovery that is less than expected, and under-utilization of opportunities for trending and analysis to support continuous improvement. CAS has been moved down several levels in the organizational chart and the CAS team has been led by four different managers in the last year. These changes do not appear to have benefitted the program. External reviewers have explicitly identified weaknesses in the Earned Value Management System for projects as a weakness in the CAS.

The Laboratory conducts a robust program of self-assessments which provide valuable information on which management action can be based. Many constructive improvements arose from that work during the performance year. As this system matures, there is an expectation that self-discovery will improve and discovery by the small cadre of external evaluators will decline. The Laboratory tracks this through performance metrics and those metrics have consistently shown Self-Discovery needs to improve. Where audits and investigations identified internal control, ethical, or other challenges, the Laboratory sometimes resisted timely acceptance of shortcomings, which inhibited continuous improvement and organizational growth. As noted under Management Assurance, challenges remain in the disciplined investigation and closure of identified issues; and in exploiting opportunities for trending and analysis of issues which, if pursued, could result in organizational growth and improvement.