
National Nuclear Security Administration

# FY 2013 PEP

# Lawrence Livermore National Security, LLC Performance Evaluation Report

**Livermore Field Office**
**Lawrence Livermore National Laboratory**
**Performance Period:**
October 2012 – September 2013

**November 22, 2013**

## Executive Summary

This report was produced by the Department of Energy/National Nuclear Security Administration (DOE/NNSA), Livermore Field Office (LFO) 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 Determination Official (FDO) with an evaluation of the Contractor's performance for all Performance Incentive requirements under contract DE-AC52-07NA27344 against the NNSA Strategic PEP. The Strategic PEP provides the expectations to evaluate the M&O Contractor's performance and promotes a performance-based framework based on results tempered by prudent management of risk, accountability, and renewed trust. The evaluation period for this report is from October 1, 2012 through September 30, 2013.

The Performance Evaluation Report (PER) is a collaboration of input from all elements of NNSA, including HQ Program Offices. The scope includes adjectival ratings for each of the Performance Objectives (POs) based on performance against Contributing Factors, Site Specific Outcomes, and other criteria as set forth in the Strategic PEP. No recommendations on award fee or award term are provided in accordance with guidance. Adjectival ratings are set forth and defined in Federal Acquisition Regulation (FAR) Subpart 16.4, Table 16-1. It is noted that the evaluation of performance considers unanticipated barriers (e.g., budget restrictions, rule changes, circumstances outside Contractor's control), accomplishments, and other events in accordance with the Strategic PEP. The degree of difficulty of the Contractor's accomplishments is fully considered when determining whether these outcomes meet or exceed expectations. The evaluation is based on the results of LFO oversight and NNSA HQ Program and Program Support Office feedback for the performance period.

The Contractor exceeded many DOE/NNSA performance expectations in executing a broad spectrum of technically challenging mission work, generally in a safe and secure manner. It overcame significant unanticipated barriers including budget reductions and uncertainties resulting from a series of continuing resolutions and sequestration. It successfully executed Nuclear Weapons mission work in accordance with NNSA priorities, with all but one of the 76 Defense Programs Level 2 milestones rated green or blue. The Contractor successfully executed the broader National Security mission work, exceeding many expectations in Non-proliferation, Emergency Operations, and Counterterrorism. It successfully executed research to enable, support, and advance national security missions and exceeded nearly all expectations in advancing frontiers of Science, Technology, & Engineering (ST&E). The Contractor effectively and efficiently managed the operations of the site, exceeding many expectations in security, safety & health, infrastructure, environmental stewardship, and institutional management. Additionally, while the Contractor exceeded some expectations in demonstrating leadership in supporting the direction of the overall NNSA mission, significant challenges in leadership at LLNL existed throughout the performance period.

It is noted that we recommend a bottom-line reduction to the Contractor's award fee of $365,000 for potential violations of 10 CFR 851 related to an acid splash incident that occurred at Site 300 in February of 2013. This proposed contract action has been fully coordinated with the Office of Enforcement.

## Performance Objective 1: Nuclear Weapons Mission

### Narrative Summary

Very Good

Lawrence Livermore National Laboratory (LLNL) exceeded expectations in many areas in conducting the Nuclear Weapons mission activities despite major budget challenges. All but one (75 of 76) DP level-2 milestones associated with this Performance Objective are "Green" or "Blue" for the performance period. One milestone, "Safely and Efficiently Operate HED Facilities to Support the Needs of the Stockpile," was not completed. LLNL completed all deliverables in support of Advanced Assessment Report (AAR) Cycle 18, closed 5 Significant Finding Investigations (SFIs) using a new LLNL peer-review process, and responded rapidly to NNSA requests by completing GTS and NG requirement assessments and providing recommendations to support NNSA decision-making. LLNL also responded on time and met deliverables for NNSA assigned tasks including the 30-day Long Range Stand-Off (LRSO) study, the 90-day LRSO study, and the 60-day joint LLNL–Los Alamos National Laboratory (LANL) re-analysis of past Halite-Centurion experiments. It provided excellent support of the W87/88-1 Life Extension Program (LEP) at significantly reduced levels of funding for Phase 6.2 and supporting campaigns. At the request of NA-10, LLNL established a joint design, dual-lab certification nuclear design team for the W78/88-1. LLNL provided all design data needed to support W87 legacy pit EDU fabrication at TA-55. LLNL completed one more Special Nuclear Material (SNM) Joint Actinide Shock Physics Experimental Facility (JASPER) shot than in FY12. The Phoenix program completed a campaign of flat plate shots and a Mini-G test. The National Ignition Facility (NIF) executed a full range of system shots, including 86 SSP High Energy Density (HED) shots, more than a 3X increase over FY12, while also improving the predictive capability for those shots. Sequoia moved to classified operations ahead of schedule despite extremely challenging new National User Facility issues. LLNL achieved a new scientific demonstration in a Pollux experiment pre-shot prediction completed for the Gemini series. LLNL also accomplished an orderly transition to operating the Superblock as a Security Category (CAT) III facility while continuing to support mission.

However, an area of concern continues to be the management of the ICF program, which is further discussed and evaluated under Performance Objective 5. In terms of programmatic impact, LLNL did not successfully complete the milestone, "Safely and Efficiently Operate HED Facilities to Support the Needs of the Stockpile." An additional concern is a lack of management attention to the safety and effectiveness of program operations, which led to an acid splash incident at Site 300 in February 2013 that delayed high explosive formulation and synthesis operations supporting Milestone 4655 (LX-21 compatibility and aging baseline studies).

LLNL made very good technical progress during the performance period and met overall expectations in program management. LLNL minimized the sequestration impact to weapons program level-2 milestones by working closely with NNSA. LLNL accomplishments include:

- Delivered 90 day studies on Centurion-Halite and on Long Range Stand-Off (LRSO), which were added scope activities.
- Released over 800 QC-1 compliant Engineering Authorizations providing production and engineering support for the complex, including B83 dismantlement, JTA2 and GTS.
- Commenced B83 pit surveillance and completed W87 Mechanical Safe Arming Detonator (MSAD) surveillance activities.

- Developed an integrated strategy with the Los Alamos National Laboratory (LANL) production agency to complete FY13 Design Definition Unit pit builds.
- Supported Directed Stockpile Work (DSW) Planning summit, and DSW R&D, Engineering Campaign, Readiness Campaign and Enhanced Surety.
- Successfully demonstrated transformation to Security Cat III plutonium operations in support of Pu Sustainment, Pu Science and Pit Surveillance.
- Applied the new surveillance metric to all Annual Assessment Reviews which incorporates the most current aging models along with statistical analysis of surveillance data to provide a more comprehensive understanding of the stockpile.
- Proposed an innovative method to allow for the Certification of Newly Manufactured Pits that enables the use of existing plutonium facilities at LLNL within the current Security Cat III envelope, providing significantly benefits to the government through significant reductions in cost and schedule.
- Rapidly established with LANL a joint-design, dual-certification nuclear design team for the W78/88-1 while executing the LEP Phase 6.2 Study, an increase in scope and beyond NNSA's expectation of what might be required or accomplished in this Study.

LLNL improved the program management environment to support the NIF ignition efforts and to provide NIF experiments in support of stockpile stewardship weapon system. In the programmatic area, NIF has made outstanding accomplishments in support of Alpha Heating. The NNSA ICF program office noted that by midyear, the quality and candor of communications between the lab ICF program and headquarters has markedly improved lending increased confidence in and credibility of necessary internal efforts to meet ICF and Stockpile stewardship goals under increasingly constrained budgets. Headquarters especially noted and complimented efforts to engage the broader high energy density physics community in efforts to understand issues in the ignition effort and to build on the excellent Ignition Science workshop report.

In addition to the ICF program management issues, an additional concern is a lack of weapons program management attention to the safety and effectiveness of program operations. This failure has led to several incidents, which have had programmatic impacts, the most serious of which was the acid splash at Site 300. During the event, two employees received acid burns to their faces, torsos, and extremities from a direct acid splash. The third employee was exposed to sulfuric acid mist but suffered no significant injuries. An identifiable line-management chain is ultimately responsible for each work activity. In this case, the management chain for the activity was within the Weapons and Complex Integration Principal Directorate. Inconsistencies were evident in the level of supervisory oversight of personnel and expectations for ensuring safe work procedures for matrixed employees. In addition to the injuries, programmatic work was delayed or significantly slowed and an important facility was rendered unusable for an extended period.

Overall, LLNL performance under stockpile stewardship met mission and operational requirements including cost, schedule, safety, security and technical performance requirements. A high point has been the continued outstanding leadership by LLNL of the national boost initiative. LLNL has met NNSA's expectations for planning and assembling a strong program to provide the technical basis enabling re-use of pits in the future stockpile. LLNL has contributed significantly to Stockpile Stewardship by developing tools and methods to assess weapon performance. LLNL has taken appropriate measures to minimize costs to government while not compromising core objectives and mission performance. It has accomplished all INWAP deliverables on schedule and all 15 L2 milestones are blue. Accomplishments include:

- Successfully worked on HE mechanical properties testing and model development, polymeric component characterization, and new material characterization in support of assessment activities.
- Developed, validated, and deployed improved predictive capabilities to assess performance and lifetime for nuclear and non-nuclear materials.

- Ensured the Laboratory Cycle 18 Annual Assessment Reports and Laboratory Director letter were completed and distributed to DOE/NNSA and the Department of Defense (DoD).
- Completed NG and GTS requirement assessments for multiple LLNL systems, responding rapidly to requests from HQ for calculations and recommendations to support NNSA risk-informed decision-making.
- Implemented a new peer review process of Significant Finding Investigations (SFIs) and closed five SFIs in the third quarter.
- 21 publications on LLNL diagnostic methods and aging models were accepted in peer reviewed journals.

LLNL exceeded expectations on weapons systems by making excellent progress during the performance period, successfully completing all L2 milestones. LLNL continues to perform excellent work to fast track 2 hydro-tests and a surety experiment in support of the W78/88LEP in spite of severe budget constraints. LLNL provided outstanding support to NNSA/DoD for Long Range Stand-Off (LRSO) development. After delivering a 30 Day Study and a 90-Day Study on schedule, LLNL supported the development of a "Pit attribute/down-select tool" for the Air Force NWC. Although FY13 started off without a LRSO budget, LLNL supported NA-10's 30 day study looking at the benefits of the W80 and W84, began the 90 day study looking at a spectrum of W80 and W84 options, supported the ICD working group, and the new USAF LRSO SPO. LLNL also completed LRSO enterprise analyses (including additional tasking request from LRSO Interagency Group). LLNL supported a scope and cost factor working session at LLNL and follow-up development activities on scope/cost and infrastructure risk metrics. Other accomplishments include:

- Designed, fabricated, and built a device for an Integrated Weapon Experiment in roughly half the time than is typical for an experiment of this type. This included working with LANL to expedite manufacture of parts for this hydrotest in order to receive them within the timeframe needed for acceptance and assembly.
- Just six months into the W78/88-1 Phase 6.2/2A study, demonstrated sufficient design concept maturity to support an early NNSA pit down-select which significantly reduced Phase 6.2 costs.
- Helped resolve critical issues caused by the delayed FPU of the Small Ferroelectric Neutron Generator for the W87.
- Supported the NNSA Complex by helping to secure a production source of triamino-trinitrobenzene (TATB) and performing small scale testing of early production batches. Worked to restart production of TATB to meet the needs of the Weapons Complex, including initiating small-scale testing of early production batches.

LLNL met expectations on demonstrating stockpile strategies. LLNL continued to characterize the thermal and mechanical response of high explosive and polymer materials, components, and systems by developing constitutive material models and model validation methodologies. This activity supported the CMF by developing the enabling simulation and experimental technologies to validate models that assess insensitive explosive systems in normal, abnormal, and hostile environments in support of the W78 LEP and LRSO. LLNL effectively worked with LANL to expedite production of "difficult to manufacture" parts for a key LEP hydro test. They continued to provide significant support for W87 pit fabrication at LANL and developed a joint LANL and LLNL statement regarding Pu aging and pit reuse. LLNL continued to perform design, computational and experimental work to identify pit reuse concepts to support NNSA and future LEPs. Other accomplishments include:

- Led the W87 legacy pit Integrated Project Team (IPT) as the DA and supported LANL completing fabrication of EDU-1 pit. LLNL provided LANL with a timely final design of the W87-Like (DDU-1) pit and completed reviews with LANL.

- Developed an improved scaled slapper detonator design that addressed some previous scaled test issues. Design was constructed and successfully tested, performing as expected.
- Continued development of new material LLM-105. LLNL developed an approach for the testing and qualification needed to certify this material as LX-21/LX-22. Recognizing that these materials may also be used for a future scaled shot, it modified testing and qualification, saving time and money.
- Achieved excellent progress on the next LLNL scaled hydro at DARHT scheduled for FY14 (including development, design, precision machining and physics modeling).

LLNL exercised creative leadership in sustaining and strengthening unique science and engineering skills to ensure current and future Nuclear Weapons requirements, meeting DOE/NNSA expectations and completing all 8 of the active DP level-2 milestones. LLNL published a year-end report on insensitive high explosive mechanical properties testing and model development in support of sustaining science and engineering capabilities. Department of Defense, Defense Threat Reduction Agency and Department of Energy, Intelligence and Counterintelligence accepted copies of their own beta electronic Redbook for stand-alone computers. Other notable accomplishments include:

- Extended SSP tools and capabilities in support of the intelligence community.
- Completed a historical data preservation project with NSTec to pack and ship over 23,000 post UGT samples to LLNL.
- Working with the production plants and AWE, developed applications and mature additive manufacturing technology.
- Made progress with the procurement and installation of a new x-ray machine and a thermal conditioning unit at Site 300, which provide upgraded capabilities for hydro-tests.
- Achieved new scientific demonstration in the Pollux experiment pre-shot prediction for the Gemini series.
- Performed a series of novel HEAF experiments to demonstrate ability to measure unreacted Hugoniots at pressures exceeding Chapman Jouget pressures of LX-17, providing data for critical initiation and safety studies.
- Released new versions of "Cheetah" (LLNL thermochemical computer code) and “ALE3D” to government and other users worldwide including DOE laboratories, DoD facilities, DoD contractors from industry and universities, NASA facilities, and NASA contractors that are ITAR registered.

LLNL demonstrated capability at applying new technologies to actual weapons, meeting expectations for effective operations and implementation of policy. Accomplishments include:

- Completed all five (5) RTBF DP level-2 milestones.
- Improved cycle time between CFF shots, particularly in clean-up phase, reducing shot cycle time and cost.
- Supported B83 thermal test on schedule and budget.
- Successfully fielded and completed a flawless Phoenix MG-9 shot.
- Supported Prompt Global Strike vibration testing.
- Exceeded RHWM SPOMC commitment with DOE to repackage 75 TRU waste drums. A total of 80 drums were repackaged.
- Completed 2 initiatives at HEAF to reduce legacy chemicals and aerosol cans, both of which far exceeded expectations.
- NNSA Weapon Quality Assurance Survey of WCI NWEP's QC-1 Quality Management System resulted in no findings.

LLNL made excellent progress and exceeded expectations in executing key Special Nuclear Material (SNM) and Integrated Experiments, including JASPER, Hydro, and EOS experiments, exceeding expectations. All 7 of the DP level-2 milestones were completed in spite of funding reductions. LLNL continues to make great progress on 5 IWEs scheduled for late FY13 and early FY14. It enabled other sites to successfully meet their mission deliverables by hosting a successful Integrated Weapons Experiment for SNL at CFF and completing the design and initiating procurement of a critical part of the build of an IWE for LANL. LLNL performed surety screening tests, and conducted experimental campaigns on Omega to support HED platforms and diagnostics all with less than anticipated funding. In total, LLNL conducted 86 experiments on NIF (more than a 3X increase over FY12) including 25 HED SSP shots in support of SSP missions covering key efforts on high-foot, planar, ablator, complex hydrodynamics, hohlraum physics, CD Mix, and hydro-growth radiograph. High-foot delivered new results with DT yield closer to the pre-shot prediction than past integrated capsule results. LLNL's high-foot shot on 08/12/2013 gave the highest yield of any layered DT implosion on NIF with 1/3 of the yield coming from alpha heating while maintaining a yield-over-simulated >70%. LLNL delivered the first demonstration of cryogenic DT implosions on NIF with performance levels in agreement with calculations in a regime where hydrodynamic instabilities do not play a major role. This work was a highly complex and difficult effort that delivered results for understanding key physics issues left unresolved after the National Ignition Campaign, and validated simulation of ASC codes. Hydro-growth started to deliver results on early-time instability growth. LLNL increased JASPER shot rate at NNSS with 11 SNM shots year to date – a record 8 SNM shots and 3 surrogate shots were accomplished this year; LLNL completed the first ever in-situ x-ray diffraction of Ta up to 2 Mbar at Omega, successfully matching their first principles multi-scale strength model. It completed Phoenix FPG-12 with data matching predictions. LLNL also supported a growing workload for complex experiments for non-DP customers.

LLNL exceeded expectations in demonstrating effective use of Advanced Scientific Computing (ASC) high performance computing systems for weapons applications. It provided exceptional support for the FastForward Project in managing contract activities for both ASC and the DOE Office of Science. This project funds partnerships with multiple companies to accelerate the R&D of critical technologies needed for extreme-scale computing. (also CF 1.2, 1.4 and 1.5, CSSE/FOUS subprogram). LLNL completed all ASC L2 milestones and successfully applied ASC code analysis tools to understanding the impacts of different models used in current codes, with particular examination of mix. Sandia National Laboratory provided an improved algorithm for dynamic load balancing, which has been implemented. Internal package to package comparisons have been done against the ICF code laser package. Package has been demonstrated to work with ALE-AMR in 3D. Comparisons have been made against experimental diagnostics of hohlraums (Integrated Codes subprogram). LLNL added several new events (4 primary and three secondary) to common models as well as improving algorithms and underlying databases used in the primary and secondary common modeling frameworks (V&V subprogram). For the Physics and Engineering Models (PEM) sub-program, Livermore has exceeded expectations in building inter-lab coordination, engaging and transparency with headquarters, development of plans, and milestone completion. Particularly noteworthy is LLNL's membership in and contributions to the COMUEX collaboration (PEM subprogram).

LLNL was proactive and exceeded expectations in managing the Sequoia overall computing environment and bringing the machine into general availability (GA) mode for users throughout the Tri-Lab community. LLNL has exceeded expectations by expeditiously transitioning Sequoia to classified operations and immediately implementing Capability Computing Campaign procedures (CSSE/FOUS subprogram). Sequoia is demonstrating the world's most capable file system for computational simulation (Grove). The capacity and throughput of Grove dwarfs existing LC production file systems. 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 strengthened capabilities for facilities to support recovery of applications and relocation of operations in the

event of a disaster. For the first time, LANL, LLNL and SNL have developed and exercised their Tri-Lab Disaster Recovery plans verifying the ability of each lab to backup/recover a weapons code application at a remote site, demonstrating professionalism of the lab in an era of increased risks to our operations (also CF 1.2, 1.4 and 1.5, CSSE/FOUS subprogram). LLNL provided exceptional support in collaborations between NNSA/ASC and DOE Office of Science/ASCR in computing research; LLNL's work in FY13 is particularly notable in their excellent preparations for meetings, and their helpful dialogues within ASC/ASCR in the areas of co-design and software environment research (also CF 1.2, 1.4 and 1.5, CSSE/FOUS subprogram). LLNL has also developed a new pre-exascale HPC high-performance computing acquisition strategy in collaboration with ORNL, Argonne, and HQ. LLNL's CORAL system acquisition project, Sierra, CD-0 was signed last June. LLNL expanded the Primary Metrics Project to more than 100 events in total, making possible important studies of current computational predictive capability that underwrites methods for stockpile certification and advanced physics and materials model development. LLNL continued extending ASC codes to enable their use to support achieving ignition on NIF. They have already achieved direct benefits to the weapons program due to this effort. In advancing scientific computing and systems, LLNL has completed the Sequoia Acquisition Project and supported tri-Lab HPC and National Exascale strategies.

Overall, LLNL met expectations executing shots on NIF in support of the Stockpile Stewardship Program. There has been significant cooperation between LLNL Weapons Complex Integration (WCI) and NIF management as a result of management changes at the laboratory, which has resulted in increased shot availability for stockpile stewardship experiments (SSP). The efforts in WCI have further contributed to stockpile stewardship by bringing the weapons programs resources and perspective to bear on science issues of common interest to both ignition and stockpile stewardship. The improved management of NIF experiments through the implementation of the NIF governance plan and the reliance upon community based peer review in relevant mission areas is also noteworthy. Significant progress has been made in the number of HED shots on the NIF in support of weapons physics. Additionally, the quality of the data from those shots has been very good during this period. Implementation of all committees associated with allocation of facility time called for in the NIF Governance Plan is complete. The highest priority for the NIF was to operate the facility in a manner to maximize beneficial use to the community of mission users in particular for stockpile stewardship and ignition. LLNL has significantly contributed to stockpile stewardship via assessing viability and certifiability of new design options associated with future life extension program. However, LLNL executed only 13 of 27 planned tier-one stockpile stewardship experiments. This is largely the result of facility use decisions made without NNSA participation. LLNL’s overall understanding of implosion physics improved significantly in FY2013. A record yield (~5x1015 neutrons) was obtained in a joint WCI/NIF implosion experiment using a “high foot” or “high adiabat” pulse, demonstrating for the first time “scientific breakeven.” This shot was the highest yield in a series of implosion experiments marked by increasing neutron yield and much improved agreement with one-dimensional simulations. This is a major achievement; achieving yields close to “one-dimensional” calculations has been a longstanding and difficult goal. The improved agreement with simulations is especially noteworthy as it reflects the increased understanding of implosion physics gained as a result of a series of detailed physics campaigns executed in the past several years and is a key benchmark in developing the capability to simulate high performance ignition implosions. LLNL also achieved a record neutron yield (~1.7x1015 neutrons) in a NIF ICF implosion. The target capsule had a high-density carbon (HDC) shell as opposed to the plastic shell used in implosion experiments to date. Advances in target fabrication were achieved. LLNL demonstrated the ability to conduct experiments with extremely thin "membranes" or "tents" supporting the capsule in the hohlraum target. Earlier experiments have demonstrated this membrane could perturb the capsule surface and seed hydrodynamic instabilities. The new membranes are 15-nm (or approximately 15 molecules) thick, compared to the 110-nm thick tents in use previously. The NIF team addressed this difficult and unforeseen challenge in an outstanding manner, quickly developing and

delivering the required membranes. Results to date indicate the thinner membranes result in reduced capsule perturbations at the level required. Additional accomplishments include:

- Executed 70 HED shots, and LANL 16 HED shots on NIF, totaling 86 shots in FY13. This is over 3 times the number HED shots completed in FY12 on NIF.
- National Ignition Facility (NIF) x-ray environments developed and optimized for the first NIF shot with system generated electromagnetic pulse (SGEMP) test articles in two lines of sight. Collaborative effort with Sandia National Laboratories and Atomic Weapons Establishment generate SGEMP data at unique flux levels and with unique x-ray spectra at the NIF.
- Conducted initial highly successful experiments in the hydrodynamic growth radiography (HGR) campaign. These difficult experiments, the first to measure directly hydrodynamic instability growth on NIF, compared well to calculation and provided important insights on capsule implosion physics. These experiments are an important step in testing the ability to predict hydrodynamic instability in HED implosions.
- Developed four new types of "keyhole" shock-timing targets in response to program needs. The standard NIC "keyhole" "1 view equatorial" liquid deuterium shock-timing target was modified to enable shock-timing measurements in 2 directions, 3 directions, and then 3 directions in the equatorial plane. A further modification enabled shock timing in layered DT targets and verified understanding our DT vs. liquid deuterium shock timing. This series of experiments was enabled by outstanding rapid-turnaround work by the NIF target fabrication group.
- NIF and Photon Sciences Principal Directorate researchers published over 150 papers in FY13.

LLNL exceeded expectations in completing a Joint Integrated Lifecycle Surety (JILS) baseline and conducting surety option benefit assessments. It has informed and directed national security decisions through unprecedented multi-agency teamwork. LLNL has taken appropriate measures to minimize costs to the government in ways that did not compromise core objectives and mission performance. The one DP level-2 milestone associated with this Site Specific Outcome is blue. LLNL supported all JILS meetings (venue, asset, methodology, and analysis) including presentations. Phase 1 baseline assessment was completed and results briefed to HQ. LLNL prepared the phase 1 report and Phase 2 proposals have been discussed with NA/HQ. LLNL has updated some W78/88 architectures/scores and completed an add-on task to create a summary report of Phase-1 activities.

## Performance Objective 2: Broader National Security Mission

### Narrative Summary

Very Good

LLNL successfully executed the broader National Security mission work, exceeding many expectations in Non-proliferation, Emergency Operations, and Counterterrorism, despite major budget challenges. It performed approximately 400 project management reviews each month in Global Security with fewer than 2% of the projects reporting issues. LLNL made major improvements in national security technologies, e.g., received five R&D 100 Awards and continued successful execution of National Atmospheric Release Advisory Center (NARAC), Biodefense Knowledge Center (BKC), Forensic Science Center (FSC), Radiological Assistance Program-7 (RAP-7), Bio-watch, and Render Safe Programs. It maintained world class and effective nuclear counterterrorism and incident response and provided required personnel to fill watch bills and rosters when needed. LLNL performed planning to minimize impacts with available funding during sequestration. It successfully executed DOE mission outside of NNSA, e.g., DOE-IN, DOE-SC, DOE-EE/RE,

DOE-NE. LLNL exceeded its metric goal for recovering radioisotope thermoelectric generators (RTGs) and provided excellent support on the Rostechnadzor Support, Material Protection Control & Acccounting (MPC&A) Sustainability, and Transportation Security projects, as well as NA-25's work on International Atomic Energy Agency (IAEA) nuclear security initiatives. In support of the Post-Detonation Device, Pre-Detonation Device, and Bulk Special Nuclear Material (SNM) Analysis Programs, LLNL performed all tasks in accordance with written guidance and maintained operational readiness. LLNL demonstrated outstanding performance on the International Emergency Management and Cooperation Program with respect to the NA-46 mission. LLNL's execution of the International Exchange Program (IXP) and its support of our international agreements with IAEA, and Israel are noteworthy.

LLNL performed exceptional project management for all program areas in Global Security, exceeding expectations in terms of project cost, schedule, and technical requirements. LLNL performed intense systematic tracking of a massive number of small projects; the attention to detail resulted in exemplary performance on the vast majority of work efforts. LLNL reviewed over 400 projects each month from a wide range of customers including NNSA, Office of Science, EERE, and other WFO. LLNL proactively negotiated modified scopes and maintained customer satisfaction in response to funding delays and reductions. Although the vast majority of projects (98%) reported no major issues, there were several projects where misconduct and unallowable costs were disclosed due in part to a breakdown in internal controls. Additional accomplishments include:

- Surpassed its metric goal for recovering RTGs. The joule metric was 8 RTGs; however, 38 RTGs were successfully recovered.
- Conducted two successful NA-242/INECP-funded Enterprise Outreach workshops – one in Lithuania and the second in Latvia.
- Conducted a NA-242/INECP-funded "Introduction to Border Analysis for the Kenya Rural Border Patrol" in Manyani, Kenya. The training simulated cross-border smuggling analysis to determine effective enforcement-personnel and equipment responses. After the workshop, the lead instructor of the Kenyan Wildlife Service Training Academy requested a copy of the training modules so that they could be included in Academy curriculum.
- Provided excellent technical oversight of collaborative R&D projects with former WMD scientists from research institutes in the former Soviet Union (FSU) and excellent support for the development of a country prioritization tool for scientist engagement activities.
- Accomplished high quality work for the NIS nuclear forensics program. This includes support to engagement with South Africa, Russia, Ukraine, and the EU.
- Provided excellent technical support to several on-going and multi-laboratory nuclear verification projects, including Country of Concern Assessments, Graphite Isotope Research Method Secondary Ion Mass Spectrometry, UF6 Age Dating, and leading the Uranium Sourcing project.
- Nearly tripled the size of the Uranium Sourcing Database, a tool that has been in continuous development since 2006. This greatly improved the USG capability to determine/verify the likely source of uranium ore concentrate samples.
- Provided extensive experience, technical leadership, and expertise critical to the successful conduct of special monitoring visits to Russian nuclear facilities and to the planning for program completion.

LLNL accomplished major improvements in technologies for National Security needs with developments in nuclear detection, forensics, bioterrorism detection and response, energy alternatives, and materials improvements, thus exceeding expectations. This was demonstrated by numerous peer reviewed publications and patent developments. Accomplishments include:

- Received five (5) R&D 100 awards.

- Deployed two “smart” gas samplers at an annual international exercise in Slovakia in support of the Comprehensive Test Ban Treaty Organization.
- Developed rapid debris analysis for nuclear explosion simulations.
- Received award for new scintillator for best nuclear/radiation detection" category in Homeland Security Awards.
- Obtained novel, unexpected data on sputtering rates of the virion with a Cs primary beam.
- Advanced petroleum & non-petroleum fuels development.
- New desalination technique using flow-through electrodes featured on back cover of Energy & Environmental Science.
- Described in a paper of a new method for mapping the distribution of small molecules in a cell membrane.
- Developed new method for detecting rare mutations that reduces sequencing errors.
- Broke the record for tracking movement and concentration of CO2 in a geologic formation using the world’s deepest Electrical Resistance Tomography (ERT) system.

Overall, LLNL met expectations in pursuing and performing high impact work to meet current and future national security mission requirements. Accomplishments include:

- 21st Century Energy Systems (CES-21) project - California utilities will use the Lab’s advanced technologies and expertise to improve the efficiency, security and safety of the state’s utility systems under an agreement approved on December 20 by the California Public Utilities Commission (CPUC). LLNL will provide the utilities with access to LLNL technological capabilities, such as supercomputing, and related domain expertise in engineering and applied science.
- Critical Materials Institute (CMI) - The Department of Energy has launched a research hub, CMI that focuses on solutions to the domestic shortages of rare earth metals and other materials critical for U.S. energy security. Housed at Ames Laboratory in Iowa, Lawrence Livermore has been involved in establishing this Energy Innovation Hub since its conception more than two years ago.
- California Energy Commission (CEC) - CEC awarded a project on solar forecasting and grid integration in partnership with Cool Earth Solar (a small Livermore-based company), LLNL, and SNL-Livermore using Cool Earth Solar's innovative solar technology with LLNL's solar forecasting to integrate power into building on the LVOC. Project supports LLNL's focus on fostering economic development and prosperity in Livermore Valley through partnerships between LLNL and local companies.
- DOE Office of Advanced Scientific Computing Research (ASCR) - DOE ASCR announced support of a new project at LLNL to develop computer science research tools related to exascale computing.
- NNSA Announcement: “U.S.–Russia Reaches Key Milestone in Converting Russian Nuclear Weapons to U.S. Nuclear Fuel” - NNSA announced on June 24, 2013 that it has monitored the elimination of more than 475 metric tons (MT) of Russian highly enriched uranium (HEU) under a landmark nuclear nonproliferation program, commonly known as Megatons to Megawatts. LLNL is the lead laboratory for the Megatons to Megawatts Program.

LLNL exceeded expectations in demonstrating effective operations and implementation of policy for mission success. In managing the NARAC, LLNL maintained readiness to accomplish emergency preparedness and response missions. LLNL conducted 64 responses, including 18 for NA-42, 16 for Naval Nuclear Propulsion Program, and 1 National Technical Nuclear Forensics exercises requiring staff support. LLNL deployed to the FBI-led multi-agency Science Reachback Center during the Presidential Inaugural. LLNL upgraded the NARAC systems to become the premier worldwide unique set of products for Chemical, Biological and Nuclear Power Plant scenarios, new meteorological data displays, and use of advanced nuclear fallout model (LODI). LLNL worked with DOE and DoD contacts to provide an assessment of potential atmospheric releases from the North Korean test. LLNL released NARAC Central system that includes tools to statistically and

graphically compare multiple model runs with field measurements, additional nuclear detonation radionuclide source term options, dose conversion factors standardized with other DOE tools, and several maintenance modifications. LLNL effectively managed the Biodefense Knowledge Center (BKC), releasing to the interagency a comprehensive report on BW agent source strength. LLNL added LDA (Latent Dirichlet Allocation)-based topic modeling capability to the BKMS. They responded to a high priority reachback request for DHS S&T support a potentially new, large and classified project. They released drafts of 5 classified factsheets in a series of 54, including for C. psittaci and Chickungunya virus. LLNL staff briefed smallpox Material Threat Assessment (MTA) to OHA, USCG, NORTHCOM in DC. LLNL remained the premier supporter to technical reachback requests including Ricin, IEDs and unknown bio-hazardous materials. Other accomplishments include:

- Forensic Science Center (FSC) - Completed the 32nd Organization for the Prohibition of Chemical Weapons (OPCW) Proficiency Test. Worked with the FBI to expand scope for casework sample receipt and analysis.
- Reviewed 4,430 Export Control and Licensing cases and recommended 237 for denial.
- Counterproliferation Analysis and Planning System (CAPS) - Provided information to 188 requests for information. Provided onsite technical support to 9 major commands and 292 personnel. Provided seven onsite technical support workshops to 254 warfighters.
- Led NNSA's Interdiction Technical Analysis Working Group on nuclear and missile issues.
- Participated in government-to-government meetings to support stronger export control under the Nuclear Suppliers Group Guidelines Multilateral Supplier Policy).

LLNL maintained a world class and effective Nuclear Counterterrorism and Incident Response Capability, exceeding expectations. With fewer resources than planned, LLNL fully met its commitments to NNSA and other federal agencies. LLNL has also taken a lead role for NNSA by hosting a Fukushima lessons learned teleconference to improve response to similar events and to develop a guide for best practices for use by the CTBTO. LLNL continues to provide leadership internationally and maintain a world class nuclear forensics capability; LLNL has been recognized by the US Coast Guard and the European Commission's Joint Research Centre Nuclear Security Unit for their efforts supporting those organizations in their respective areas. LLNL team won a first place award in the Government Security News magazine annual Homeland Security Awards competition for their Nuclear Detection R&D work. LLNL conducted first "Davis Calibration" in 20 years at the Crocker Nuclear Laboratory at UC Davis in collaboration with US Air Force and DTRA. With a short schedule and limited resources, LLNL implemented a new approach to WMD indicators and warnings analysis. LLNL proactively contributed to the tri-Lab NCT High Explosive roadmap, which is now being used to guide a cohesive national program. International support of the NA-80 mission was well coordinated and executed, with special recognition for hosting a number of US/UK technical exchanges involving discussions at a range of classification levels.

LLNL met expectations on NA-42 RAP Program support, including maintaining equipment, personnel training and readiness, and willingness to support short notice operational taskings. LLNL has done an outstanding job of supporting CM and other exercises, and upgrading computer system to improve the speed of product delivery. For the NA-42 Science and Technology (TI and RS R&D) Program, LLNL met expectations as it completed 100% of its deliverables for the program, of which 60% were completed on time. LLNL provided scientific expertise as part of the Home Team during Gauntlet Challenge Exercise and the Seattle STAB Team Roll-out training. It performed tasks in accordance with written guidance and the schedule and budget were executed according to plan for the Pre and Post Detonation Device Programs and the Bulk SNM Analysis Program. Additionally, LLNL maintained operational readiness in support of the Render Safe Program, DOE Forensics Operations team (DFO), and the Disposition and Forensic Evidence Analysis Team (DFEAT).

LLNL executed DOE mission work outside NNSA to a broad range of sponsors in an outstanding manner that exceeded expectations and improved base scientific capabilities. Accomplishments include:

- DOE Intelligence and Counterintelligence - LLNL published over 50 formal intelligence assessments on foreign nuclear programs, WMD proliferation and terrorism targets. LLNL conducted training classes and completed over 30 site country and transportation security profiles for the Nuclear Materials Information Program.
- DOE Lithium Ion Batteries - A multi-institution team, led by LLNL, has been awarded a five-year, $3.7 million award from DOE's Office of Basic Energy Sciences (BES) and Office of Advanced Scientific Computing Research (ASCR) to develop a new methodology for performing first principles quantum mechanical simulations on an unprecedented scale, and apply that methodology to understand key aspects of the chemistry and dynamics of lithium-ion (Li-ion) batteries.
- LLNL researchers elected to DOE FES MFE Plasma Edge Committee - At the DOE's Office of Fusion Energy Sciences Edge Coordinating Committee (ECC) meeting, the ECC elected a LLNL employee to a two-year term as Vice Chair, to be followed by a two-year term as Chair beginning in 2014. Maxim Umansky was also elected to a three-year term as a member of the ECC.
- DOE Safety Training for Iraq Ministry of Electricity - In support of the DOE Office of Electricity Delivery and Energy Reliability, LLNL staff provided training to approximately 100 Iraq Ministry of Electricity (MOE) personnel from the Iraqi electricity distribution, transmission, and generation sectors on the topics of Incident Prevention and Energy Restoration and Critical Essential Infrastructure Protection. This work is part of a U.S. State Department sponsored program to assist in the operations and maintenance, safety, and security of the Iraqi electricity sector.
- DOE Nuclear Energy - LLNL is a leader in DOE-NE's Fuel Cycle Options Evaluation and Screening Team. LLNL is evaluating the full range of nuclear fuel cycles (thermal/fast spectrum, water/gas/liquid-metal/molten-salt coolant, metallic/oxide fuel, stand-alone/reprocessing/accelerator-or-fusion-driven, etc.). The result of the multi-year evaluation will support multi-decade R&D decisions by DOE-NE.
- DOE OE and DOS Near Eastern Affairs - In support of the DOE Office of Electricity Delivery and Energy Reliability, LLNL staff developed two draft Program Specific Agreements for cooperation with the Kingdom of Saudi Arabia (KSA) Ministry of Interior (MOI). These two agreements cover the creation of a security engineering internship program for early career MOI officers and recent engineering graduates, and covers the creation of a national inspection and evaluation program for KSA critical infrastructure.
- DOE-SC/BER - Climate Change Model Simulations in Proceedings of National Academy of Sciences: LLNL is a worldwide leader in climate model evaluations. By comparing simulations from 20 different computer models to satellite observations, LLNL climate scientists and colleagues from 16 other organizations have found that tropospheric and stratospheric temperature changes are clearly related to human activities. The team's goal of the study was to determine whether previous findings of a "discernible human influence" on tropospheric and stratospheric temperature were sensitive to current uncertainties in climate models and satellite data.

LLNL exceeded expectations in the strategic pursuit of interagency work and implementation of project management tools. It completed development and implementation of an aggressive agenda of enhancements for the Project Reporting System (PRS) and achieved notable strategic successes in pursuing interagency work. Accomplishments include:

- All 358 Global Security Monthly Project Reports were successfully uploaded into the new web-based Project Management System.
- The U.S. Navy's suite of simulation tools, DYSMAS, which includes LLNL's ParaDyn code, received accreditation from Naval Sea Systems Command for use in preparing vulnerability assessments for ship structural response to weapons effects.

- LLNL's Multi-Programmatic and Institutional Computing (M&IC) Program - At the request of the Institutional Computing Executive Group, the M&IC Program recently expanded its scope to offer a Secret National Security Information computing environment. A Tri-Lab Linux Capacity Cluster scalable unit was added to Global Security's Institutional Secret National Security Information (iSNSI) network to enhance collaboration with DoD and other SIPRNet-connected stakeholders.
- LLNL and its industry partners, AOSense, presented an update on their gravity imaging modeling and design project at the Defense Nuclear Detection Office quarterly review. The Defense Threat Reduction Agency recently selected the AOSense–LLNL partnership to build a prototype gravity imaging system ($2M/year for 3 years; $500k for LLNL in the first year with a larger fraction in later years).
- LLNL 3rd-generation conventional weapons - Core LLNL scientific and technical competencies in areas such as, warhead design and weapon engineering, materials science, and HPC modeling and simulation, were successfully applied to DoD priorities. In support of contemporary operations and in anticipation of emerging requirements, LLNL supported DoD's development of conventional weapon systems to achieve critical national security objectives.
- Chem–Bio Threat Awareness - LLNL prepared course materials and provided lectures/tabletop exercises for 2 workshops in Amman, Jordan. The workshops were 1) Chem–Bio Threat Awareness Training, and 2) Workshop on Chemical Handling, Detection and Forensics Training.

LLNL met expectations in developing and executing a Foreign Nuclear Weapons Assessment (FNWA)/Capabilities for Nuclear Intelligence Program Plan. All associated milestones were completed on time and on budget. The Foreign Nuclear Weapons Assessments provide the USG with valuable information on Foreign Capabilities. In addition, analyses from this program will help improve the capabilities of the USG. LLNL worked with Sandia and Los Alamos National Laboratories and developed a tri-lab plan for high explosives experiments. This effort has led to discussions with the UK Atomic Weapons Establishment for future exercises.

Throughout the year, LLNL continued to provide exceptional technical expertise to the Nevada National Security Site (NNSS) to ship nuclear material to LLNL, thus exceeding expectations. LLNL held regular meetings with NNSS to coordinate the activities to effectively execute the NMPO Project Execution Plan. LLNL's packaging plan for the nuclear material was approved by NNSA, and the LLNL process line completed all Authorization Basis requirements and is ready for operation. LLNL met its schedule objectives and exceeded its scope and cost goals for FY2013. The LLNL team has been managing RTG activities for many years, and it brings significant experience to the project. The team leads are able to effectively evaluate the Russian proposals and their educational and work background enables them to discuss technical operations with the Russian counterparts in the areas of removal, transportation, disassembly, and disposal of the RTGs, as well as installation of alternative power sources.

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

### Narrative Summary

Excellent

LLNL exceeded nearly all expectations in conducting Science, Technology & Engineering Mission activities despite major budget challenges. LLNL advanced mission-relevant R&D, generated new expertise and capabilities in anticipation of national needs, promoted the development of intellectual property, seeded new programmatic activities, strengthened the ST&E base, and gained international recognition. All associated milestones were completed on time and on budget. The LLNL contributions to the

Future Capabilities roadmap were productive. LLNL effectively invested institutional resources, including those from the Laboratory Directed Research and Development (LDRD) Program, which was closely aligned with LLNL's long-term strategic ST&E Roadmap. The quality of science was demonstrated by receiving prestigious external awards and the publication of influential, innovative papers, presentations at conferences and in peer-reviewed journals. The excellent quality and programmatic relevance of the technical work was further affirmed through a vigorous program of external peer review. LLNL continued a strong technology transfer program that benefits American industry through innovations, in the form of intellectual property.

LLNL effectively managed its LDRD and other research efforts, exceeding expectations. LLNL completed FY14 LDRD program plan, which included 164 proposed projects with an approximate funding of $123M. LLNL performed 4 External Reviews in FY13 in the ENG, GS, PLS and WCI directorates to objectively evaluate the quality of science being performed. LLNL reported the required metrics on publications, patents, and postdocs. LLNL improved accounting methods for project selection costs; therefore, in FY13 the Field CFO issued a no-findings report.

The research conducted by LLNL continues to exceed expectations, advancing the frontiers of science and engineering, and has been transformative, innovative, leading edge, and high quality. LLNL scientists published more than 1,100 journal publications, which was a sharp increase (over 15%) from 2012. One example of a scientific advance is the development through LDRD investment of the antineutrino detectors for remotely monitoring nuclear reactors. The online edition of Physical Review Letters recently published two papers describing experiments performed with a new apparatus developed for precision beta-decay spectroscopy and a paper in Nature reported the first-ever measurement of a supermassive black hole spin rate. Other examples of pioneering research and effective collaborations include:

- Established record-breaking simulations on Sequoia for discreet event simulations that far outstripped previous records.
- Established new insights into the kinetics of reaction for this programmatically significant compound through double shock experiments on LX-17.
- Completed the first hydrodynamic growth radiography data shot on the NIF.
- Discovered that a class of zeolite materials may hold the key to adsorption of the powerful greenhouse gas methane.
- Contributed significantly to Bacillus ACT 2013, an International conference that brings together the world's specialists on Bacillus anthraces.
- Held a workshop on mesoscale materials science that was attended by 115 external and internal participants.
- Collaborated with colleagues at more than 500 universities and research centers and in more than 80 countries.
- Recognition in the HPC Wire of the Parallel Implementation of Molecular Docking Program.
- Published Identifying Human Influences on Atmospheric Temperature in the Proceedings of the National Academy of Sciences.
- Published Investigation of MgO at High Pressure and Temperature in Science.
- Published (LLNL with multinational team) Astrophysical Journal Letters announcing the first distant galaxy cluster discovered with NASA's Wide-field Infrared Survey Explorer.
- Signed an MOU with the Center for Urban Science and Progress (CUSP) at New York University to study urban issues (transportation, air quality) using data science.

LLNL met expectations in maintaining a healthy and vibrant research environment that enhances technical workforce competencies and research capabilities despite significant challenges due to declining budgets and competition by other high tech employers in the local area. LLNL pursued an aggressive hiring program that

averaged 4 new postdocs each month in FY13 to date. During the first nine months of FY13, 33 postdocs were converted to career status, which is a 50% conversion rate. As of June 30, 2013, the postdoc population stood at 161. LLNL initiated a new Early-Mid Career Recognition program that identifies and rewards employees due to their performance and leadership skills. When budget shortages required an FY13 Voluntary Separation, although 7% of workforce departed, only 3 of 159 LDRD leaders (1.9%) left. LLNL named nine employees to LLNL new "Distinguished Members of Technical Staff" category.

LLNL demonstrated that it is advancing ST&E and developing technologies for the public good through extensive technology transfer efforts, exceeding expectations. LLNL conducted a wide array of activities along the technology transfer pipeline from generating patents and executing licenses to signing key agreements using CRADA and ACT instruments. Outstanding achievements in commercialization for several technologies were recognized by five R&D 100 awards. The award winning technologies included quick diagnostic of dangerous contamination in airflow, video imaging of superfast processes at the billionth-of-a-meter scale, small software applications for high performance computing, laser screening to protect high-cost optics (NIF), and increasing power in high-quality fiber lasers. LLNL obtained 84 new US patent, filed 206 applications, executed twenty new licenses, and received royalty receipts totaling over $8.23M for the year. LLNL is the first and only NNSA laboratory to execute an agreement under the ACT pilot program, a novel tech transfer mechanism. LLNL signed significant ACT partnership agreement after concluding more than a year of negotiation with the Czech Republic's Institute of Physics for a $45 million to build the state-of-the-art High Repetition-Rate Advanced Petawatt Laser System (HAPLS). LLNL signed several new CRADAs including the Livermore Microbial Detection Array with Denmark's Statens Serum Institut (SSI) and the dislocation dynamics code ParaDis for studying deformation of alloys, in partnership with John Hopkins University. LLNL continued development of the upcoming CES-21 agreement with California utilities, adjusting the scope of the program planned to reflect ongoing budget negotiations by the California legislature. LLNL also continues to leverage the Livermore Valley Open Campus (LVOC) as a hub for discussion and recruitment of new partnerships. The existing HPCIC facility has proven highly successful with more than 15,000 visitors and more than 1,700 events.

LLNL exceeded expectations in defining a future capabilities roadmap that explicitly addresses stockpile stewardship and other national security objectives. This was accomplished by updating and improving the LLNL ST&E Roadmap (Roadmap 2.0, LLNL-MI-620372) and then evaluating proposals for their technical strength and their strategic alignment with the goals outlined in the Roadmap. LLNL included in the ST&E Roadmap the goals put forward in NNSA's strategic plan for reducing nuclear dangers, managing the nuclear weapons stockpile, and strengthening underlying ST&E relevant to NNSA's mission. LLNL also convened a high-level external advisory panel at LLNL in February 2013 to advise senior Laboratory managers about the new roadmap, assess the investment approach, evaluate the general concept and identification of core competencies, and suggest opportunities for improvement.

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

### Narrative Summary

Very Good

LLNL exceeded expectations in many areas of Security, Infrastructure, Safety & Health, Environmental Stewardship & Institutional Management despite major budget challenges. Especially significant to DOE/NNSA are the proactive workforce restructuring actions by LLNL that resulted in significant annual labor cost savings while maintaining effective and compliant operations. LLNL successfully transitioned to a Category III Special Nuclear Material security posture, reducing security staffing and facilities six months ahead of NNSA

DNS expectations, and achieved over $40 million in annual cost savings. In addition to executing a Self-Select Voluntary Separation Plan (SSVSP) and Involuntary Separation Plan (ISP) for the security organization, LLNL successfully planned and executed a general SSVSP in June 2013 that will result in an additional $39 million in cost savings in FY14, and $60M annually thereafter. Successfully planning and executing a total of three major workforce restructuring actions during the year required an extraordinary level of outstanding support from the LLNL HR and legal organizations. Despite these major staffing reductions, LLNL was able to continue to provide effective and compliant operations in support of mission work.

LLNL exceeded expectations in Security, performing effective and efficient management of security operations conducted within the site while maintaining an NNSA enterprise-wide focus, despite significant budget and manpower challenges. All Performance Evaluation Plan (PEP) related security milestones identified by LLNL that support the safeguards and security (S&S) element for this Contributing Factor (CF) were completed on or ahead of schedule. The Site Specific Outcome (SSO) of transitioning to a Category III Special Nuclear Material security posture and reducing security staffing and facilities to be consistent with requirements for a Category III facility was completed in March 2013, six months before the end of the performance period, and six months before NNSA DNS expectations. This SSO was achieved without incident and will save DOE/NNSA at least $40 million per year. LLNL submitted quarterly S&S assurance reports and plans on time and they met expectations. LLNL completed preparations to implement new DOE security Orders. LLNL worked to address skills gaps for its security staff and efficiently managed staff reductions, and associated resourcing impacts as a result of significant budget reductions and involuntary and voluntary separations. LLNL achieved 100 percent completion of its scheduled S&S Program self-assessments on time and in all security topical areas and reported quarterly performance ratings to LFO. Deficiencies and observations were self-identified as a result of these self-assessment activities and they are being managed in LLNL's Institutional Issues Tracking System. Results from completed FY 2013 IAP assessments of LLNL security operations indicate effective and compliant performance resulting in all security topical areas being rated as Satisfactory and an overall composite rating of Satisfactory. LLNL's S&S Program experienced only one finding in FY 2013 in the area of Physical Security for not clearly documenting their false and nuisance alarm rates. Approved corrective actions are in place for this issue. LLNL also completed a corrective action plan designed to improve formality of security operations. The plan established a Conduct of Security Program that consists of formal documentation, practices, and actions implementing disciplined and structured operations that support mission success. LFO validated LLNL implementation of this program and concluded that these actions will strengthen the formal governance of security operations. Evidence of improved formal governance of security operations is found in LLNL management of budgets, incidents, and assessments. In FY 2013, LLNL experienced an approximate 15 percent security budget cut and lost personnel due to a voluntary separation action. Budget cuts and separations resulted in staffing challenges in the areas of protective force training, technical surveillance countermeasures, and classified matter protection and control activities. These challenges were identified to NNSA in quarterly Management Systems Assurance Program (MSAP) reports. In spite of these resource challenges, LLNL effectively prioritize security operations and met performance expectations in all security functional areas. For security incidents reported in FY 2013, LLNL established corrective actions that involved management decisions for improvement of program management elements such as policies, procedures, and accountability. In addition, LLNL senior security management established an Incident Analysis working group for FY 2013 incidents with the goal of improving security operations by addressing common causal factors. Such actions demonstrated an increase in LLNL's formality of operations. All incidents were self-identified, and resulted in no compromise of sensitive information. LLNL completed 100 percent of its scheduled self-assessments and 8 additional self-assessments in FY 2013 resulting in the self-identification of approximately 30 deficiencies and 80 observations. LLNL also completed several additional protective force performance tests in response to the recent NNSA security incursion in an effort to assure security system posture readiness and to prepare protective force response to a similar incursion.

In Emergency Management, LLNL completed all Emergency Readiness Assurance Plan (ERAP) deliverables while addressing workload resource implications from a constrained budget. This constrained budget resulted in a voluntary reduction in force in June that had a negative impact on Emergency Response Organization (ERO) staffing levels. Nineteen ERO positions became vacant; however, all primary ERO positions remained at least two-deep to support an extended ERO response. LLNL proactively initiated recruitment activities to fill vacant ERO positions and conducted a no-notice ERO drill to demonstrate its ability to activate and fully staff its Emergency Operations Center. LLNL reorganized the Disaster/Self-Help Program to optimize zone and assembly point locations, to facilitate effective facility/program reporting processes, and address shifting site populations. LLNL developed actionable deliverables to address LFO performance expectations regarding rigor and depth of institutional exercises. It provided support for continued maturity of the operational drill programs for those facilities having hazards assessments to foster institutional and facility/program integration. LLNL completed a corrective action plan and root cause analysis to address issues from an independent review of the site's preparedness for severe natural phenomena events. LLNL personnel now coordinate with the Alameda County Fire Department (ACFD) Incident Commander in order to confirm that initial protective actions and recommendations meet DOE Order 151.1C requirements.

In Fire Protection, LLNL completed the update of the Fire Alarm System Description document for the site-wide fire alarm system from a more worker knowledge-based program to a more documented program. Emergency paging infrastructure upgrade for all EVA system buildings was included to resolve a continuing communications fault. One area that was in need of improvement was EMD's institutional requirements for managing and controlling fire suppression system (FSS) impairments, which has exhibited problems in developing, implementing, and promulgating clear and concise policies and procedures that meet requirements. LLNL has since revamped its impairment process for sprinkler systems with re-writes of EMD Policy 100, Fire Protection Policy 430.00, and FPE Standard 1.6, and has withdrawn Alarms 850.046 and Proc Ops 0002.

LLNL is performing satisfactorily in supporting the Emergency Management Facility Line Item and meeting expectations. Currently, the project is on hold, but LLNL contracted an emergency facility consultant and a local architect to develop planning documents and conceptual layout drawings. Work is in progress. LLNL continues to support the proposed Electrical Infrastructure Upgrade (EIU) line item.

LLNL exceeded expectations in delivering efficient, effective, and responsive business operations and systems. The Strategic Human Resource group completed deployment of its annual plan of leadership and development initiatives; engagement, work-life campaigns and activities; implementation and deployment of its business software tools enables managers to access employee information real-time; and implementing changes to health and welfare benefits to reduce cost while maintaining employee benefits. The five project management activities: implementation of a High Deductible Health Plan, skills and competencies definitions, workforce management policy updates, leadership program management, and job matrices update were completed. Major activities outside the normal work scope for the Strategic Human Resource group this year included the development and successful execution of the Self Select Voluntary Separation Plan (SSVSP) for the Proforce in November 2012 and the rest of the site in June 2013; and an Involuntary Separation Plan (ISP) for the Proforce in March 2013. The contractor released a total of 525 individuals under the SSVSP and ISP in FY 2013. LLNL utilizes the NNSA OFFM Integrated Contractor Financial Management Performance Measures to assess its performance under its Contractor Assurance System. Most recently, OFFM rated LLNL as "good," which is its highest rating level. LLNL received a passing rating in every general and core financial measure and based on its documented performance in the strategic measures resulted in its good rating. The CFO's office met several challenges this year due to budget constraints, sequestration and loss of resources as a result of the VSSP. A significant budget reprogramming was necessary to implement a CAS compliant cost model as a result of the

special allocations for NIF in FY 13 and the resulting cost impacts. The reprogramming was completed by August 2013. The procurement system continues to perform at a very high level as it achieved a rating of "outstanding" on the Procurement Objective Matrix Report for the 3rd quarter (980 points out of 1,000). LLNL is significantly exceeding its small business goal (63.5% vs. 52%) and will meet or significantly exceed all NNSA Supply Chain Management Center goals (over $43.6M in portal spend vs. goal of $25M and over 2,900 e-store transactions vs. goal of 2,400). The OIG recently issued an audit report on time & materials (T&M) subcontracts that included several findings and recommendations. NNSA is currently engaged in fact finding with LLNL on this issue. The property system continued to perform at a very high level as it achieved a rating of "outstanding" (492.2 points out of 500 points) on the Property Performance Assessment Model (PPAM) for the 3rd quarter. LLNL completed the annual wall-to-wall personal property inventory of attractive and equipment categories and achieved a "far exceeds" rating (99.82% accountable by value), as validated by the NNSA OPMO. LLNL was able to account for 100% of all firearms and precious metals. Additionally, LLNL has taken the lead to develop an enterprise solution for implementing a new DOE order (580.1A) with extensive requirements in a risk-based and cost effective manner.

LLNL exceeded expectations in delivering efficient, effective and secure networks and information. It delivered government and non-government owned portable electronic devices (PEDs) (PPAs and within LA buildings) to LLNL users ahead of schedule. This allowed non-government PEDs in both PPA and LA buildings as well as the roll-out of the GOOD application to enable Entrust encrypted email. The BSC completed their review and selection of proposed projects, and completed the development of the Project Execution Plan as expected. Updates to the CIO website were made to include the Cyber Security Program adding links to the MAS. ITS items from the IT FA LCon5 have been closed and the IT Subject Area is adding information as a best practice. A Video Conferencing Policy and Strategy were completed as scheduled. Implementation of the Video Conferencing strategy and the upgrade of LLNL's Communication Server to Lync were completed by September 30, 2013 as scheduled. The Electronic Health Records (EHR) Business Systems Project was completed by July 2013 and within budget.

All PEP related security milestones identified by LLNL's Cyber Security Program (CSP) that support the security element for this CF were completed on or ahead of schedule. LLNL submitted a Risk Management Framework (RMF) for in 2nd quarter for the LFO Manager's approval. LFO approved the RMF, enabling a transformation from a compliance-based cyber program approach to one that allows LLNL to make risk-based decisions for unclassified systems. LFO's review of the RMF Project Plan determined that it is well-defined, well-planned, and should provide a sound program for cyber security governance. Implementation of the RMF Project Plan has met expectations. RMF Project Plan accomplishments include development of the unclassified Common Controls Catalogue (CCC), revision of the unclassified Site Risk Assessment, completion of a Functional Management Review for the RMF Project Plan implementation, and LFO approval of the RMF Site Risk Agreement. LLNL also submitted an initial version of the CCC for implementation of security controls on classified information systems. The CCC was submitted on-time for LFO approval. Results from completed FY 2013 IAP assessments of LLNL cyber security operations indicate effective and compliant performance resulting in the topical area being rated as Satisfactory. LLNL's CSP successfully implemented corrective actions for four issues that were identified in FY 2012. In FY 2013 the CSP experienced only one finding as a result of IAP assessment activities regarding the protection requirements for Sensitive Unclassified Information. For this compliance issue LLNL submitted a CAP on schedule and implemented the approved actions as expected. The CSP completed corrective actions for this Finding and requested LFO closure. Corrective actions have been developed for the configuration/patch management issues identified by the OIG in their FY 2013 DOE Unclassified Cyber Security Program Audit. Corrective actions for these issues have been developed. LLNL's overall cyber performance in FY 2013 was effective in spite of budget cuts associated with NNSA re-programming, as well as sequestration impacts.

LLNL met expectations in the areas of facility/infrastructure and sustainability. LLNL leadership support and expertise in supporting NNSA's implementation of the US Army Corps of Engineering's Builder Sustainment Management System (BSMS) for bringing NNSA to a whole new level of life cycle management of its assets has been excellent and extremely beneficial to the NNSA facility mission and strategic planning. FCIs for Mission Critical facilities far exceeds NNSA 5% goal and is now below 3.1%. FCIs for Mission Dependent Not Critical facilities exceeds NNSA 8.45% goal and is now below 8.3%. LLNL has improved the written content and details for some of its Preventative Maintenance (PM) Task Code procedures for some most important systems. However, other Task Codes are still in need of improving. LLNL filled a void for lack of PMs by implementing a new electrical panel PM program in FY13. LLNL reacted positively to HS-45 comments regarding water distribution system PMs and very quickly addressed concerns regarding valve preventative maintenance. PM completion rates have slightly increased as LLNS has made changes in how it tracks PMs and Corrective Maintenance (CM) to help improve the PM/CM ratio to 37.5/62.5. Additional efforts will be required to achieve what would be considered a Best Management Practice (60/40). Overall real property maintenance investments per Replacement Plant Value for LLNL enduring facilities are approximately 1.84% or about $9.8M below the 2% goal. The yearly base funding levels for maintenance continues to struggle from year-to-year and it is affecting the maintenance backlog, PM/CM ratio, and needed replacements.

Of the eight DOE/NNSA Sustainability goal areas (GHG Scope 1-3, Buildings (Energy Use), Fleet, Water Use, Pollution Prevention/Waste, Sustainable Acquisition, Data Centers, Renewable Energy), LLNL is progressing towards the Federal target in most of these areas with the exception of the facility energy intensity reduction goal and the potable water intensity reduction goal. Based on evaluating performance against contractor energy and water intensity reduction goals (which was about a 1% improvement from the previous year), progress on energy and water intensity reduction falls just short of the internal goals of -15% and -4%, with LLNL reporting -14.74% for energy and -3.5 % for water. Lack of progress on reducing energy intensity is impacting other goal areas such as the reduction Scope 1 and 2 GHGs. The final data is not available but LLNL is projected to either just meet or fall just below the federal GHG Scope 1 and 2 targets. Goals have been exceeded in the areas of fleet management and renewable energy. Good progress is also being made on data center consolidation; however, more progress is needed through senior management direction to the programs in server room consolidation to fully support the federal goals in this area. LLNL continues to support a small onsite renewable energy project in the buffer zone and current projections indicate 15% of the total electricity usage will be covered by the purchase of RECs in FY13.

Overall, LLNL exceeded expectations for efficient, effective, and responsive ES&H management and processes, demonstrating a downward trend in overall LLNL injury and illness rates. LLNL improved the effectiveness of the ES&H Program through development of the Risk Assessment and Control database that allows increased formality and consistency for industrial hygiene hazard control selection, provides an interactive database allowing significantly improved access to facility baseline (facility hazard) data, and contains ready access to regulatory limits (e.g., OSHA, ACGIH). LLNL continued to provide high quality support for institutional ES&H following LLNS VSSP that included loss of senior ES&H SMEs. LLNL completed a comprehensive Lab-wide Safety Conscious Work Environment self-assessment. Lab-initiated "Health of the Program" reviews for Worker Safety and Health subject areas increased safety and health program formality and compliance and resulted in improved program implementation. LLNL quarterly laser safety newsletter and Worker Safety and Health "safety flashes" continued as valuable tool for conveying lessons learned. LLNL started or continued several ES&H initiatives such as Lifecycle Management of explosives, nuclear, radiological and hazardous materials, an Employee Wellness program, including flu shot clinics, ES&H fair, and the Working Well program.

LLNL environmental staff consolidated air permits (from 36 to 3) thereby substantially reducing annual fees and negotiated reduced frequency of metals analysis for the wastewater discharge permit thereby reducing analytical costs. These actions demonstrate more efficiency with regards to ES&H management of environmental permitting processes, resulting in costs savings while maintaining permit compliance.

In the area of nuclear safety, LLNL exceeded expectations in Criticality Safety through significant reduction of fissile material items approved in B332 procedures, a 100 percent compliance for criticality safety training, staff participation in national consensus standards development, and lead roles in two key experimental campaigns at the NNSS. The NMTP work permit process has been improved such that the NMTP Work Permit now includes a link to the eIWS for verification of training of workers by the RI prior to work permit approval and release of work. LLNL improved procedures integrating nuclear safety basis effort between facility, program, and analytical support, including improvement of the process to more effectively identify, evaluate, manage, resolve, and close safety basis related issues. LLNL improved resolution of PISAs through improved quality of Evaluations of Safety and when necessary submission of Justifications for Continued Operation. LLNL demonstrated an emphasis on internal identification of issues and opportunities for improvement through self-assessments in the LLNS Integrated Assessment Plan. LLNL also completed an internal Management Self-Assessment (MSA) of planning, development, review, and submittal of facility safety basis amendments and annual updates. This was followed by a Functional Management Review completed by URS of LLNS safety basis development process that confirmed MSA results and identified seven noteworthy practices.

However, NNSA has concerns with certain aspects of implementation of ES&H policies and procedures. Multiple ES&H events occurred in FY13 (e.g., B827D acid splash, B191 High Explosive Applications Facility explosive experiment, Site 300 chlorine exposure, Site 300 potential asbestos exposure, and B322 Engineering Plating Shop fire) that indicate inadequacies in the implementation of elements of work planning and control, specifically with definition of work scope, hazard analysis and hazard control selection. In nuclear safety, LLNS has not submitted Evaluations of Safety in response to PISAs in a timely manner.

LLNL continues to incorporate best practices into its legal management program and continues to effectively manage its complex litigation despite several adverse court rulings, exceeding expectations. Contractor General Counsel and staff continue to maintain excellent communication/interaction with Site legal counsel on all legal/policy matters. The Office of General Counsel has provided substantial and ongoing advice in support of workforce issue including an Involuntary Separation Program, a Voluntary Self-Select Program, and a revision to the Personnel Policies Manual. Additionally, the legal office has provided significant support to the laboratory's mission enhancement activities, including those associated with the Czech laser ACT Agreement (the first ever for NNSA), CES 21 CRADA, and the agreement with the OPCW. It has also provided support to efforts to expand the LVOC initiatives. The Office of General Counsel has effectively managed its litigation and continues to litigate the most complex case in the NNSA enterprise.

LLNL completed all milestones toward ISO 9001 registration, including successful completion of the third-party ISO9001 registration audit, in spite of significant personnel changes at the institutional level. Implementation of the ISO9001 Quality Management System should result in improved assignment of responsibilities and authorities, definition of policies and requirements, and performance and assessment of work. The registration audit was completed by the end of the FY with registration anticipated for early October. The LLNL Weapons Complex and Integration (WCI) Nuclear Weapon Engineering Program (NWEP) quality assurance program is functioning at a very high level and is exceeding performance expectations. There were no findings from a comprehensive independent assessment by the Livermore Field Office and NA-121 in January 2013. NNSA noted great improvement in the LLNL weapons quality assurance program and a high degree of management commitment to the weapons quality assurance from WCI and NWEP management. The

revised ES&H Manual Document 41.1, Quality Assurance Program sufficiently addressed NNSA concerns and was approved in Q3. NNSA will continue to monitor its implementation. LLNL has demonstrated progress towards completion of the corrective actions for Software Quality Assurance (SQA), despite limited resources.

LLNL continued to mature its institutional Contractor Assurance System (CAS) activities into the larger Management Assurance System, meeting expectations. LLNL has made progress in implementing corrective actions in response to the FY 12 LSO LCON-5 review. As part of the corrective action plan, LLNL has refocused and refined its 31 previous CAS functional areas into 2 groups. The first group consists of 13 functional areas that have a direct and sustained impact on worker safety and health, security and environment. The second group consists of 13 areas, previously known as functional areas, but do not have the same impact, which are now designed as subject areas. These subject areas may employ tools other than the institutional CAS tools to assure their performance. LLNL completed the planned corrective action of "perform assessments on Contractor Assurance System readiness". The deliverable for this action was a thorough, comprehensive, and timely self-assessment report, conducted by both the LLNL functional area and line managers. Using the NAP 21 CRADS, the self-assessment examined the effective use of the CAS by the Laboratory's 13 functional areas. LLNL concluded that 11 of the 13 functional areas are effectively using the LLNL CAS tools and processes, with one functional area using third-party accreditation for much of its assurance activities. Another functional area is newly created and immature and will receive CAS support directly from the MAS Organization. The report identified 2 deficiencies, 34 individual observations, 6 institutional CAS observations and 35 strengths. The opportunities for improvement identified by the self-assessment provide LLNL a good path forward in continuing to advance their CAS.

Building 419 RCRA Closure Project excavation activities and waste shipments are now complete and LLNL has met expectations. The site is paved and has been returned to pre-demolition boundaries. The closure report was submitted to DTSC in May and a letter signifying the completion of this RCRA Closure is expected to be received from DTSC shortly. Pending final shipment costs and lien recovery, the Building 419 RCRA Closure Project has spent its allotted funds and will need to utilize approximately $250K-$280K in Long-Term Stewardship funds.

LLNL exceeded expectations for transitioning to a CAT III SNM security posture and reducing staffing and facilities consistent with CAT III requirements. All milestones for this challenging SSO were achieved yielding a $40 million annual cost savings in security spending costs, despite significant budget and manpower challenges. In October 2012, LLNL obtained approval from LFO to downgrade to an SPL 4 site, and to transition its authorization for SNM to CAT III. LLNL fully implemented its CAT III security program in accordance with its Site Security Plan (SSP) and used the resources and completed the essential tasks identified in the Post 2012 Security Program Plan. The resource requirements were incorporated into LLNL's FY 2014-2018 budget submission. Representatives from NNSA Headquarters Office of DNS conducted a validation of LLNL's de-inventory process and CAT III security program plans to ensure that LLNL was capable of maintaining a CAT III protection level for the possession of SNM. The validation focused on the plans, procedures, and processes implemented by LLNL's S&S and MC&A programs. Overall the validation found LLNL's protection level and CAT III security program to be effective and meeting NNSA expectations. In March 2013 LLNL reduced security staffing and facilities to be consistent with requirements for a Category III facility. This SSO was achieved without incident and will save DOE/NNSA at least $40 million dollars per year. This objective was completed six months before the end of the performance period and six months before the end of NNSA DNS expectations. LLNL took exceptional measures to minimize the impact of the transition, including the identification of other employment opportunities within the NNSA complex for the displaced Protective Force Officers. LLNL also reduced its security footprint by consolidating three of its Protective Force facilities. LLNL reviewed and updated the LLNL Strategic Rollup Area (SRA) risk analysis and

completed a self-assessment on the implementation of its policies and procedures for SRA operations effectiveness. The results revealed a compliant and effective CAT III security program.

## Performance Objective 5: Contractor Leadership

### Narrative Summary

While the Contractor exceeded some expectations in demonstrating leadership in supporting the direction of the overall NNSA mission, significant challenges in leadership at LLNL existed throughout the performance period.

Satisfactory

LLNL defined its strategic vision in a Multi-Year Performance Strategy, which was updated in May 2013. This vision has been communicated to senior LLNL management through meetings, presentations, All Hands, etc. The strategy incorporates the objectives of DOE/NNSA and expresses the vision and priorities of LLNL in three mission key areas: Nuclear Security, National Security, and Energy and Environment. LLNL also convened a high-level external advisory panel at LLNL in early 2013 to advise senior Laboratory managers about the new laboratory roadmap, assess the investment approach, evaluate the general concept and identification of core competencies, and suggest opportunities for improvement.

LLNL has been an active participant in NNSA leadership activities throughout FY13 during many of the budget and leadership challenges. Senior LLNL management has participated in many NNSA enterprise-wide activities such as the NLDC COO, COR, Communications, Finance, and Legal working groups, the Benchmarking study, the CAPE study, and Mission First efforts. The Deputy Director was actively engaged as a member of the EFCOG Board of Governors, the Mission First Co-Lead, and the NNSA COO Council.

LLNL has demonstrated that it is highly committed to developing and maintaining long term partnerships with industry, academic, and community partners. LLNL demonstrated initiative by engaging in non-traditional partnerships and partnering instruments. LLNL has partnered with a consortium of California utility companies to explore the applications of computing to the energy sector. The California Public Utility Commission approved a five year, potential $150M partnership with LLNL which will start at $35M. LLNL is the first and only in NNSA to enter into an ACT agreement as it recently executed such an agreement with the Czech Republic for the E23 project valued at $46M. LLNL continues to move forward with the Livermore Valley Open Campus effort despite a lack of dedicated NNSA funding. The existing High Performance Computing Innovation Center facility has proven highly successful with more than 15,000 visitors and more than 1700 events.

A number of LLNL governance boards ensured performance at both the Principal Associate Director and institutional level. The quality of interagency work is being tracked through a new management system which includes monthly project reviews with responsible Lab staff.

On a positive note, LLNL leadership, primarily the Deputy Director, successfully navigated the challenges associated with a voluntary reduction in force and a reduction from a security category 1 site to a security category 3 site. Lower budgets, including the impacts of sequestration, have resulted in changing priorities and made necessary a voluntary separation program, which resulted in a reduction of approximately 400 employees, in addition to a reduction of approximately 115 security employees with no impact on operations. The voluntary separation will save $60M/year after the first year. The security budget has been reduced by $40M/year due to material de-inventory which can be utilized in the NNSA complex. LLNL worked hard to

place excess people locally or within the DOE/NNSA complex. Efforts have been made to create less stressed environment for workers through the use of such things as a new day lock procedure, access to personal electronic devices, and corrective actions to improve the safety culture. The Lab responded swiftly to the events following the Acid Splash event at Site 300. A Lab investigation was conducted and some organizational and process changes were made. The Lab also responded appropriately to several lower level incidents at the HEAF facility and to other individuals engaging in misconduct.

LLNL is actively working to revitalize the postdoctoral program to maintain the future technical workforce. LLNL has continued to emphasize professional excellence, providing necessary training and development activities, including the opportunity to pursue college degrees. Succession planning has been initiated and focused on early and mid-career employees.

LLNL continues to make efforts to improve the institutional use of the Management Assurance System (MAS) and parent company resources. The MAS office held hands-on training sessions for LLNL Line, Functional Area, and Subject Area managers which addressed the use of the MAS Portal and associated CAS tools. A parent company review of CAS effectiveness was performed. The parent company noted that the maturity of the CAS has increased over the past few years. Additional evidence demonstrating performance results include: a well-established, transparent and beneficial Director's Monthly Performance Review, which uses key MAS processes and products to track and trend LLNL institutional performance for the benefit of both LLNL and LFO. In FY 13, LLNL developed new protocols for LFO oversight and transparency of the parent company functional management reviews. However, LLNL needs to be more self-critical in self-assessment activities, i.e. the PEP self-assessment.

NNSA has concerns regarding several management issues at LLNL. On several occasions LLNL management engaged Congress contrary to stated NNSA strategy or in open opposition to that strategy. There were also a number of issues related to a lack of transparency of operations and program management decisions regarding the ICF program. NNSA and LLNL worked for several months to meet budget challenges requiring the reprogramming of funds to alleviate impacts due to the ICF program rate changes. NIF operating costs and assumptions were not transparent or well communicated to the NNSA Program Office, which made it more difficult to understand programmatic tradeoffs with FY13 budget pressures. NNSA raised concerns regarding the ICF spend rate that resulted in an extremely low level of carryover late in the fiscal year. NIF management also expended considerable facility time and resources on two facility activities (AMP 3 and ARC) despite input from the NNSA program office that these efforts were of a lower priority. Communications with external stakeholders was a continuing issue. LLNL mismanaged external communications in several instances regarding ICF activities and budgets. LLNL attempted to mitigate some of these issues and improve communication with NNSA by making some mid-year organizational changes, and improvements were noted. Additionally, LLNL made changes to its senior management team (key personnel) as coordinated with NNSA leadership to improve performance in this area.