Department of Energy
National Nuclear Security Administration
Washington DC 20585

November 30, 2017

OFFICE OF THE ADMINISTRATOR

MEMORANDUM FOR PETER D. RODRIK
MANAGER
LIVERMORE FIELD OFFICE

FROM: WILLIAM I. WHITE [redacted]
ASSOCIATE PRINCIPAL DEPUTY ADMINISTRATOR

SUBJECT: Lawrence Livermore National Security, LLC, DE-AC52-07NA27344
Fiscal Year 2017 Award Fee Determination

The National Nuclear Security Administration (NNSA) has completed its assessment of Lawrence Livermore National Security, LLC's (LLNS) performance of the contract requirements for the period of October 1, 2016 through September 30, 2017, as evaluated against the Goals defined in the Performance Evaluation and Measurement Plan (PEMP). Based on assessments provided in the NNSA Performance Evaluation Report, award fee amounts are as follows:

	At Risk %	Available	Final	Percent	Award Term
Goal 1: Manage the Nuclear Weapons Mission	35%	$8,844,548	$8,048,539	91%	Met
Goal 2: Reduce Global Security Threats Mission	15%	$3,790,520	$3,600,994	95%	Met
Goal 3: DOE & Strategic Partnership Project Mission Objectives	5%	$1,263,507	$1,149,791	91%	Met
Goal 4: Science, Technology & Engineering (ST&E)	10%	$2,527,014	$2,400,663	95%	Met
Goal 5: Operations & Infrastructure	25%	$6,317,534*	$5,338,404*	85%	Met
Goal 6: Leadership	10%	$2,527,014	$2,274,313	90%	Met
Total		$25,270,137	$22,812,704	90%	

In addition, the fixed fee and total fee summaries are provided below for your information:

Fixed Fee	$10,830,058	$10,830,058
SPP (Fixed Fee)	$6,587,000	$6,587,000
Total Fixed Fee	$17,417,058	$17,417,058
Total Summary	**$42,687,195**	**$40,229,762**

*Amount includes $90,000 available fee for Key Outcome 5.6 for EEDS Project and $45,000 earned fee based on a rating of Satisfactory.

National Nuclear Security Administration

Lawrence Livermore National Security, LLC

Performance Evaluation Report (PER)

NNSA Livermore Field Office

Performance Period:
October 1, 2016 – September 30, 2017

November 8, 2017

Executive Summary

This Performance Evaluation Report (PER) provides the National Nuclear Security Administration (NNSA) assessment of Lawrence Livermore National Security, LLC's (LLNS') performance of the contract requirements for the period of October 1, 2016 through September 30, 2017, as evaluated against the Goals defined in the Performance Evaluation and Measurement Plan (PEMP). The NNSA took into consideration all input provided (e.g. Contractor Assurance System (CAS), Program Reviews, etc.) from NNSA Program and Functional Offices both at Headquarters and in the field. NNSA also considered LLNL's self-assessment, which was provided per the terms and conditions of this contract, and is generally in agreement with the information provided in that assessment. Performance against the Goals summarized below, resulted in an overall rating of Very Good for Lawrence Livermore National Laboratory. Specific observations for each Goal are provided in the following pages.

LLNL earned Excellent ratings on Goals 1 – 4, exceeding expectations on nearly all Objectives and Key Outcomes. It continued to successfully deliver on our nation's challenging stockpile requirements and lead the Weapons Laboratories in strengthening the underpinning and future of stockpile stewardship. LLNL also continued to successfully deliver at a very high level across the balance of the NNSA mission portfolio including Non-Proliferation, Emergency Management, Incident Response, and Nuclear Counterterrorism while effectively supporting DOE and Strategic Partnership Project (SPP) programs. The National Security missions were successfully executed by leveraging and advancing the frontiers of Science, Technology, and Engineering (STE). LLNL earned Very Good ratings on Goals 5 and 6 by exceeding expectations on many Objectives and Key Outcomes with relatively few issues. LLNL leadership implemented effective corrective actions in response to issues identified in FY 2016 with improvements in Operations noted.

Goal-1: Manage the Nuclear Weapons Mission — Fee Allocation: 35%

LLNL earned a rating of Excellent and an award fee of 91% under this Goal. LLNL exceeded expectations on nearly all Objectives and Key Outcomes and met or exceeded the overall cost, schedule, and technical performance requirements on Nuclear Weapons Mission work. A summary of LLNL's accomplishments is set forth below.

LLNL met or exceeded requirements on the four LLNL systems (W80, B83, W84, and W87) and one LANL system (W78 flight testing), successfully staffing workloads. For Quality and Nuclear Enterprise Assurance, LLNL reviewed and provided recommendations to improve to Weapon Quality Policy (marking and stamping), which are expected to result in schedule and cost efficiencies for the Nuclear Security Enterprise (NSE). LLNL also provided key support in the analysis of data from CoLOSSIS I and qualification and startup of CoLOSSIS II. In Plutonium Sustainment, LLNL provided effective support to a Product Realization Team by releasing both the qualification and certification plans and successfully provided tabulation operational requirements to the Production Agency to complete Pu-238 reclamation and recovery efforts.

LLNL successfully completed the Cycle 22 Annual Assessment Review and made great progress in increasing the robustness of the science and understanding behind the process. A full uncertainty qualification (UQ) analysis was applied to certain aspects of performance for the W80-1 and the W87 for the first time. LLNL successfully met all Independent Nuclear Weapons Assessment Process (INWAP)

requirements, submitted its assessment report on the four LANL systems, and concluded with LLNL Independent Nuclear Weapon Assessment Team (INWAT) presentations to WCI, the Red Team, and to LANL Director.

LLNL completed all surveillance activities on the B83 and W80 ahead of schedule and successfully completed surveillance on three years' backlog of detonators, bringing the program back on schedule. LLNL displayed effective leadership in managing engineering work at the Production Agencies (PA) with its components and successfully led the 50+10 project by negotiating requirements as delays were encountered at Y12. LLNL provided high quality support for all readiness activities for the W80 ALT 369 startup project and during ALT 369 First Production Unit (FPU) build to support the objective of completing the FPU ahead of baseline schedule. LLNL initiated efforts to design a mock Nuclear Explosive Package (NEP) that will provide provisioning relief for a critically important Joint Test Assembly (JTA) component. LLNL provided effective support for LLNL Independent Diagnostics Scoring System (LIDSS), Component Disposition program, and the Warhead Measurement Campaign.

LLNL demonstrated multiple lower-energy shots NIF, which paved the path to full NIF operation at a higher energy level. LLNL generated the highest fusion yield-to-date on the NIF. LLNL also demonstrated a new diagnostic capability to obtain the highest quality radiographs to date. LLNL successfully executed the second high-Z strength shot and showed significant progress in high-Z diffraction phase experiments. LLNL executed 408 shots over broad areas of science, HED, ICF, and national security.

LLNL successfully demonstrated the feasibility of incorporating new additively manufactured (AM) compounds in future LEPs. LLNL successfully captured two images from an exploding detonator using the Flash X-Ray (FXR) double pulsing at Site 300. These results supported the Sierra Nevada experiment series. LLNL successfully completed the first ever sound speed measurements at the Joint Actinide Shock Physics Experimental Research Facility (JASPER). Results from NIF and JASPER were used to validate Pu equation-of-state (EOS) and aging models. LLNL also successfully completed the Safety Level 1 milestone.

LLNL made significant progress in Advanced Simulation and Computing (ASC) Computational capabilities, with construction underway to prepare for the installation of the Sierra computing system in support of the goal of 25% of installation of Sierra by the end of CY 2017. The LLNL ASC code teams achieved substantial simulation speedups in an Early Assessment (EA) version of the Sierra machine. The CD-0 for the Exascale Computing Facility Modernization line item was approved in December and authorized by NA-1 in April. The LLNL ASC Verification and Validation (V&V) Team was awarded an R&D 100 award for Carbon Capture Simulation Initiative.

LLNL continued to make advances in Advanced Manufacturing (AM) Development, manufacturing a polymer component for potential insertion in the W80-4 LEP, addressing challenges associated with qualifying and certifying the AM process and AM'ed components, and in and the components manufactured via that process. LLNL made significant progress in synthesizing and formulating insensitive high explosives to leverage for the W80-4 LEP.

LLNL made great progress in achieving all W80-4 program requirements, goals, and objectives through high quality research, development and engineering effort. LLNL successfully met milestones by participating in the Integrated Phase Gate (IPG) Implementation Plan (IP) and providing the required gate package body evidence and presentation for the W80-4 6.2 Requirements Gate and Feasibility Gate. LLNL successfully performed its role as the Independent Peer Reviewer for all nuclear component Final Design Reviews executed during the year.

Goal-2: Reduce Nuclear Security Threats — Fee Allocation: *15%*

LLNL earned a rating of Excellent and an award fee of 95% under this Goal, exceeding expectations on nearly all Objectives and Key Outcomes for global nuclear security mission work, including Non-Proliferation, Emergency Operations, and Counterterrorism. A summary of LLNL's accomplishments is set forth below.

LLNL led the development of programmatic guidelines for International Nuclear Security (NA-211) and served as the lead for International Nuclear Forensics work, including the development of a tiered framework for engagements and 20 training classes during the year. LLNL led several aspects of work in nuclear explosion monitoring, including the experimental fielding and high explosive operations of the final Phase 1 Source Physics Experiment (SPE) conducted at NNSS. LLNL led the Source venture for the Low Yield Nuclear Monitoring Project (LYNM) and provided high quality results. LLNL oversaw the Helios team that completed a series of ten high explosive tests at the Big Explosives Experimental Facility (BEEF) at the Nevada National Security Site (NNSS) in April and May. LLNL serves as the Venture Manager for Helios, which develops and experimentally validates physics-based models for the optical and RF signatures produced by explosive tests. LLNL led a 5-lab team to plan the development of new data analytics capabilities that will enable continuous monitoring of rapidly growing global data streams to discover indications of nuclear proliferation earlier and on a wider geospatial scale than ever before. LLNL received "A" grades on both the proficiency and biomedical testing for annual Organization for the Prohibition of Chemical Weapons (OPCW) laboratory certification. LLNL provided technical reviews and end user reviews to support nuclear export controls, including exceptional support to a special interagency project that required considerable work (over 1000 end user reviews) in a short period of time.

LLNL exceeded expectations by increasing the resident staffing of nuclear weapon designers that participate in the nuclear Counterterrorism and Counter Proliferation programs by 50%. LLNL continued to modernize and support emergency responder training of its software and simulation system, which is used to support several large national interagency exercises. NARAC also helped enable NNSA's international outreach with the International Exchange Program (IXP) for use by IAEA Member States and by direct support and participation in international nuclear security exchanges, e.g., the 2017 US-Japan Emergency Management Working Group.

LLNL provided exemplary leadership in Standoff Disablement efforts, including an initial drafting of an engagement strategy that highlights specific NNSA accomplishments and the need for continued execution of this capability. In addition, LLNL executed a three-week experimental campaign at Site 300 to collect additional data to help validate current modeling and simulation efforts. LLNL conducted a major hydro-test at NTS to quantify threats from Improvised Nuclear Devices (IND's) and to determine defeat strategies, a culmination of three years of detailed calculations and planning.

LLNL is working with other NNSA design agency laboratories on a draft process to resolve data access issues in the Warhead Measurement campaign for INL, PNNL, ORNL and other non-NNSA labs. The process should be fully resolved and implemented in the first quarter of FY 2018, in time to fully meet all deliverables.

Goal-3: DOE and Strategic Partnership Project Mission Objectives — Fee Allocation: *5%*

LLNL earned a rating of Excellent and an award fee of 91% under this Goal, exceeding expectations on nearly all Objectives and Key Outcomes. LLNL successfully executed high-impact work for DOE and Strategic Partnership Projects (SPP) mission objectives safely and securely, demonstrating the value of the work in addressing the strategic national security needs of the U.S. Government. DOE and SPP projects leveraged LLNL's unique capabilities, including basic and applied research and development (R&D), to sustain and strengthen science and engineering core competencies and develop essential workforce skills. LLNL earned numerous prestigious awards from U.S. Government sponsors, which demonstrated the quality of this work and its strategic value. A summary of LLNL's accomplishments is set forth below.

LLNL achieved significant advancement in grid modernization through successful simulation of cyberattack on the electric grid and prediction of impacts as part of California Energy Systems for the 21st Century (CES-21) project to improve security of the grid. LLNL successfully conducted multi-agency tabletop exercise in New York City subways and the San Francisco Bay Area Rapid Transit system in support of the Underground Transportation Restoration (UTR) project to develop national threat level guidance for subway systems. LLNL also formed a new national level partnership named Accelerating Therapies for Opportunities in Medicine (ATOM) with pharma giant GSK and the National Institutes of Health/National Cancer Institute (NIH/NCI) to apply LLNL's high-performance computational models to huge data sets as a framework in pioneering applications of deep learning for drug research and discovery.

Goal-4: Science, Technology, and Engineering (ST&E) — Fee Allocation: *10%*

LLNL earned a rating of Excellent and an award fee of 95% under this Goal, exceeding expectations on nearly all Objectives and Key Outcomes, LLNL successfully advanced national security missions, frontiers of ST&E, and effectively managed Laboratory Directed Research and Development (LDRD) and Technology Transfer programs. LLNL's research strategy and investments, including the LDRD program, has been successful in advancing the frontiers of science, maintaining strong foundational expertise in core competencies, and developed the skills of the workforce. As demonstrated by the accomplishments below, the research at LLNL consistently remained transformative, innovative, of high quality and internationally recognized.

LLNL completed an important milestone on the path to ignition. LLNL designed, built and delivered the world's highest average power petawatt laser system, the High-Repetition-Rate Advanced Petawatt Laser System (HAPLS), to the Extreme Light Infrastructure Beamlines (ELI-Beamlines) Project in the Czech Republic. ELI Beamlines will make HAPLS available in late 2018 to the international scientific user community for a broad range of research. LLNL developed a comprehensive suite of new additive manufacturing (AM) technologies for a wide range of materials across a broad spectrum of utilizations. These AM technologies revolutionize materials synthesis and fabrication capabilities with applications directly relevant to LLNL missions. LLNL also developed bioengineering technology to replicate human heart tissue on a chip. The technology could speed up the new drug screening process and ensure that potentially lifesaving drugs are safe and effective while reducing human and animal testing. The accomplishments in ST&E earned LLNL numerous awards including prestigious Presidential Early Career

Awards for Scientists and Engineers, NNSA Administrator's Distinguished Service Gold Award for outstanding leadership and broad contributions to nuclear security, and R&D 100 awards.

Goal-5: Operations and Infrastructure — Fee Allocation: *25%*

LLNL earned a rating of Very Good and an award fee of 85% under this goal. LLNL demonstrated improvements in operations and infrastructure and exceeded expectations on many Objectives and Key Outcomes with few issues. LLNL maintained highly effective environment, safety and health (ES&H) programs and achieved an excellent safety record. LLNL served as a leader in enterprise infrastructure initiatives and successfully performed several major acquisitions on behalf of DOE/NNSA in support of critical programs. LLNL exceeded expectations in security by successfully implementing many corrective actions in response to security incidents experienced in FY 2016 and demonstrated improved security performance. While LLNL generally exceeded expectations in operations and infrastructure, there were challenges in conduct of operations for mechanical utility system maintenance and operations.

LLNL continued to excel in managing its ES&H programs, with injury and illness rates remaining at or near historic lows. LLNL improvements to its workers health program included implementing a new OSHA-required silica medical surveillance exam for affected employees and successfully establishing a pilot program for foreign travel health advisory and protection services, which earned an Energy Facility Contractors Group (EFCOG) leadership award. LLNL's accomplishments in Environmental Protection resulted in a new permit that will result in significantly reduced groundwater monitoring and lower costs. LLNL developed a new explosives training program at Texas A&M for use by NNSA to proactively meet the demands of the national explosives safety community.

LLNL continued to promote its Security Culture Campaign aimed at engaging and educating employees on security importance and security responsibilities, which contributed to heightened security awareness and a slight reduction in the number of serious security incidents (Category A) compared to FY 2016. LLNL successfully developed a multi-year Design Basis Threat (DBT) Implementation Timeline and Work Breakdown Structure, which is being utilized to effectively update and fully implement the DBT.

LLNL provided excellent criticality safety support, completing the first in a series of critical measurements for the DOE Nuclear Criticality Safety Program as well as Criticality Safety Statements for the W80 and B83 systems. LLNL also improved its Nuclear Maintenance Management Program, including vital safety systems critical spare parts and a new post-maintenance testing guidance document.

LLNL awarded several large, innovative, and multi-year contracts on behalf of the DOE complex and NNSA enterprise in support of the Exascale high performance computing (HPC) project (6 awards exceeding $265M) and NNSA's Cooling and Heating Asset Management Program ($75M). These and other large enterprise procurements in HPC awarded to large businesses contributed to LLNL not meeting its established overall small business goal (41% vs. 52%), although it is noted that LLNL's small business performance exceeded its forecast (38%). LLNL's office of General Counsel displayed consistent sound judgment and case management practices while faced with a wide range of challenging matters including procedurally complex patent litigation, and Davis/Bacon Act claims for underpaid wages.

LLNL served as a model for the complex with its contributions to the NNSA Master Asset Deep Dive, BUILDER initiative, and execution of CHAMP. LLNL was awarded the NNSA Excellence Award for the

Functionality Module and set the highest standard of any NNSA Site for meeting NA-50's FY 2017 "Make it Happen List" by successfully incorporating the BUILDER data directly into the LLNL Deep Dive. LLNL exceeded expectations on the Exascale Computing Facility Modernization (ECFM) project by completing CD-0 approval, Analysis of Alternatives, Conceptual Design, Independent Project Review (IPR), and an Independent Cost Review (ICR) on an accelerated pace. LLNL's total deferred maintenance continued its downward trend and ended the year at $14M less than FY 2016. Under sustainability, LLNL's Electric Vehicle Initiative will be the largest implementation within DOE.

LLNL is developing a comprehensive corrective action plan to resolve conduct of operations for mechanical utility system issues and leadership attention is required in FY 2018 to ensure the plan is adequate, resourced, and effectively implemented.

LLNL earned a rating of Satisfactory and an award fee of 50% for the Expand Electrical Distribution System (EEDS) Line Item Key Outcome. The EEDS project team completed an Independent Cost Review and Independent Project Review (IPR), published a Request for Proposal, evaluated bids, and prepared for CD-2/3 approval. However, in March 2017, the IPR committee concluded that the EEDS project had not made sufficient progress and that a focused effort was required to understand current Departmental requirements in order to achieve CD-2/3. In addition, LLNL had an Other Project Cost (OPC) overrun in March 2017, which has been resolved.

Goal-6: Leadership — Fee Allocation: *10*%

LLNL earned a rating of Very Good and an award fee of 90% under this goal. LLNL exceeded expectations on many Objectives and Key Outcomes. Leadership effectively supported the direction of the DOE/NNSA mission, improved the safety and security culture, responded to issues and opportunities for continuous improvement internally and across the Enterprise, and provided parent company involvement/commitment. However, while LLNL leadership response to security issues was timely and effective, it was slow to react to LFO concerns over fire protection services.

LLNL demonstrated strategic leadership through its participation and key role in numerous enterprise initiatives, councils, working groups, and collaborations that addressed issues and led to performance improvements. The LLNL Director served as the Chairman of the National Laboratory Directors Council and is currently the Director of the Exascale Board of Directors. High performance computing is integral to accomplishing DOE/NNSA missions and plays a key role in NNSA's Stockpile Stewardship Program. LLNL is a leader in defining the pathway to Exascale computing with responsibilities for CORAL, Sierra, PathForward, and the National Strategic Computing Initiative (NSCI). LLNL developed a Strategic Plan that is aligned with DOE/NNSA missions and the LLNL Director presented the plan to NNSA leadership in June 2017. LLNL is fully engaged with NNSA and DOD on the changing deterrence environment, need for the long-range standoff (LRSO) weapon, and national security responses in multi-domains.

LLNL continued to improve its assurance system by better defining risks, establishing joint assessments with LFO, and enhancing its focus on potential issues. In response to a number of high visibility security incidents experienced in FY 2016, LLNL leadership aggressively implemented corrective actions and actively promoted security awareness activities across the Laboratory to improve its security culture.

While LLNL was able to extend the existing fire department contract with no service interruption, poor planning and coordination have delayed a long-term solution. The Director's Office is now fully engaged and is developing a long-term plan.