

**Fiscal Year 2006
Annual Performance
Evaluation and Appraisal**

Lawrence Livermore National Laboratory


Prepared by:

**Livermore Site Office
National Nuclear Security Administration
Revision 1
January 19, 2007**

CONTRACTING OFFICER'S EVALUATION

The National Nuclear Security Administration, Livermore Site Office Manager reviewed and discussed the recommendations of functional managers and staff concerning the appropriate adjectival ratings with which to rate the University of California's performance in the management and operation of the Lawrence Livermore National Laboratory. Based upon this process, an adjectival rating of "**Outstanding**" is earned for Mission, and a "**Good**" is earned for Operations. This report, the "Fiscal Year 2006 Annual Performance Evaluation and Appraisal - Lawrence Livermore National Laboratory" provides the basis for my determination, and is hereby endorsed and approved.

Approval:



for Camille Yuan-Soo Hoo
Manager
Livermore Site Office

Date: 12/21/06

FY 2006 Annual Performance Evaluation and Appraisal
for
Lawrence Livermore National Laboratory

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Introduction

This report was produced by the U. S. Department of Energy (DOE) National Nuclear Security Administration (NNSA), Livermore Site Office (LSO) to provide the Contracting Officer's written assessment of the Contractor's performance at the Lawrence Livermore National Laboratory (LLNL) under contract W-7405-ENG-48, Appendix F. Contract Appendix F defines the Objective Standards of Performance agreed to by DOE/NNSA and the University of California (Contractor or UC) to annually measure the Contractor's overall performance of its Science and Technology (S&T) Mission and its Operations. UC is eligible to earn program performance fee based on the Objective Standards of Performance listed in Appendix F of the contract.

There may be programs, systems, compliance requirements or observations not covered by Appendix F presented in this report. These additional observations are limited to items of performance that require the attention of the Laboratory Director, but are not effectively covered by Appendix F performance measures. Although these items are included in this report, they do not contribute to the basis for the overall rating of Contractor performance under Appendix F.

Evaluation Process

The Contractor and NNSA have agreed to use a performance-based management system for Laboratory oversight as part of the contract. These standards are used for the appraisal and evaluation of work under this contract. The primary objective of this report is to provide a summary of the annual Contracting Officer's written assessment of the Contractor's performance and the amount of earned Program Performance Fee as specified in contract clause H.007 and H.014, respectively. The parties agree that the purpose of the Appendix F is to focus on strategic and mission-critical activities (i.e., the "critical few") and to appraise the Contractor's systems and outcomes in terms of:

- Are they producing appropriate national security, science and technology results? and
- Are they producing these results efficiently, safely and securely?

The Contractor will provide an annual Contractor's Evaluation Report assessing their performance. An annual Performance Evaluation Report prepared by the Site Office Manager will provide an evaluation of the Contractor's performance during the Appendix F appraisal period. DOE/NNSA will use the Contractor's Evaluation Report as the primary basis for the annual appraisal of Contractor performance, recognizing that DOE/NNSA will take into account other pertinent information, including that performance against each Strategic Performance Objective is subject to timely availability of adequate funding, as well as operational oversight, internal and external program reviews and audits, consistent with the intent of this Contract, in determining the annual appraisal for performance.

The validation effort is conducted by teams responsible for the various Performance Objectives and Measures represented in Appendix F. These teams, with guidance from LSO management, are responsible for developing an adequate, independent basis for assessing the quality,

credibility, and accuracy of the Contractor's self-assessment. These evaluations are used as a basis for the Contracting Officer's evaluation of the Contractor's performance.

Performance Period

Designed to capture performance for Fiscal Year 2006, the self-assessment period for the Laboratory is October 1, 2005 through September 30, 2006, unless specified in the Performance Objective. Significant performance data addressing fiscal year end data and information is to be assessed by the Laboratory and provided as a supplement to the self-assessment. The Contractor provided the self-assessment of LLNL, supplemental information and proposed rating to LSO in October, 2006.

Overall Appraisal Results

This is the fourth annual contract performance assessment under the restructured Appendix F process. The Livermore Site Office (LSO) has worked closely with NNSA Headquarters, the Lawrence Livermore National Laboratory and the University of California (UC), Office of the President, to develop, negotiate and implement what we believe to be an improved contract assessment tool that focuses on completing the NNSA mission as defined in the NNSA Strategic Plan while allowing the contractor flexibility in determining how the work will be accomplished.

In assessing the performance of Lawrence Livermore National Laboratory (LLNL), the LSO considered, but was not limited to LLNL self-assessment, LSO reviews, external reviews and audits, NNSA HQ input and LSO daily operational oversight. Based upon these activities, LLNL has earned an **Outstanding** rating in Mission and a **Good** rating in Operations.

These ratings are supported by the following examples with the detailed LSO rating sheets attached.

Mission

Performance Objective 1: Warhead Certification

Major progress was made this year both in the development of Quantification of Margins and Uncertainties (QMU) as a scientifically rigorous methodology for addressing key issues in nuclear weapon assessment and certification and in developing a common approach to QMU with Los Alamos National Laboratory. LLNL continued to employ the QMU methodology for assessment and certification in major warhead activities, including the warheads for which LLNL has assessment responsibilities (W62, W80-mod0/1, B83, W84, W87), ongoing life extension programs (W80-LEP), and peer review activities (B61 LEP, W76 LEP, W88). In addition, the QMU methodology was applied to Reliable Replacement Warhead (RRW) design study activities. Recent QMU workshops have aided in guiding the laboratories to a common and consistent language for QMU. The annual assessment process was on schedule and meeting Congressional requirements as well as NNSA direction.

Additional “worked examples” are needed to advance detailed implementation of QMU. In addition, identifying scientifically rigorous and computationally efficient methods for combining and propagating important sensitivities and uncertainties represents an ongoing technical challenge.

Performance Objective 2: Stewardship

The Laboratory made major advancements in developing and implementing long-term, balanced, integrated stewardship. Seven full-scale Integrated Weapon Experiments and 21 focused hydrotests were conducted on LLNL systems with LLNL conducting one such experiment on a LANL system. The Laboratory executed 8 Joint Actinide Shock Physics Experimental Research (JASPER) and 2 Phoenix experiments at NTS. The Laboratory updated pit lifetime assessments for the LLNL stockpile warheads, a Level One milestone. In addition, LLNL completed a design data package for the RRW Feasibility Study. Exploiting its high performance computing

capability, the Laboratory executed the first large 2D/3D calculations on ASC Purple, providing new insight into burn physics. In addition, an LLNL scientist received the 2005 Gordon-Bell prize for 100 TFlop quantum-based molecular dynamic simulations of rapid re-solidification in a 500 million-atom tantalum sample. LLNL has done an outstanding job in the area of High Energy Density Physics (HEDP), meeting all of its Level 2 and lower milestones. National Ignition Campaign (NIC) accomplishments included significant progress on establishing the NIC cost and schedule baseline, the FY10 ignition target point design, the integrated experimental plan, target (capsule and hohlraum) fabrication, and advanced diagnostic development. LLNL has demonstrated significant improvement in its working relationship with and support to Pantex, particularly in the area of resolution of issues associated with the authorization of multi-unit operations at Pantex.

Diamond Anvil Cell (DAC) experiments for static Pu Equation of State (EOS) data to validate next-generation theory were behind schedule due to a delay in restart of the facility, for loading DAC with SNM, and the need to rework the security plan at Argonne. Development of a coordinated and integrated joint-Science Campaign and Advanced Simulation and Computing roadmap were not yet complete. Due to shortfalls in out-year funding, the availability of High-Energy-Density Physics (HEDP) facilities, including Omega and Z, to conduct stewardship relevant HEDP experiments that are necessary pre-cursors to planned NIF campaigns may be delayed.

Performance Objective 3: Near-Term Weapons Program

Directed Stockpile Work (DSW) effort included weapon maintenance, comprehensive surveillance, assessment and certification, supporting research and development, and scheduled weapon refurbishments. It also includes other stockpile commitments, such as dismantlement. Pit surveillance and die cast development resumed at B332. The Laboratory participated in development of the Surveillance Transformation Plan to improve the technical basis and cost-effectiveness of the surveillance program. LLNL began the W80 LEP full engineering test, and completed FSET-Q2, FTU-1 and DJTA-1 flight tests, and fired two large scale W80 hydro tests at Site 300. W88 Certification support included performing criticality assessment of Unicorn, plutonium machining and materials characterization, fabricating and firing JASPER shot, and completing environmental testing and radiography of W88 qualification pits. LLNL successfully supported detonator production, detonator surveillance and pit surveillance engineering evaluation activities. The Laboratory completed SS21 activities for the W87, B83, and W80 per the rebaselined schedule, with all ongoing tasks remaining on schedule. Finally, Product Realization Teams for all weapons program activities were fully supported to meet requirements of QC-1 Technical Business Practices (TBP), with Configuration Management of all weapons programs implemented, and LLNL currently has no high-priority Significant Finding Investigations (SFI).

B332 resumed all operations supporting pit surveillance: completed all operations on B83, most of the surveillance on the W87, and limited the W80 to non-destructive evaluations. Delays were due in part to the stand-down of B332. In addition, resolution of the W80 IHE Test SFI is important for the W80-0/1 program. The B332 stand-down affected schedule of hot plutonium operation testing of equipment related to prototype modern pit foundry and pit surveillance, but recovery efforts were successful. Finally, a lack of priority and AB issues at Pantex resulted in

postponement of computed tomography and disassembly and inspection of 3 backlogged B83 high fidelity Joint Test Assemblies (JTA).

Performance Objective 4: Nuclear Nonproliferation

The Laboratory made important, and in some cases critical, contributions to U.S. nonproliferation and counterterrorism objectives and to sponsor missions and programs. These accomplishments span the full range of LLNL nonproliferation and counterterrorism activities, which are executed in an integrated program for multiple sponsors (DOE, NNSA, DHS, and DOD). Of particular note, the Laboratory received four 2006 R&D 100 Awards for nonproliferation- and counterterrorism-related technologies: Sonoma persistent surveillance system, UltraSpec ultrahigh-resolution gamma and neutron spectrometer, E.L.I.T.E. explosives detection test, and Sapphire scientific data-mining software. In addition, recognition as one of U.S. Army's "Ten Greatest Inventions" for 2005 was awarded to an LLNL-Army-Air Force-industry team for the development and deployment of the Persistent Threat Detection System. Other LLNL technologies (e.g., hyperspectral imaging spectrometer, antineutrino detector, Autonomous Pathogen Detection System, BioBriefcase, multiplex bioassays) were successfully demonstrated in challenging real-world environments. The Laboratory achieved successful MPC&A activities in Russia involving the Kola Technical Center, Ministry of Defense, Kurchatov Institute, and the Federal Nuclear Center. LLNL also demonstrated success in extending MPC&A interactions to China. The Laboratory had a lead role in the initiation of the Air Cargo Explosives Detection Pilot Program at San Francisco International Airport. Further, Laboratory-developed analysis and modeling tools for counterproliferation, military tactical planning and rehearsal, military force protection, civil emergency response planning, and critical infrastructure assessment achieved widespread user application. LLNL also continued to support national nuclear incident response programs with Home Team operations and deployment of subject matter experts and equipment for real-world events and numerous exercises and drills. In addition, LLNL provided subject matter expertise with regard to U.S.-India nuclear policy and Iranian uranium enrichment activities and completed more than 60 in-depth technical analyses on specific topics related to WMD proliferation and terrorism.

Performance Objective 5: Science, Engineering, and Technology Base

LDRD and other institutional investments continued to produce prize-winning scientific accomplishments, resulting in high profile publications, and established advanced institutional research capabilities including the short-pulse Titan laser that was added to the Jupiter facility and state-of-the-art ultra-high resolution transmission electron microscopes. LLNL awards and recognition of S&T achievements included a Gordon Bell Award, the DOE Gold Award, seven R&D 100 awards, and numerous newly elected fellows of prestigious professional societies. Laboratory efforts also resulted in recognition as one of the Army's Greatest Inventions for 2005 for Development and Deployment of Persistent Threat Detection System. Greatly enhanced High Performance Computing (HPC) capabilities came online in FY06, with the ASC Purple machine and the world's fastest computer, BlueGene/L. New strategic partnerships with academia and other national laboratories were formed in FY 2006, including efforts in high performance computing, nanoscience, and adaptive optics. For FY 2006, the Directorates' Review Committees (DRCs) and the DRC Chair's Panel noted overall high quality of the basic scientific advances and the cutting edge technology developed by LLNL scientists and engineers in support of the DOE mission and in anticipating future needs.

LLNL needs to outline what is the right amount of basic biological scientific research, applied R&D and what part is biosecurity. LSO believes that the biological perspective needs to be addressed since the bioscience directorate and chemistry and material science directorate have been combined under the reorganization. LLNL efforts are needed to bridge biodefense, chemistry and other related DHS projects and work for NIH/NCI, DoD, and UC Davis.

Performance Objective 6: Facilities and Infrastructure

LLNL achievements included successful accomplishment of NIF Experimental Support Technologies Program activities, including NIF Cryogenic Target Systems, the National NIF Diagnostic Program, User Optics, and Personnel and Environmental Protection Systems. The NIF Project made excellent progress on production of optics and Line Replaceable Units (LRUs). Additional LRUs are being installed including operationally qualifying a second bundle of 8 beams. Operations of the Terascale Simulation Facility (TSF) began nine months ahead of schedule. In addition, the UC/LLNL Earned Value Management System (EVMS) was certified by DOE. Full programmatic operation was restored in Building 332. Additionally, Five FIRP projects were started in FY06 including recapitalization, disposition and planning efforts. Readiness in Technical Base and Facilities availability was greater than 90%. Seventy-four DOE standard 3013 cans created for long-term storage and off-site shipment. The Laboratory established clearly defined roles & responsibilities for programmatic activities at the Nevada Test Site (NTS) and provided outstanding support on DNFSB letter pertaining to Device Assembly Facility (DAF) leaks & cracks issue. Finally, LLNL processed and packaged all excess HEU for future shipments to the Savannah River Site once an agreement is reached with officials in South Carolina.

The Contractor has demonstrated a need for improvement with regards to compliance with Contract 48 provisions which govern the Livermore Site Office (LSO) approval for General Plant and Operating Funded construction projects that are estimated to cost between \$500,000 and \$5,000,000. For example, in late FY 2005, LLNL Safeguards and Security Division personnel and Building 332 Programmatic staffs purchased long lead procurement items costing approximately \$530,000 using expense funds. Construction of site related modifications and installation of the long lead procurement items cost an additional \$510,000 in expense dollars for a total of \$1,040,000, all without LSO approval. With large dollar value Line Item construction projects diminishing and the number of smaller projects increasing, this issue will require attention.

Operations

Performance Objective 7: Recruitment and Retention

The Laboratory established a Workforce Executive Council chartered to address workforce restructuring, recruiting and succession management. Thirty percent of graduates of the directorate leadership development program assumed higher-level responsibilities. In addition forty five percent of Leadership and Management Development Program alumni in the last 3 years were females, and 23 percent were minorities. In order to effectively manage the contract transition, senior managers identified critical areas of focus for the most senior leadership

succession pool, created a change management plan for transition, and established a LLNL Contract Process Website as well as a monthly transition newsletter and a Director's Column. A Diversity Strategic Plan was also developed, and the continued partnership with the Museum of Tolerance is one of the highlights of the LLNL diversity strategic planning process. Finally, the Laboratory exceeded DP's FTE Reduction Guidance.

Performance Objective 8: Safe, Secure, Environmentally Sound, Effective, and Efficient Operations

Integrated Safety Management System

The Laboratory conducted an assessment on ISMS implementation at the work activity level (ISM Certification) involving line managers in active participation and with each associate director certifying ISMS implementation and areas for improvement. It also implemented a new Web-based Case Analysis Report (Injury-Illness reporting). Additionally, LLNL developed an "Assurance System Implementation Plan," to reflect the Laboratory's implementation of the current assurance system and its planned evolution at the Laboratory to an improved system that meets the 17 attributes of the Contractor Assurance System (CAS) draft National Nuclear Security Administration (NNSA) policy. Improvements in the PAAA program included improvements in Noncompliance Tracking System reporting, timely completion of corrective actions, and timely updating of the database.

In order to ensure a more robust and comprehensive ES&H self-assessment program, LLNL needs to ensure that assessment results are consistently and effectively being used as part of its feedback and improvement process across Laboratory organizations.

System Engineer, Emergency Management, Configuration Management

The system engineer gap analysis against DOE O 420.1A, Facility Safety was completed and an implementation plan developed. All deliverables stipulated in the LSO-approved Emergency Readiness Assurance Plan were of acceptable quality and were received on or ahead of schedule. In addition, LLNL has begun to make progress in the implementation of configuration management institutionally.

In order to continue this progress, laboratory management needs to continue its focus on Configuration Management.

Nuclear Safety

Corrective actions on B332 deficiencies identified in OA-40 inspection were completed. The Laboratory received approval for resumption of full SAR authorized operations in B332. The Laboratory also received approval of the B332 Rule compliant DSA and TSRs. In addition, three criticality safety self-assessments were conducted.

The Laboratory needs to improve its timeliness in resolving LSO comments on the annual update to the B239 Documented Safety Analysis (DSA) and Technical Safety Requirements (TSR). Continued Management attention is needed on USQD quality, as LSO has noted examples where the contractor inappropriately used new information, outside the safety basis, to arrive at a negative USQD, with LSO reevaluations resulting in positive USQDs. In addition, for a number

of positive USQDs, the contractor did not submit the required safety basis amendments and the Nevada Site Office assessment identified seven findings associated with the WSQ implementation process. LLNL has not submitted an implementation plan for implementing the full requirements of Software Quality Assurance as directed. The Laboratory's radiation protection corrective action and issues management processes need to be improved, as there is a lack of formality and rigor in the implementation of the program and adherence to policies and procedures. Finally, although the recently performed readiness assessments were marginally adequate, LLNL has made improvements in their readiness review process. LLNL recently approved a comprehensive rewrite of their ES&H Manual for Start-Up Restart Activities which is now based clearly on the requirements of DOE O 425.1C and provides clear expectations for when a readiness assessment is needed and how one is performed. Additionally, LLNL senior management and key personnel participated in the NNSA Readiness Review Training course. LLNL has worked with both LSO and CDNS to refine the Startup Notification Report to ensure that early planning and notification is provided and that clear defensible justification is given for selection of level of readiness and authorization authority.

Environmental Management

The Laboratory disposed of 1,421 m³ of mixed and low level wastes, 291 m³ above Forecast. LLNL completed the legacy waste project within budget, disposing of 64 cubic meters of legacy waste by November 2005 and bringing the total of legacy waste disposition from FY03-FY06 to 2,072.4 cubic meters. The Laboratory also completed self-declaration process for the ISO 14001 Environmental Management System.

Cost savings and efficiencies must be identified in order that all regulatory commitments are met within existing funding profile. Carryover funds necessary for the B850 removal action in FY07 and FY08 are vulnerable to other departmental priorities.

Safeguards and Security

In its Safeguards and Security efforts, the Laboratory completed work to implement the 2003 Design Basis Threat (DBT). SP-40 Special Review of Security and Emergency Management of Chemical and Select Biological Agents found examples of innovative and effective security measures that will be considered in national policy development. The Laboratory experienced a decrease in severity of incidents with high level of self-reporting noted. It also began implementing two factor authentication on LLNL computers which will strengthen LLNL's defense against malicious code vulnerabilities. Finally, the Central Alarm Station (CAS) was singled out for their superior performance during the Shaker 2006 exercise.

LLNL's approved performance assurance plan outlining protection strategy testing and training was not adhered to during FY 2006. LSO noted deficiencies for performance testing and physical training of protective force officers. In addition, the cyber security program was consistently late or non-responsive in completing milestones and deliverables. LSO recognizes the large volume of cyber requests and deliverables, but LLNL has been remiss in responding to these requests and in keeping LSO informed of milestone slippage. See the body of the report for specific details.

Counter Intelligence

The LLNL Counter Intelligence Office set the “Gold Standard” for collections by publishing 154 Intelligence Information Reports, a number several times more than any other single office within the CI enterprise. LLNL also maintained a Suspicious Incident Chart in support of the overall counterterrorism effort at LLNL. LLNL CI Office was selected as the location for a “pilot” project in the area of Software Acquisition Risk Management.

Performance Objective 9: Business Processes and Systems

LLNL implemented the first phase of the indirect rate restructuring, eliminating seven service centers, purifying the General and Administrative pool, and creating an Institutional Facility Charge pool. Exemplary progress was made in the area of the OMB Circular A-123 internal controls. In the area of Property Management, NNSA SC validations confirmed the Laboratory is in compliance with approved Property Management System requirements. Further, LLNL “Best in class” status for inventory continued with 99.96 percent of the attractive property accounted for. The Procurement Department deployed four major LINCS maintenance releases during quarters two and three to implement system enhancements, new functionality and bug fixes. A Litigation Management Plan is in place to ensure the control of costs associated with retaining outside legal counsel, and a lessons-learned process has been created to review recent employment based litigation leading to revisions in our return to work procedures. The Laboratory also improved badge security through employee termination procedures. In the Human Resources area LLNL established a Workforce Executive Council (WEC) to address workforce restructuring, recruiting and succession management. LLNL regularly assesses the readiness of the Workforce using multiple assessment methods. Findings confirm that the Lab has the appropriate skill mix to accomplish its mission, with a strong pipeline to maintain its readiness. In its first full year of operation, Audit Tracking System demonstrated its effectiveness through a significant reduction of Management Corrective Actions. The Laboratory also developed procedures to independently validate completion of corrective actions.

The development and implementation of the replacement (LINCS Subcontract) for the Procurement, Accounting, and Receiving Information System (PARIS) is three years behind schedule. Senior LLNL management has decided to postpone the implementation of new systems, including LINCS Subcontract, until the second quarter of FY2008, after the new contract is awarded. The current PARIS system is obsolete and creates inefficiencies in subcontract reporting and administration. LSO expressed its concerns over these delays in the FY2005 Appendix F Performance Evaluation and again during the FY2006 period.

Performance Objective 10: Community Initiatives

LLNL continued its successful science, technology, engineering, and mathematics (STEM) educational outreach. LLNL and the UC Edward Teller Education Center partnered with San Ramon school district to pilot the Lab’s middle school “CSI” forensic science program. Science on Saturday expanded to two back-to-back lectures each Saturday, resulting in average Saturday attendance of 900, a 33% increase from last year. The Laboratory also sponsored the Tri-Valley Science & Engineering Fair, with 312 students entering 227 projects.

The Laboratory also maintained a strong community outreach program to address potential community issues. For example, the community newsletter, Discover LLNL, was distributed to more than 3,000 residents and organizations. VIP tours were offered to newly-elected officials, as well as the new commander for the U.S. Army's Camp Parks Reserve. The Laboratory also provided environmental restoration tours to the public for its Superfund sites at both the Livermore Site and Site 300. LLNL participated in regional emergency planning and exercises and had numerous Memorandums of Understanding (MOU) with local and regional agencies, and played an integral role in the state's Golden Guardian emergency exercise.

Overall LLNL Rating

Mission		Outstanding
1.	Conduct warhead certification and assessment actions using the Quantification of Margins and Uncertainties (QMU) methodology.	Outstanding
2.	Develop with NNSA and implement long-term, balanced, integrated stewardship.	Outstanding
3.	Develop with NNSA and implement near-term balanced weapon programs that are coordinated with the other NNSA M&O site contractors and DoD customers and that foster complex-wide solutions to meet the needs of the U.S. nuclear deterrent.	Outstanding
4.	Implement an integrated science- and technology-based program aimed at preventing the proliferation or terrorist acquisition of weapons of mass destruction as well as detecting and responding to their deployment or use.	Outstanding
5.	Enhance and nurture a strong science, engineering, and technology base in support of national security strategic objectives.	Outstanding
6.	Optimize current and evolving mission performance by providing effective and efficient facilities and infrastructure.	Outstanding

Operations		Good
7.	Utilize UC strengths to recruit, maintain, and develop the workforce.	Outstanding
8.	Maintain safe, secure, environmentally sound, effective, and efficient operations in support of mission objectives.	Satisfactory
9.	Improve or maintain effective business processes and systems that safeguard public assets and support mission objectives.	Outstanding
10.	Sustain and/or implement effective Community Initiatives.	Outstanding

Detailed Appraisal Results

Mission

Performance Objective 1	Outstanding
Conduct warhead certification and assessment actions using the Quantification of Margins and Uncertainties (QMU) methodology.	

Performance Measure 1.1	Outstanding
Use progress toward quantifying margins and uncertainties, and experience in application to further refine and document a common certification/assessment methodology with Los Alamos National Laboratory.	

In support of this Performance Measure, Lawrence Livermore National Laboratory (LLNL) continued to hold meetings at all levels within its management structure on Quantification of Margins and Uncertainties (QMU) maturation and fully supported the tri-laboratory workshop on QMU held in August 2006 at NNSA HQ. The LLNL technical preparation for the QMU workshop was excellent. LLNL should also be commended for the laboratory's senior level management commitment to support further development and application of QMU methodology. Dr. Crandall applauded both LLNL and Los Alamos National Laboratory (LANL) for obvious collaboration in this area and noted that the message on QMU was more consistent than ever before. Cooperation between the LLNL and LANL continued to be a strength in this area, and the introduction of Sandia National Laboratories (SNL) to the process added value. An area of concentration of future activities should be to focus efforts on establishing the QMU "handbook" described in the QMU workshop and ensure that the QMU process is applied consistently to the annual assessment report and certifications.

Performance Measure 1.2	Outstanding
Demonstrate application of the common certification/assessment methodology, (QMU) in major warhead assessments and the certification of Life Extension Program (LEP) warheads.	

For FY 2006 at LLNL this Performance Measure applies only to the W80 LEP. Under this program LLNL planned to perform both Abnormal Thermal Test -1 (ABN-1) and Abnormal Drop Test - 3 (ABN-3). The analysis is in progress for both tests and should be completed by the end of reporting period. LLNL demonstrated outstanding performance by accomplishing the planned tests and analysis while W80-3 program was being cut funding and shutdown.

Performance Measure 1.3	Outstanding
Complete the annual assessments of the safety, reliability, and performance of all warhead types in the stockpile, including conclusions on whether nuclear testing is required for resolution of any issue, the adequacy of Stockpile Stewardship tools, and other issues as required by law. Support NNSA as required during interagency and community coordination of the Annual Assessment Process.	

This performance measure is an extremely important mission for LLNL in support of Stockpile Stewardship. The annual assessment reporting process and the work that is accomplished to support the completion of that reporting process are key activities under this performance measure. The FY03 National Defense Authorization Act (NDAA) provides the specific guidance for the annual assessment process and the deliverables for LLNL include: providing input to the cycle surveillance report, submitting Annual Assessment Reports (AARs) for each weapon system to the Project Officer Group (POG) and NNSA Headquarters, briefing the Strategic Advisory Group Science and Technology (SAGSAT), and submitting the final reports to the Secretary of Energy for submission to the President. LLNL will submit AARs for the following weapon systems: B83, W62, W80, and W87. For the W84 an AAR was not planned or prepared, only a joint (LLNL and SNL) safety letter was developed and published to report on the safety of the warhead while in the inactive stockpile. LLNL also planned to perform Research & Development (R&D) activities (and others) required for safe nuclear explosive operations, such as multiple unit processing and Electro-Static Discharge (ESD).

LLNL has consistently performed this measure in an outstanding manner each year. LLNL accomplished all assessment activities on time or ahead of schedule and within budget. The SAGSAT briefings were very well presented and DoD provided positive feedback on the briefings. LLNL has led the way by incorporating discussions on the QMU process in the AARs. LLNL took proactive steps to keep NNSA management well informed of the status of the W62 warhead through prompt notification of a Significant Finding Notification (SFN) and a briefing at NNSA HQ. The quality of the R&D activities performed by LLNL in the area of nuclear safety was of the highest standard. Additionally, the results of the R&D activities for multiple unit processing and ESD in support of operations at Pantex was successfully presented to the Defense Nuclear Facilities Safety Board (DNSFB) staff on August 30, 2006.

Issues and Concerns

None

Performance Objective 2	Outstanding
Develop with NNSA and implement long-term, balanced, integrated stewardship.	

Performance Measure 2.1	Outstanding
Support the needs of warhead assessment, certification, and simulation validation by executing a coordinated program of targeted small- and large-scale experiments and mining of archival UGT data to improve predictive capability. In cooperation with LANL, develop and execute a program of hydrotests and subcritical experiments that addresses assessment and certification needs.	

Under this Performance Measure and in cooperation with LANL, LLNL develops and executes National Hydrotest Plan. The hydrotests are performed for model validation and certification, including new results in support of the RRW program. Under the plan, LLNL scheduled a variety of tests including: full-scale Integrated Weapon Experiments (IWEs), a full-scale experiment on a LANL system, and 16 focused experiments. Dynamic Pu experiments at the Joint Actinide Shock Physics Experimental Research (JASPER) facility and static Pu experiments at Diamond Anvil Cell (DAC) facilities are also included under this Performance Measure. The experimental effort (JASPER and DAC), modeling and simulation activities, and re-analysis of nuclear test data were planned to support a revised pit lifetime assessment. Additionally, National Security Technologies (NSTec) assists LLNL and LANL in defining and executing a series of High Explosive Pulse Power (HEPP) experiments and Unicorn experiments fielded at the Nevada Test Site. LLNL's large scale experimental portion of PHOENIX kicked off in FY 2006. The PHOENIX team concentrated on re-configuring the Big Explosives Experiment Facility (BEEF) for HEPP experiments. These changes were validated in a test designated EMPT. This test used the Jill and Booster helical generators manufactured by the Air Force Research Lab (AFRL) and validated the bunker capabilities. EMPT represented a re-focusing of the LLNL - NSTec sub-critical experiment team to supporting HEPP experiments.

LLNL exceeded expectations and conducted exemplary work to develop and execute the National Hydrotest Plan. The plan itself was clear, well formatted and exceeded expectations. LLNL took an aggressive approach to the hydrotest schedule and accomplishment. During the FY 2006, LLNL completed seven full-scale IWEs, one full-scale experiment on a LANL system performed at the Contained Firing Facility (CFF), and 16 focused experiments. Additionally, LLNL's Full Function Test 1 (FFT1) was executed successfully in May 2006, which was the first integrated test of the Jill, Booster, and coaxial generator assemblies. This experiment reached current delivered to the load three times higher than on other facilities in the complex (>60MA) and represented one of the best-diagnosed, pulsed power experiments in recent history. FFT1 validated the LLNL approach to HEPP and prepared PHOENIX for bigger experiments in the future. LLNL successfully completed seven Special Nuclear Material (SNM) experiments at JASPER. Two of these JASPER shots, along with DAC Pu experiments, modeling and simulation activities, and re-analysis of Underground Test (UGT) data, supported LLNL's excellent work to complete a revised assessment of pit lifetimes by weapon system.

Issues and Concerns

Assisting in the process to obtain an authorization basis for experiments conducted at Nevada Test Site (NTS) is the area where the greatest improvement is needed. NSTec intends to increase its presence in this arena by developing a core team of authorization basis experts to assist the Nevada Site Office (NSO) and the national laboratories in developing the authorization basis for future experiments involving special nuclear materials at NTS.

Performance Measure 2.2	Outstanding
Conduct design and analysis of nuclear weapons that address the future needs of the U.S. nuclear deterrent.	

Covered in the activities under this Performance Measure, LLNL was tasked to develop concept designs in support of the Project Officer Group (POG) led Reliable Replacement Warhead (RRW) Feasibility Study. To meet the goals of the RRW concept and the design competition in general, heavy component design, certification and manufacturability expertise would be needed to develop replacement design concepts that support both Navy and Air Force requirements. Other than Military Characteristics (MCs) / Stockpile to Target Sequence (STS) requirements and NNSA goals for enhanced surety and certification without additional underground nuclear testing, the independent laboratory teams were left to propose candidate design options to meet a 2012 First Production Unit (FPU). LLNL worked with SNL and conducted concurrent engineering with the production plants to develop design concepts and understand manufacturability concerns. LLNL was able to operate under tight deliverable schedules to develop the best design options for its respective team. LLNL was also required to submit Life Extension Option (LEO) tables. The tables included newly required information fields for end-of-life data. For the Safety Enhanced Reentry Vehicle (SERV) for the W87, LLNL accomplished various activities in order to issue a Major Assembly Release (MAR). In FY 2006 there were four planned flight tests for the SERV as a basis for preparing the MAR. Three of the tests were conducted and there was one test not conducted. LLNL prepared a set of output analysis for threat warheads.

In the area of RRW activities, LLNL performed cost benefit trade studies with the production plants to determine design option selections. The NNSA HQ review team was pleased with the level of program management principles implemented by the LLNL team as evidenced by the risk management review. Though the design data packages were only required to include a certification strategy, LLNL went beyond the requirement and developed draft certification plans. For the LEO tables, LLNL provided good quality inputs for the data and the descriptions of the drivers. Regarding the W87 SERV project, the LLNL W87 Program Manager managed the “no test” reporting very well, and the team has done an outstanding job of coordination with the Air Force, SNL, and NA-12 for desired follow up testing. Information on the “no test” investigation was provided in a very timely manner, and the report was well received by NNSA senior management. In the area of output analysis for threat warheads, LLNL met or exceeded performance expectations in most areas. LLNL prepared a prioritized set of output analysis based on discussion and agreements with Defense Threat Reduction Agency (DTRA) on time and within budget. This work will potentially have a substantial contribution to the Advanced Simulation and Computing (ASC) Validation and Verification (V&V) needs, as well as Missile

Defense Agency (MDA) needs. The site program managers have provided excellent summary reports updating the status of analysis.

Issues and Concerns

For RRW support, additional integration with the campaigns to identify specific work scope would further enhance program planning. Additional interactions with the production agencies to refine design definitions and identify material specifications would also further enhance program planning. In the LEO tables, the quality of the draft inputs can be improved, thus reducing the comment resolution effort and the required iterations to resolve apparent inconsistencies between the tables and the driver section.

Performance Measure 2.3	Outstanding
Develop and demonstrate Science Campaign models, experiments, and capabilities that support the ongoing needs of stockpile assessment and certification.	

The lab assessed and evaluated weapon related data from a wide range of experiments and testing programs that contributed to the evaluation of specific issues and validation of the physical models as well as improving predictability of weapon performance and utilizing the nuclear test database for assessing weapon related issues like providing understanding into fundamental behavior of weapon primaries, estimating pit lifetimes, and completion of design data for RRW Feasibility Study.

Performance Measure 2.4	Outstanding
Develop and demonstrate Advanced Simulation Computing (ASC) capabilities that support the ongoing needs of stockpile assessment and certification.	

FY 2006 has been an outstanding year of achievements for LLNL simulation capabilities. From delivering computational infrastructure to more capable codes, LLNL support of the ASC program was exemplary.

Livermore scientists and researchers continue to push the bounds of computational weapons science. They are the lead lab for the bi-lab Thermonuclear Burn Initiative (TBI), and have dedicated themselves to exploring the physics behind the most challenging “knobs” in the ASC performance codes. Early science calculations on BG/L garnered international recognition, proving the utility of the machine to scientific applications at unexplored scales. Further, LLNL was able to run weapons-relevant codes quickly on BG/L demonstrating applicability early. LLNL provided significant input to the DARPA HPCS program as a representative for NNSA, benefiting a wide array of government agencies with supercomputing requirements. The ASC Purple supercomputer was integrated on schedule and cost. The tri-lab Purple L1 milestone work for Q1FY07, led by LLNL, is proceeding on schedule with all major runs completed. LLNL was proactive and provided significant support to HQ in developing procedures for operating the complex’s first supercomputing national user facility.

Performance Measure 2.5	Outstanding
Improve and apply tools and models for prediction of systems, subsystems, and/or component lifetimes. By the end of FY 2006, determine a technically defensible estimate of the pit lifetime for the primary of each of the weapons systems for which LLNL is responsible.	

Under this performance measure, the most significant accomplishment was the development of an updated pit lifetime assessment for each of the LLNL stockpile warheads, a Level One milestone. These assessments were supported by a broad-based experimental program, detailed theoretical models, and a major re-analysis of the nuclear test database. Additionally, LLNL performed material and component lifetime assessments in support of the enduring stockpile and the W80-3 Life Extension Program (LEP) for material and component reuse and selection decisions. In support of the Annual Assessment Report (AAR) for each weapon system, LLNL provided current aging related data. LLNL supported the transformation of surveillance by developing diagnostic tools, such as the 1-2 mil resolution pit x-ray computed tomography (CT) system for installation and qualification at Pantex.

LLNL has performed excellent experimental and analytical work for pit lifetime assessments. The experiments on aged and new Pu include gas gun data from JASPER and TA55, Diamond Anvil Cell equation of state (EOS) measurements, density measurements, and x-ray diffraction and transmission electron microscopy. Two of the seven JASPER shots were conducted with aged material. These experiments, along with DAC Pu experiments, modeling and simulation activities, and re-analysis of Underground Test (UGT) data, supported LLNL's excellent work to complete a revised assessment of pit lifetimes by weapon system. Integration with other programs was evident as extensive computer simulations using ASC codes and platforms were used to extend the experimental data to later times. The revised pit lifetime assessments and the supporting technical work were briefed to the JASONs as an independent scientific review. LLNL and LANL jointly presented their findings on Pu aging and its implications for Pit lifetimes to the JASON's twice during FY 2006. By the time of the latter meeting, June 2006, earlier discrepancies between estimates of key Pu aging parameters by the two labs had largely been resolved. The JASONs report was very complimentary of the experiments and analysis performed by LLNL. In addition, a model to predict the end-of-service-life conditions expected in canned subassemblies has been validated against surveillance data from a variety of warhead types. LLNL has conducted excellent technical development of new diagnostic technologies for nondestructive evaluations of nuclear weapons systems and components including the 1-2 mil pit x-ray CT and high-intensity neutron sources to complement x-ray techniques for examining weapon components shielded by large masses of high-density metals.

Issues and Concerns

While the technical work performed by LLNL in order to improve and apply tools and models for lifetime assessments has been excellent, LLNL's program managers need to improve the communication and reporting procedures between the management level and the primary investigator level at the laboratory. Additionally LLNL needs to improve its coordination procedures with production sites, Pantex in particular, when working joint projects. The communication and coordination deficiencies contributed to a multi-site L2 Milestone for an

X-ray pit computed tomography (CT) diagnostic being missed for FY 2006.

Performance Measure 2.6	Outstanding
Develop and implement a collaborative and complementary program of experiments at High Energy Density (HED) facilities that supports assessment and certification needs.	

LLNL has done an outstanding job in the area of High Energy density Physics. They have met all their level 2 milestones and the lower level ones as well. In addition they accomplished several important tasks that were above what NNSA required.

The three level 2 milestones that were completed are:

- Demonstrate advanced radiographic diagnostic techniques for HED applications.
- Update plan for use of NIF for stockpile support. (Joint with LANL and Bechtel Nevada)
- Perform initial tests of an experimental platform for burn physics for NIF.

In addition the contractor accomplished the following lower level milestones and tasks:

- Design and execute a directly driven implosion experiment on Omega that allows diagnostic techniques to measure time-dependent electron and ion temperature to be tested and compared to simulations.
- Perform material dynamics experiments to test constitutive models at high strain rate.
- Perform experiments on Omega to assess effect of material structure for complex hydrodynamics experiments.
- Start up a high energy X-ray calibration facility that provides up to 100 keV X-rays.

The contractor also completed the following tasks that were beyond what was required:

- Update calibration plan consistent with NIF HED plan.
- Measure X-ray source efficiencies as a function of different target geometries at high photon energies (>10 keV) for high intensity driven sources.
- Perform experiments to test graded density reservoirs to shocklessly load targets to high pressure

Issues and Concerns

The scope for this work is no longer in the ICF campaign. The major issue is to effect a smooth transition of these efforts to the Science Campaigns.

Performance Measure 2.7	Outstanding
Develop, implement, and lead an integrated national program (National Ignition Campaign (NIC)) with the goal to achieve ignition at NIF in 2010.	

The Contractor made outstanding progress on National Ignition Campaign (NIC) Program activities during FY 2006, including leading the development of a revised NIC Execution Plan for performing the first ignition experiments on NIF in FY 2010 in collaboration with LANL, SNL, UR/LLE & GA. The NIC Execution Plan Revision 1 was completed in May 2006 and circulated for approval by all participants. Comments received during the approval cycle are being integrated into the EP, and Revision 1A should be released shortly. The Contractor

provided effective leadership for the planning and management of this Enhanced Management Program, including completion of the NIC baseline cost and schedule, a cost plan summary (by fiscal year, participant, & WBS), and Control Account Plans (CAPs). The NIC Program remains on schedule for meeting the ICF Level 1 milestone "Begin first integrated ignition experiments" [MRT #360] by September 2010. A self assessment of overall NIC management performance has been prepared and circulated to all participants for review and comment.

An independent (Lehman) review of the NIC Program (and NIF Project) was completed in July 2006, with the conclusion that the organization and definition of the NIC Plan is appropriate, but that implementation is at an early stage. The reviewers were concerned that additional efforts will be needed to better accommodate the expectations of all users that may wish to conduct experiments at the NIF facility, and recommended additional attention to this area.

NIC Program enhanced management reporting to NNSA started in October 2005. An Earned Value Management system was implemented, and NIC earned value reporting started in July 2006. All NIC monthly reports were received on time and there were no surprises. Based on the latest earned value data, through August 2006, the NIC Program is 8% complete and on schedule. The NIC Program cumulative Cost Performance Index (CPI) and cumulative Schedule Performance Index (SPI) were 1.02 and 0.98 respectively [>0.95 = outstanding], and the Cost Variance & Schedule Variance were \$2.8 million (2.1%) and -\$2.2 million (-1.6%) respectively.

All of the 46 FY 2006 DOE/NNSA reportable NIC Program milestones, where LLNL was the lead or a participant, were completed on or ahead of schedule [$>90\%$ of Level 1 & 2 milestones and $>80\%$ of Level 3 & 4 milestones = outstanding], including the following seven ICF FY 2006 Level 2 milestones which were all completed ahead of schedule:

- "Begin polarization smoothing (PS) crystal growth" [MRT #1825], completed 02/28/06 vs. plan 03/31/06
- "Place ignition diagnostics requirements under configuration management" [MRT #1824], completed 06/21/06 vs. plan 06/30/06
- "Complete cryogenic target system (CTS) Title I design" [MRT #1823], completed 06/21/06 vs. plan 06/30/06
- "Begin hohlraum energetics experiments with smoothed beams at OMEGA" [MRT #1815], completed 08/17/06 vs. plan 09/30/06
- "Perform Be shock-melting experiment on Z and compare with predictions" [MRT #1819], completed 09/05/06 vs. plan 09/30/06
- "Demonstrate scientific prototype ignition capsules (Be and/or plastic)" [MRT #1816], completed 09/19/06 vs. plan 09/30/06
- "Complete Be shell capsule characterization capability" [MRT #1822], completed 09/22/06 vs. plan 09/30/06

In addition, one FY 2007 DOE/NNSA reportable NIC Program milestone "Complete laser glass melting for operational inventory" was completed early 08/30/06 vs. plan 12/31/06.

The NIF Programs Directorate (including the NIC Program) achieved an excellent safety record at LLNL during FY 2006 with a 12-month average total recordable case rate (TRR) of 1.4 [<2 =

outstanding]. In addition, the NIF Programs Directorate received two National Safety Council awards on September 13, 2006. One was a Perfect Record award for having 12 consecutive months (06/01/05-05/30/06) without an injury or illness involving a day away from work. The other was an award for One Million Safe Hours without an injury or illness resulting in time off work (1,330,347 hours between 08/20/05 and 05/30/06. The Contractor completed 100% [>95% = outstanding] of the minimum line management safety “walkabouts” specified in the directorate procedures. Required corrective actions were documented, and a 100% corrective action closure rate within one month for high priority actions was achieved [>85% = Outstanding].

FY 2006 Technical Accomplishments

Excellent progress has been made on implementing the plan for ignition. In Systems Engineering, integrated reviews of the NIC mission baseline configuration and requirements made good progress. In Target Physics, improvements in the ignition target point design have made it more robust, and four Integrated Experiment Teams were formed in the areas of Laser Performance, Hohlräum Performance, Capsule Performance, and Ignition Performance. In Target Development and Manufacturing, Beryllium (Be) capsules now meet all but one of the key specifications in the NIC ignition point design; notable progress has been made on capsule fill tube fabrication and attachment; and substantial progress has been made in hohlraum fabrication and assembly. In Operational Capabilities, the NIF FY 2006 Precision Diagnostics System (PDS) campaign laser performance experiments were completed and the 1MJ ignition point design laser performance was achieved on a beamline basis, and the ICF Program performed experiments at several other facilities. The OMEGA laser at the University of Rochester’s Laboratory for Laser Energetics (UR/LLE) imploded cryogenic DT spherical direct-drive targets meeting NIF smoothness requirements, and started hohlraum energetics experiments with smoothed beams. The Z machine at Sandia National Laboratories (SNL) performed Be shock melting experiments.

Technical accomplishments in Cryogenic Target Systems, Target Diagnostics, User Optics, and Personnel and Environmental Protection Systems (PEPS) are covered in Performance Measure 6.1.

Issues and Concerns

Success of the National Ignition Campaign will require continued cooperation among all participants in identifying and resolving the challenges inherent in such an undertaking. The NIC Director bears a substantial responsibility for maintaining a positive collaboration among the participants and assuring that all available capabilities are utilized as effectively as possible in pursuit of the ignition goal.

Continued efforts are required to define and implement a governance model for NIF as a National User Facility.

Performance Measure 2.8	Outstanding
In cooperation with LANL and NNSA HQ, continue the development and implementation of an integrated program and governance model for plutonium capabilities of LANL and LLNL to support the overall NNSA strategic requirements.	

LLNL demonstrated excellent cooperation with LANL in bringing a group of senior managers together to develop a strategy for joint use of Plutonium facilities at both labs. Specific accomplishments included LLNL doing WR radiography for LANL, operating the LLNL radiography facility as a prototype user facility, transferring die casting technology and tilt-pour furnace technology from LLNL to LANL, fabricating JASPER targets for LANL and exchanging technical staff. LLNL also established B239 as a user facility and developed an agreement with LANL on how to accommodate floor space requirements for the national Plutonium mission at PF4 and CMR-R.

Performance Measure 2.9	Outstanding
In support of Responsive Infrastructure (RI), develop and execute projects to improve the responsiveness of the design, manufacturing, and testing infrastructure of the integrated nuclear weapons complex.	

LLNL participated in the Responsive Infrastructure planning activities, including an extensive meeting held in January FY 2006. The Laboratory made significant contributions to development of "Responsive Infrastructure Strategy Implementation Plan," developed a proposed set of LLNL site RI metrics, and worked to finalize the metrics in coordination with all NNSA sites.

LLNL work in support of the Responsive Infrastructure Initiative is focused on rapid case manufacturing, and multi-unit processing. For the rapid case manufacturing project, the Laboratory completed Phase 1 documentation and Phase 2 project plan, and is in preparations for a hydrodynamic test to assess response under high explosive conditions. For the multi-unit processing project, a small scale HE test used to develop initiation thresholds was completed. In addition, two planned Integrated Weapons Experiments (hydro-dynamic test) to assess spatial, energy and velocity distribution of shrapnel from a donor warhead in near-by explosion (NBE) scenario were completed.

Performance Objective 3	Outstanding
Develop with NNSA and implement near-term balanced weapon programs that are coordinated with the other NNSA M&O site contractors and DoD customers and that foster complex-wide solutions to meet the needs of the U.S. nuclear deterrent.	

Performance Measure 3.1	Outstanding
Conduct stockpile surveillance activities, investigate significant findings and issues identified in technical assessment reports on a prioritized basis, and establish closure plans for Significant Finding Investigations (SFIs).	

Each lab is expected to prepare closure plans within 12 months of a Significant Finding Investigation (SFI) going into a high-priority status and conducting activities to accomplish the closure plan deliverables. LLNL planned activities in order to close a W87 SFI in FY 2006. The activities included Coordinate Measuring Machine (CMM) data assessment and a closure report.

LLNL currently has no high priority SFIs. LLNL did complete the CMM data assessment and the closure report was completed in September 2006.

Performance Measure 3.2	Outstanding
Deliver on the major milestones for the LEP for the W80-3 in accordance with the joint DOE/DoD phase 6.x process. Continue to support LANL on the LEPs for the W-76 and the B61-7/11.	

Under this Performance Measure, LLNL conducted various activities in support of three concurrent Life Extension Programs (LEPs): B61 Alt 357, W76-1, and W80-3. For the W80 LEP, a LLNL system, the volume of activities was much greater than those in support of the B61 LEP and W76 LEP. For the B61 LEP and the W76 LEP, LLNL performed an Inter-laboratory Peer Review (IPR).

W80-3

In support of the W80-3, the LLNL activities included: providing the required sub-system engineering releases by the dates specified in the integrated master schedule, conducting hydrotests according to the hydrotest plan, conducting flight and ground tests as planned including: Full-Scale Environmental Test - Q2 and Flight Test Qualification Unit 5 which supports the Development Joint Test Assembly 5 flight test.

B61 Alt 357

The inter-laboratory peer review was intended to cover Phase 6.3 and 6.4. As a result, its scope covered more than the typical IPR at the end of the individual 6.X phases. It required that tests be completed, and test results obtained, prior to completing the IPR and final report. Due to schedule constraints, LLNL was forced to prematurely evaluate the design and production engineering phases without all the test data being provided. The IPR report was incomplete, but did reflect the complete evaluation of all data available at the time. The scope of the initial IPR was reduced to just examining the Mod 7 design. The Mod 11 IPR is scheduled for FY07.

W76-1

The LLNL peer review team consisted of design physicists, chemists, materials scientists, and engineers (design, production and QA) and conducted the Preliminary Phase 6.4 Peer Review in accordance with the FY 2006 schedule.

Areas of Excellence

W80-3

LLNL performed the required tasks to support the W80 LEP in an outstanding manner. Adding additional difficulty was the fact that this work was accomplished during a time when the W80-3 budget was decreasing due to the shutdown of the program.

B61 Alt 357

LLNL continuously pushed for this IPR and supported constantly changing schedules. The lab quickly processed all available information and provided the best response possible with the data and time they were given.

W76-1

The LLNL peer review team has done an excellent job in completing the Preliminary Phase 6.4 Peer Review IAW the FY 2006 schedule. The review was thorough and focused on evaluating LANL design requirements, certification process and readiness for production. The review also included an assessment on safety, compliance with Technical Business Practices (TBPs) and Quantification of Margins and Uncertainties (QMU). There was excellent cooperation between the peer review team and the design agency. The review was well organized and executed.

Issues and Concerns

In support of the B61 Alt 357 IPR, the final LLNL report was delivered in June, but could have included more recent information that was available in the month of May and the beginning of June. LLNL continues to push for a realistic schedule for the Mod 11 IPR, but has encountered resistance from the design agency.

Performance Measure 3.3	Outstanding
Deliver on Pit Manufacturing and Certification Project major milestones.	

LLNL has provided an outstanding level of support in its efforts to perform physics peer reviews and other project activities for LANL. LLNL showed a great deal of flexibility in accepting a moderate scope of plutonium machining and testing work from LANL. LLNL was extremely helpful and flexible in their scheduling to provide support for pit shipments and radiography operations at Superblock. LLNL staff provided excellent support in helping LANL complete all of the required engineering evaluations on pit manufacturing activities. Other significant accomplishments in FY 2006 by LLNL under this performance measure include:

- The validation of Unicorn and Krakatau SCE performance in 2-D and 3-D calculations.
- Completed the initial W88 warhead primary baseline assessment incorporating 9 relevant NTS events.
- Made significant progress on the W88 secondary baseline assessment.
- Completed radiochemistry assessment of W88 primary on most significant test events using the LLNL independent methodology.

LLNL provided significant value for the funds provided by the W88 pit project in FY 2006 and has been extraordinarily customer-oriented in its acceptance and scheduling of work that was not in the original baseline. NA-118 assigns an adjectival grade of Outstanding for performance measure 3.3.

Performance Measure 3.4	Outstanding
Meet directive schedule requirements.	

LLNL did an outstanding job supporting W80 LEP production readiness and orderly close out of this work. The lab supported detonator production and surveillance and pit surveillance engineering evaluation activities. In addition, LLNL continued to support production of the W87 MSAD, addressing detailed questions related to quality control, parts reuse, tolerance specifications, and qualifying new vendors. Excellent support was also provided for the W87 JTA-4 production, keeping it on schedule to meet FPU.

Performance Measure 3.5	Outstanding
Provide technical support to production complex operations, including the Integrated Weapons Activity Plan (IWAP), the weapons point of contact programs, and weapons response analyses.	

LLNL provided essential and timely support of SS-21 activities for the W87, B83 and W80 to meet the rebaselined schedule. In addition the Laboratory developed electro static discharge (ESD) hazards approach which was adopted for future SS-21 evaluations. LLNL also developed software to manage Pantex hazards assessment identification and the weapons response process for new processes.

Performance Measure 3.6	Outstanding
Continue to implement and execute, in accordance with NNSA-approved plans, a weapons design and manufacturing quality assurance program consistent with NNSA requirements (QC-1, Rev 10).	

LLNL met the requirements of QC-1 and TBPs for all its engineering releases and Product Realization Teams in support of the Directive Schedule. The lab also implemented Configuration Management for all weapons programs.

Performance Measure 3.7	Outstanding
Develop and implement streamlined, multi-site, technical business practices with other Nuclear Weapons Complex partners.	

LLNL actively supported the Pantex Throughput Improvement Plan (PTIP), and developed an improved process and software tools for managing the weapon response integrated activities. The Laboratory also actively supported the Requirements Modernization and Integration (RMI) project, participating on all cross-complex teams and taking a leadership role in many of the NNSA initiatives to streamline business practices.

Performance Objective 4	Outstanding
Implement an integrated science and technology-based program aimed at preventing the proliferation or terrorist acquisition of weapons of mass destruction as well as detecting and responding to their deployment or use.	

Performance Measure 4.1	Outstanding
Provide technical capabilities to limit or prevent the spread of materials, technology, and expertise relating to weapons of mass destruction (WMD); eliminate or secure inventories of surplus materials and infrastructure usable for nuclear weapons; and enable the implementation of U.S. nonproliferation policy.	

Various successful interactions with China have occurred, opening the door to further dialogue and coordination on extending the MPC&A program and building upon the experience and progress with the Russian MPC&A program. The Laboratory received an “A” grade in the 18th Organization for the Prohibition of Chemical Weapons proficiency test which continues to be indicative of the lab’s outstanding analytical capabilities. MPC&A activities continued to be very successful in Russia involving the Kola Technical Center, Ministry of Defense, Kurchatov Institute, and the Federal Nuclear Center. LLNL coordination and participation in various workshops continue to foster outstanding cooperation throughout the international community. Provision of significant analytical support and tools to the IAEA and EURATOM continues to facilitate improvement in their ability to implement international safeguards.

Performance Measure 4.2	Outstanding
Provide scientific research capability that produces cutting-edge R&D as well as the testing and evaluation needed to detect, identify, and monitor proliferation and terrorist-related WMD activities.	

LLNL continued outstanding work on the hyperspectral imaging system. LLNL demonstrated continued outstanding success of the Sonoma persistent surveillance system and the ultra-high resolution gamma and neutron spectrometer, resulting in recognition with R&D 100 Awards. The Laboratory successfully fabricated two full-scale nanolaminate mirror facesheets for the Actuated Mirror Telescope and the 3-meter Segmented Mirror Demonstrator project with one facesheet integrated with lightweight active support structures to create primary mirrors providing outstanding lightweight size-to-weight and performance characteristics. In addition the Laboratory successfully demonstrated thermal energy storage in lithium hydride in support of the Nightowl persistent monitoring platform project. The contractor also continued development of significantly enhanced geophysical seismic event models coupled with large-scale computing to discriminate between explosions and earthquakes over increasingly greater distances. Finally, the Laboratory continued in experimental confirmation of antineutrino detection as a feasible technology for reactor safeguards applications.

Performance Measure 4.3	Outstanding
Support the needs of the intelligence community by providing intelligence analysis capabilities and science and technology that improve the nation's ability to detect and thwart proliferation and terrorism.	

LLNL generated many outstanding reports on analyses of foreign weapons programs and WMD threats. It also provided outstanding support to Washington regarding U.S.-India nuclear policy, and UN Security Council decisions related to Iran's nuclear program, as well as support to DND, the DOS, and other federal agencies. The Laboratory also made significant contributions to the DHS Biological Threat Characterization Center, and to National Intelligence Estimates preparations. The contractor continued its outstanding work by the Nuclear Assessment Program on threats and illicit trafficking. The Laboratory also developed and demonstrated highly significant information networks analysis tools by the Information Operations and Analysis Center providing new and important capabilities to the sponsors.

Performance Measure 4.4	Outstanding
Develop and support the deployment of technologies and analytical capabilities that strengthen the nation's ability to protect against and respond to terrorist use of WMD and other threats against the U.S. homeland.	

Noteworthy achievements include:

- Continued advancement in the Autonomous Pathogen Detection System deployed as a network, and field testing of the BioBriefcase, as well as roll-out coordination of the Laboratory Response Network;
- Receipt of the R&D 100 Award for the E.L.I.T.E. detector (Easy Livermore Inspection Test for Explosives);
- Advances in radiation detection including a very successful first-time demonstration of gamma detection using an aluminum-antimonide device which affords the potential for a very compact, lightweight, high resolution, and field deployable system that can be used at ambient temperatures as opposed to having to operate at extremely low temperatures;
- Participation in major DHS exercises related to response and restoration after bio and chem attacks;
- Continued outstanding work in active neutron interrogation methods for cargo container nuclear material detection including low-level interference signatures, and a low-energy system design;
- Achievement of full operational capability for the Analytic Conflict and Tactical Simulation system tools for responding to chemical and biological attacks in urban environments including inside buildings;
- Significant progress in construction activities to expand the Forensic Science Center capabilities to receive chemicals and explosives at S300; and
- Provision of NARAC/IMAAC operational support to national security events, exercises, and responses to actual occurrences.

Performance Measure 4.5	Outstanding
Apply advanced science and technology to meet immediate and long-term U.S. defense community needs.	

Noteworthy achievements include:

- Continued successful development and enhancement of the LLNL Counterproliferation Analysis and Planning System, and development of new strategies for assessing the WMD threats associated with a wide variety of facilities before certain high-risk operational decisions are made. LLNL has made a valuable contribution to get this outstanding widely-used analytical capability incorporated into the armed services counterproliferation training curricula;
- Award of the Persistent Threat Detection System by DoD as one of the Army’s “10 Greatest Inventions” for 2005;
- Joint Conflict Analysis and Tactical Simulation development and support to DoD has been outstanding in providing significantly enhanced capabilities for various mission rehearsal/exercise scenarios;
- Highly successful field testing of extreme laser communications technologies has advanced the system to transition to industry for deployment and production;
- Production of record-breaking laser-driven x-ray sources having numerous applications for DoD; and
- Technical assessment of terrorist nuclear detonation effects in cities is being actively pursued.

Performance Measure 4.6	Outstanding
Maintain and deploy, as required, nuclear emergency response teams for CONUS and OCONUS response to radiological and nuclear threats.	

Noteworthy achievements include:

- Continued high-tempo participation by LLNL’s operationally-ready teams in a wide spectrum of activities including response by the Radiological Assessment Program teams to several incidents, provision of RAP trainers to radiation response training conducted by several community agencies, and deployment of the Accident Response Group personnel to major national exercises;
- Development of new diagnostic tools for significantly enhanced nuclear incident response capabilities;
- Hosting of many training sessions for new response team members, and for other agencies, utilizing LLNL-developed special training aids;
- Development of significantly improved versions of the Liquid Abrasive Cutter and Linear Special Livermore Charge tools.

Performance Objective 5	Outstanding
Enhance and nurture a strong science, engineering, and technology base in support of national security strategic objectives.	

Performance Measure 5.1	Outstanding
Nurture and maintain the Laboratory science and engineering excellence in disciplines and capabilities needed to support our national security missions and emerging national needs.	

LLNL maintained its vitality by retaining and attracting a high quality workforce dedicated to excellence and a passion for research and development. Exceptional multidisciplinary teams were responsible for achieving scientific program goals and maintaining state of the art expertise. Quality of science was demonstrated by numerous scientific accomplishments throughout the year by awards received and recognition by their peers. Several examples at LLNL were:

- Two LLNL Physicists were presented with a 2006 Award for Excellence in Plasma Physics Research by the American Physical Society (APS). Cherry Murray, LLNL Deputy Director for Science and Technology, was elected vice president of the APS for 2007, a 4-year assignment. Following her year as vice president, she will become president-elect and then president. APS is considered one of the most noteworthy scientific societies in the nation.
- LLNL team was awarded the Gordon Bell Prize for material science simulations conducted at Laboratory's BlueGene/L supercomputer.
- LLNL received seven Research and Development 100 Awards.
- LLNL won Federal Laboratory Consortium Award for Excellence in Technology Transfer for ELITE technology.
- DOE's Office of Science (Biological and Environmental Research) selected LLNL scientist as one of 4 winners in the first BER Distinguished Scientist Fellowship Award.
- Recognition as one of Army's Greatest Inventions for 2005 for Development and Deployment of Persistent Threat Detection System.

External peer review committees evaluated the science, engineering, and technology of programs/projects throughout 2006 at LLNL. Here are a few examples of the DRCs' comments:

- The Energy and Environmental Sciences and Technology external directorate peer review committee stated that, "Based on the presentations and posters during this review, and drawing upon the experience accumulated from past reviews, the Committee judges the quality of science and technology in the Directorate to be outstanding."
- The Nonproliferation, Homeland and International (NHI) security directorate review committee stated that, "NHI stands out among its peers in every category of technical application to nonproliferation, homeland security, and international security. Its work is focused on the driving issues that threaten the United States with weapons of mass destruction. It continues to work on science and technology well beyond current capabilities

used by the U.S. government. This farsighted program did not happen by chance but through years of looking ahead and managing interdisciplinary programs that would meet future needs.”

- The external peer review committee for Physics and Advanced Technologies stated that, “The reports on Stardust Super Macho and Planet are noteworthy in that they not only illustrate PAT leadership in obtaining important new scientific results, but provide the opportunity for PAT to participate in exciting science that will engage the general public and stimulate talented young scientists to consider LLNL in their future career plans.”

Issues and Concerns

LLNL needs to outline what is the right amount of basic biological scientific research, applied R&D and what part is biosecurity. LSO believes that the biological perspective needs to be addressed since the bioscience directorate and chemistry and material science directorate have been combined under the reorganization. LLNL efforts are needed to bridge biodefense, chemistry and other related DHS projects and work for NIH/NCI, DoD, and UC Davis.

The DRC report from an ad hoc committee reviewing the S&T underpinnings of biosecurity work at LLNL indicated that current LDRD bioscience work needs to be critically evaluated.

The same DRC report addressed their concern and stated that “We saw some world class biology, but it did not dominate, and is so far mostly loosely linked to biosecurity.” LSO agrees with the DRC. This certainly points out a weakness that needs to be corrected if LLNL is to continue preeminence in biological sciences and in its biosecurity capability.

LLNL needs to address this issue and actions taken in response to LSO/DRC concerns in the 2007 Laboratory self assessment for Appendix F.

Performance Measure 5.2	Outstanding
Develop and implement an integrated and balanced strategy for investing LDRD, programmatic and institutional resources to ensure the long-term vitality of the Laboratory science, engineering, and technology base in support of national security missions and emerging national needs.	

LLNL achievements under this measure are determined by the development of a long-term research and development (R&D) strategy for the Laboratory to guide future investments and implementation of the science and technology strategy. Examples of Laboratory Directed Research and Development (LDRD) funded projects that provide cutting edge R&D scientific recognition by peer groups and publications in high profile journals are listed below:

- LLNL received seven R&D 100 Awards. The awards are actually presented in October every year. LDRD funded projects supported five of the seven R&D 100 awards and are listed below:

- Ultrahigh-Resolution Gamma and Neutron Spectrometer. Three LDRD efforts established a scientific base on which this technology eventually developed (87-LW-007, 92-SR-046, and 01-LW-054).
 - Babel. Software addresses language interoperability problem. LDRD funding supported this project (00-SI-002).
 - Sapphire, Scientific Data Mining Software. LDRD supported a portion of this research with two projects (99-ERI-010 and 03-ERD-031).
 - Externally Dispersed Interferometer developed to help astrophysicists search for planets. LDRD projects resulted in intellectual property for this instrument development:
 - (98-ERD-054 and 04-ERD-067)
 - High Average Power Wavelength Converter. Original research for this device started in 1997 under LDRD (97-ERD-138).
- Multi-national team led by LLNL was selected by the National Science Foundation (NSF)-funded Association of Universities for Research for Astronomy (AURA) to build the next generation Extreme Adaptive Optics Coronagraph for the Gemini Observatory and includes participants from UC Santa Cruz, UC Berkeley, UCLA, and others. LDRD funding (05-ERD-055) on extreme AO was used initially. WFO funding is now provided to continue this work.
 - LDRD Project (06-ERI-001). Following the successful return of NASA's Stardust Mission in January 2006, LLNL researchers and others began extracting and analyzing cometary samples embedded in silica aerogel and in micro-craters in aluminum foil using Stardust Mission Support (LDRD/WFO projects). LLNL utilized high-resolution transmission electron microscopy for these projects. Developmental work in sample preparation and material recovery resulted in two publications in *Meteoritics and Planetary Science*, one of which was featured on the cover of the journal.
 - LDRD Project (04-ERD-002). This past year, LLNL researchers performed the first invitro visualization of the complete architecture of the spore coat of *Clostridium novyi-NT* spores, and achieved real time high resolution analysis of germination mechanisms of *Bacillus* and *Clostridium* single spores. This work will provide a basic foundation for more efficacious diagnostic, chemotherapeutic and immunological countermeasures for emerging diseases and biodefense. The atomic force microscopy image of this spore coat structure was featured on the cover of *Microbiology*.
 - During FY 2005, 92 students and 106 post-doctoral researchers were supported with LDRD funding. In FY 2006, 59 students and 114 post doctoral researchers were funded for support to LDRD projects.

During 2006, numerous LDRD projects were reviewed by the external directorate peer review committees and by NNSA site representatives. The following are examples of LLNL's level of scientific accomplishments:

- Under the Chemistry and Material Sciences (CMS) external Directorate Review Committee (DRC) they stated that, "The many examples of first rate LDRD sponsored research in computation and experimentation demonstrates the success of these programs. (LDRD project 04-SI-003); and

- The CMS DRC committee comments on Critical Issues on Materials for Generation IV Reactors (LDRD Project 06-ERD-005) stated, “This LDRD project clearly shows how modeling and simulation can provide key insights to understanding major problems for nuclear materials.” “...this LDRD work demonstrates that CMS has the capability to leverage its core capabilities to answer materials questions of central importance to nuclear energy applications.”
- The CMS DRC committee highlighted a LDRD project on Rate Enhancements and Catalytic Mechanisms through Simulations (05-ERD-021) and stated that, “This work falls under Performance Measure 5.2 and was funded by LDRD. It reflects the effective use of computer simulations designed for material science applications and programmatic projects to new and future applications in the bio arena. It was given a grade of outstanding.”
- The Physics and Advanced Technologies DRC committee addressed the strategy for LDRD, programmatic and institutional resource investments and stated, “Recent commissioning experiments on the new petawatt laser, TITAN (part of the Jupiter Facility), are outstanding examples of tightly coordinated resource investments. Institutional funds support the facility, but six different LDRD projects were engaged in the campaigns and four of the six projects have a strong programmatic focus (the other two were astrophysics -- a core capability for the Directorate – with important HEDP (high energy density physics) aspects)!”

Performance Measure 5.3	Outstanding
Execute non-NNSA sponsored projects and programs that make use of the Laboratory’s unique expertise, capabilities, and facilities; and that enhance the Laboratory’s ability to accomplish its current and future national security missions, including those related to homeland security and homeland defense.	

The total level of effort for non-NNSA sponsors is substantial. Because so many projects are supported by this collection of sponsors and it is not possible to describe each activity or even category of activities. Accomplishments of projects reviewed during 2006 are highlighted below as well as excerpts from external peer review committees:

Some notable non-DOE Work for Others sponsored projects reviewed in 2006 are:

- The ad hoc external Directorate Review Committee (DRC) report on the S&T supporting biosecurity efforts highlighted the Bio-aerosol Mass Spectroscopy project for DoD and stated, “The BAMS program, by any measure, is a clear triumph. This program has passed very demanding Phase I milestones for the DARPA program that funds it ...” “This demonstrates a reach for the research that the effort embeds that is clearly both world class and field leading.”
- The Biosecurity DRC also highlighted the BioBriefcase which is a compact autonomous broad capability bioagent detector for DHS. The DRC stated that, “This complex development program demonstrates the systems engineering strengths of LLNL and Sandia.”

- Much effort was devoted by the external Nonproliferation, Homeland and International security directorate review committee on work supporting DHS. This is covered extensively under LLNL's assessment and presentations to the DRC during 2006 under Objective 4. However, we wish to note that the DRC stated that, "On the basis of these briefings and the Committee's collective knowledge about the directorate and the Laboratory, the NHI DRC evaluated the quality of science and engineering, relevance to national needs and agency missions, and programmatic performance planning for measures 4.4 and 4.6 to be outstanding."

The NHI DRC report also made the following comments that are noteworthy of LLNL's accomplishments:

- "LLNL's Chemical and Biological National Security Program is first rate. It integrates leading-edge chemical and biological science with outstanding engineering and information technology capabilities." "It also has national prominence in chemical security in the areas of forensics and the Organization for the Prohibition of Chemical Weapons."
- LLNL played a role in the establishment of BioWatch, which is now a national program. BioWatch was a take-off of the Biological Aerosol Sentry and Information System (BASIS) jointly developed by LLNL and LANL and deployed as part of a security structure during the 2002 Winter Olympics.
- LLNL has just started doing some work for the State of California Department of Agriculture and the California State Veterinarian service related to outbreaks of exotic Newcastle disease that can develop in poultry and foot and mouth disease in livestock.
- "The BKC provides a central location for distributed knowledge management capability for anticipating, preventing, and responding to biological threats and terrorism...." "The BKC (Biodefense Knowledge Center) is the only organization where all relevant technical talent – bioscience, intelligence analysis, and information technology – is co-located to provide integrated knowledge products and threat assessments."
- In other radiation detection efforts, LLNL is developing a system for inspecting cargo containers for DHS and port authorities.
- "In conclusion, the NHI DRC is very pleased and impressed with the work conducted by NHI in fulfilling its critical mission in nonproliferation, homeland security, and international security. The projects briefed to the Committee during its two review meetings in support of performance measures 4.1, 4.4, and 4.6 are outstanding in their scientific, technical, and analytical quality, their innovation and creativeness, and their ability to anticipate and meet sponsors' needs."
- NNSA concurs with the external peer review committee reports that the work reviewed in 2006 for Non-DOE sponsors was indeed outstanding.

Performance Measure 5.4	Outstanding
Foster active participation in the broad scientific and technical community, leveraging unique Laboratory expertise and capabilities; develop strategic collaborations with other national laboratories, industry, and academia.	

An objective of LLNL is to develop partnerships that comply with the laws governing technology transfer and the policies of DOE/NNSA in order to promote economic development and national competitiveness, meet the needs of our nation and support the DOE mission. This report assesses LLNL performance on this Measure in several areas:

- Quality of Science/Technology and Relevance to the DOE mission by addressing advancements, cutting edge technology, accomplishments/awards.
- Program Management describing the effectiveness of LLNL's operating processes in place to support the technology transfer mission and DOE's policies and Community Involvement.
- Technology Transfer Statistics which highlights activities in a quantitative manner.

Quality of Science/Relevance to Mission

The quality of Science can be demonstrated in a variety of ways. Awards and peer recognition is of course an important measure but equally the success of LLNL's industrial partners in bringing products to the commercial marketplace must also be addressed. Success in commercializing products demonstrates that our partners and LLNL's technologies are meeting the needs of the nation.

Below are examples of scientific advances made during FY 2006 by LLNL's partners:

- **Field Forensics, Inc.**, licensed technology from LLNL and announced in December 2005 they completed their first manufacturing run of the ELITE MODEL which is an effective screening tool for the detection of explosives. This technology won both a 2006 award for excellence in technology transfer from the Federal Laboratory Consortium and a 2006 R&D 100 Award. The ELITE card is a shirt pocket-sized trace explosives test that is sensitive, cheap and simple. The card detects explosives and propellants in a test that takes about one minute to complete.
- **Cepheid**, licensed its technology from LLNL several years ago and continues to show progress. In March 2006, Cepheid announced that it had received certification and designation of their GeneXpert® technology as qualified anti-terrorism technology. The GeneXpert® is based on microreaction chamber technology developed at LLNL and is now listed among products approved by the Department of Homeland Security and is granted coverage under the Safety Act.
- In December 2006, **Innovative Survivability Technologies (IST)**, a licensee of LLNL, delivered a vehicle to LLNL called the "Radtruck". The Radtruck incorporates a mobile portable Adaptable Radiation Area Monitor (ARAM) into standard police vehicles.

ARAM can detect very small quantities of radioactive materials moving at slow speeds or as fast as 60 miles an hour.

IST has already provided units to the California Highway Patrol. Several units have been deployed at several California border crossings. ARAM won a 2005 R&D Award which Livermore shared with its partner.

LLNL continued to be recognized for the high quality of its technology available for commercial applications.

In 2006, LLNL won Seven 2006 R&D 100 Awards, more than any other institution. Since 1978, LLNL has garnered a total of 113 R&D 100 awards. The R&D magazine presents awards annually for the top 100 technological achievements that promise to improve lives through breakthrough products and or processes. Winning entries are selected on the basis of criteria that include evidence of commercial viability. A synopsis of 2006 winners at LLNL was previously noted.

Recognition of Industrial Partners is listed below based on LLNL-developed technologies:

- **Reactive NanoTechnologies**, is a start up company based on LLNL and Johns Hopkins' University technology which was selected in 2006 as a "Nano 50's" award winner by *Nanotech Briefs* magazine for its role in nanotechnology advancements. This award recognizes the top 50 technologies, products, and innovators that significantly impacted or are expected to impact the state of art in nanotechnology.
- Frost and Sullivan also notified LLNL on June 15, 2006, that LLNL's carbon nanotube technology was selected for the **2006 Frost and Sullivan Emerging Technology of the Year Award**. A nanotube membrane on a silicon chip the size of a quarter may offer a cheaper way to remove salt from water.
- In 2005, Cepheid was named on the **2005 Deloitte Technology Fast 500**, a ranking of the 500 fastest growing technology companies in North America. Cepheid has been a licensee to LLNL sine the late 1990s.

Strategic collaborations with other national laboratories and academia.

The following new strategic partnerships with academia and other national laboratories were formed with LLNL in FY 2006:

1. A new initiative was launched with University of California (UC) San Diego Super Computer Center and the Scripps Research Institute in October 2005. This effort was supported by University of California Directed Research Development's funding in Large Scale Scientific Data Management. The goal is to demonstrate advanced data management mechanisms in support of two important scientific applications: the impact of global climate change on water resources and cosmology studies of the structure of the early universe.

2. An initiative was launched with the UC Santa Barbara in Biosensing Nanosystems. The goal is to integrate the scientific expertise of UCSB's Institute for Collaborative Biotechnologies and LLNL for the development of the next generation biosensors. This initiative will include the exchange of researchers and bring students and post doctoral researchers to the Laboratory.
3. LLNL participated in the Stardust mission which is a collaboration including Stanford Linear Accelerator Center, Lawrence Berkeley National Laboratory, and UC Berkeley.
4. A multi-national team led by LLNL has been selected by NASA to build the next generation Extreme Adaptive Optics Coronagraph (ExAOC) for the international Gemini Observatory. Other participants include the National Science Foundation Center for Adaptive Optics at UC Santa Cruz, UC Berkeley, UC Los Angeles and others.

Program Management

LLNL's Industrial Partnering and Commercialization Website has become an essential and primary tool for marketing. Since the beginning of the year, LLNL has had over 14,000 hits and has now expanded its homeland security information pages.

LLNL continued to add new software and is having tremendous success with its innovative program that offers End User software and licenses via the web. The licenses are standardized agreements that are available on a non-negotiated basis. The web site features LLNL developed software available with ready-to-sign end user licenses as well as links to LLNL's open source software which can be downloaded for free.

LLNL has a very active Compliance Program in place. Unfortunately, issues and disputes are part of a successful, mature technology transfer program. LLNL has made a concerted effort to formalize a process for handling dispute or problem issues.

Several years ago, the Livermore Site Office requested LLNL to start an industrial "watch list" which is a tracking device used between our offices to track problems/issues with industrial partners. Quarterly, NNSA met with LLNL to discuss ongoing actions and any new problems.

Monthly meetings were held between NNSA Livermore Site Office, the Service Center Intellectual Property Law Attorney, and LLNL to discuss and keep abreast of business development activities.

Last year, LSO reported that LLNL is using a commercially available off the shelf technology transfer database to help manage not only licensees but also CRADAs, material transfer agreements, options, nondisclosure agreements, financial transactions and licensing commitments. As the LLNL licensing program continues to grow this has become a vital tool for management and tracking.

LLNL responded in a timely manner to all requests by LSO and participated in data calls to NNSA HQ on technology transfer success stories, statistics, etc. used in their HQ reports with

other laboratories. Activity reports by LSO highlighted technology transfer news and activities at LLNL.

Community Involvement.

LLNL continues to use their outreach program to further relationships with the surrounding community and industry. A synopsis summarizes some of the recent activities.

In May through September 2006, five college interns that participated in the LLNL Summer Scholars Program worked with business development executives and intellectual property administrators to learn and focus on market research, IP, financial and contractual issues and gain work experience. The NNSA Livermore Site Office participated in meetings with LLNL and the college interns during this time period.

LLNL participates in the Technology Venture's Corporation Innovation Magazine and contributed articles throughout the year. NNSA Livermore Site Office continued to receive the draft articles and participates in review comments prior to the publication of the articles.

LLNL's licensees continued to contribute to our nation's economy. Among them were Metal Improvement Corporation which developed laser peening technology; UltraCell Fuel Cell Technology; PowerStor which developed carbon aerogel supercapacitor and Power Air Corporation, Zinc Air Fuel cell Technology.

FY 2006 Technology Transfer Statistics

In FY 2006, LLNL executed 119 patent and copyright licenses; licensing revenue (total royalties and fees) was \$6.1 million. This is an increase of 8 percent over the prior year and the highest ever for LLNL. This revenue is also the highest income of all the laboratories.

The Laboratory executed 10 new Cooperative Research and Development Agreements (CRADA) and 4 CRADA amendments. There were 32 CRADAs active during FY 2006 with 26 active at years' end. There were 157 inventions reported, 88 U. S. patent applications filed, and 19 initial foreign patent applications filed in FY 2006. A total of 63 U. S. patents and 19 foreign patents were issued for Laboratory inventions.

Performance Objective 6	Outstanding
Optimize current and evolving mission performance by providing effective and efficient facilities and infrastructure.	

Performance Measure 6.1	Good
Operate mission essential and user facilities as national capabilities, including National Ignition Facility, Device Assembly Facility, Superblock, Site 300, and High Performance ASC Computers.	

LLNL supported the weapons program objectives by using operating infrastructures at Device Assembly Facility (DAF), Superblock, High Performance ASC, as well as meeting all the programmatic milestones for the Test Readiness Program. With the exception of the Glovebox start-up at DAF, all the program objectives were met at an outstanding level. In addition, LLNL did outstanding work on NNSA Multi-Site weapon program Measures in support of W56 “Spinner”, B61 (LEP), W76 (LEP), W87 SS-21, W80 disassembly tool design, and W88 Programs. At the Superblock, in spite of the Stand-down in January 2005 that resulted in delay in meeting the Stockpile Stewardship programmatic milestones, LLNL successfully re-started and resumed the R&D in June 2006 and so far, made significant contributions in support of the Stockpile Stewardship Pu program.

Overall, the LLNL work in this area was outstanding. As the result of slow down of the R&D work at TA-55 at LANS, some of the pit related activities were transferred to the Superblock and LLNL successfully met the responsibility once it resumed operation at the Superblock.

There were numerous accomplishments at DAF, Superblock, ASC Computers, and Test Readiness. These included, but not limited to, working in partnership with NSO to establish a NNSA assessment schedule and approach for Safety Management Program and Vital Safety Systems, as outlined in the MOU between LSO and NSO. The LLNL fully met all the L2 programmatic milestones in support of the Purple and Blue Gene ASC Computers by making it operationally ready in FY 2006. These systems are expected to make contributions to Stockpile Stewardship, Pu aging studies and RRW Programs.

Issues and Concerns

The Glovebox start-up operation has been delayed from FY 2006 to FY07. This may adversely impact the FY07 DP Programmatic Milestones and the Laboratory needs to pay special attention to assure readiness of the Glovebox in early FY07.

Another issue is the potential delay of start of DAF construction that is currently scheduled for October 2006. The Preliminary Documented Safety Analysis (PDSA) prepared jointly by LLNL and LANS was submitted to NSO Safety Basis Review Team (SBRT) for approval; however the SBRT identified number of safety issues such as fire suppression issue that need to be addressed by LLNL and LANS personnel prior to start of the construction at DAF otherwise, it may result in a delay of the approval of the CD3 which in turn would delay the start of DAF and therefore DP weapon related programmatic milestones may adversely be impacted. However, LLNL and LANS personnel are currently working with NSO to resolve the safety issue as soon as possible.

NIC

The Contractor did an outstanding job in accomplishing NIF Experimental Support Technologies (EST) Program activities, including NIF Cryogenic Target Systems (NCTS), the National NIF Diagnostic Program (NNDP), User Optics, and Personnel and Environmental Protection Systems (PEPS). The EST Program supports the National Ignition Campaign (NIC), which is covered in Performance Measure 2.7.

An independent (Lehman) review of the NIC Program (and NIF Project), which included review of EST plans and status, was completed in July 2006, with the conclusion that the organization and definition of the NIC Plan (including EST) is appropriate, but implementation is at an early stage.

NIF Cryogenic Target Systems Program (NCTS)

NCTS accomplishments for FY 2006 included completing the NCTS preliminary (Title I) design, a joint effort by LLNL, LANL, UR/LLE & GA, and prototyping of the cryogenic target system clamshell shroud remover. The NCTS is now being managed as part of the NIC under NNSA's Enhanced Management requirements.

The Level 2 milestone "Complete cryogenic target system (CTS) Title I design" (MRT #1823) was completed Q3FY 2006.

National NIF Diagnostic Program (NNDP)

NNDP accomplishments during FY 2006 included completing Ignition diagnostics requirements reviews and placing the requirements under configuration management, installing a Generic Streak Camera Platform (GSCP) optical streak camera in the NIF Precision Diagnostics System (PDS), operating the GSCP at 100 percent reliability/availability for the 86 shot PDS campaign, and completing the initial production run of four GSCP optical streak cameras

The Level 2 milestone "Place ignition diagnostics requirements under configuration management" (MRT #1824) was completed Q3FY 2006.

User Optics

User optics accomplishments during FY 2006 included initiation of user optic production for NIC, imprinting prototype continuous phase plates for laser performance experiments, and accepting 48 second harmonic generator (SHG) and third harmonic generator (THG) crystals for improved performance and lifecycle.

The Level 2 milestone "Begin polarization smoothing (PS) crystal growth" (MRT #1825) was completed Q2FY 2006.

Personnel and Environmental Protection Systems (PEPS)

Personnel and Environmental Protection Systems (PEPS) accomplishments during FY 2006 included placing PEPS requirements under configuration management and completing the PEPS conceptual design review.

Issues and Concerns

There will inevitably be funding pressures on the NIC and/or directly on the planned Experimental Support Technologies. Careful development and management of requirements, and flexibility in planning will be required to deliver the capabilities required and assure they are consistent with overall NIC/NIF planning responsive to deviations from currently approved funding profiles.

Performance Measure 6.2	Outstanding
Execute construction projects as identified and agreed between NNSA and the Laboratories within scope, schedule, and budget; and develop and implement a site-wide Earned Value Management System (EVMS), and have that system certified by an independent auditor.	

The Contractor did an outstanding job of designing and building Line Item Construction projects within budget and ahead of schedule. On January 30, 2006, the Headquarters National Nuclear Security Administration approved Critical Decision 4 to allow the Contractor to begin operations of the Terascale Simulation Facility nine (9) months ahead of schedule. The Contractor completed the Project within budget.

Construction of the \$27,599K Engineering Technology Complex Upgrade Line Item Project was preceding ahead of schedule and under budget. The Contractor planned to complete the Project approximately three (3) months ahead of schedule. Despite the potential for significant risks associated with performing seismic retrofit and general construction work within an occupied laboratory, the Project Team has safely and successfully completed over 51 months and approximately 129,000 man-hours without a lost workday or reportable accident. This remarkable achievement was due primarily to the close coordination between the Building 321C occupants, Contractor construction management staff and construction workers.

On May 10, 2006, DOE certified the Contractor's site wide Earned Value Management System (EVMS). DOE hired the Defense Contracts Management Agency (DCMA) to review the Contractor's EVMS for certification in accordance with American National Specifications Institute Standard EIA 748 EVMS.

Issues and Concerns

The Contractor has demonstrated a need for improvement with regards to compliance with Contract 48 provisions which govern the Livermore Site Office (LSO) approval for General Plant and Operating Funded construction projects that are estimated to cost between \$500,000 and \$5,000,000. For example, in late FY 2005, LLNL Safeguards and Security Division personnel and Building 332 Programmatic staffs purchased long lead procurement items costing approximately \$530,000 using expense funds. Construction of site related modifications and installation of the long lead procurement items cost an additional \$510,000 in expense dollars for a total of \$1,040,000, all without LSO approval. With large dollar value Line Item construction projects diminishing and the number of smaller projects increasing, this issue will require attention.

NIF

The Contractor did an outstanding job in accomplishing NIF Project activities associated with the Total Project Cost (TPC) funded Line Item Construction Project and the Operating funded NIF Demonstration Program (NDP) during FY 2006, including exceeding 88 percent construction complete (vs. 87 percent target), passing the 43 percent complete mark (vs. 41 percent plan) on installation of Line Replaceable Units (LRUs), operationally qualifying a second bundle of 8 beams, and installing Laser Bay multi-bundle controls. The NIF project remained on schedule for meeting the Level 1 milestone “CD4 approval to begin NIF operations” [MRT #356] by March 2009.

The FY 2006 Congressional funding reduction and FY 2006 rescission on the NIF Project (\$1.4M TPC & \$11.0M NDP) was a directed “Programmatic Baseline Change.” A change control action for the NIF Project was completed and Baseline Change Proposal (BCP 06-001) was approved by the Level 3 Baseline Change Control Board authority (NIF Project Manager), on March 16, 2006, that incorporated a 3-month slip of two FY07 Level 3 milestones.

Based on the latest earned value data, through August 2006, the NIF Project is 88 percent complete and on schedule. The NIF Project cumulative Cost Performance Index (CPI) and cumulative Schedule Performance Index (SPI) were 1.01 and 1.00 respectively [>0.95 = outstanding], and the Cost Variance & Schedule Variance were \$15.1 million (0.5 percent) and -\$8.0 million (-0.3 percent) respectively. All but one of the 115 LLNL FY 2006 DOE/NNSA reportable NIF milestones were completed on or ahead of schedule, including one NIF Project Execution Plan (PEP) FY 2006 Level 2 milestone, “Deliver Laser Bay Multi-Bundle Controls” [MRT# 1827], and two NIF PEP FY 2006 Level 3 milestones, “Cluster 3 Laser Bay Amplifiers Installation Qualified” and “Cluster 4 Laser Bay Amplifiers Installation Qualified”, that were completed ahead of schedule. NIF Project unallocated contingency as of the end of August 2006 is considered adequate at 22 percent of remaining costs.

The NIF Project achieved a world class safety record during FY 2006 with a 12-month average total recordable case rate (TRR) of 0.7 [<3 = outstanding], although one lost work day case occurred early in the fiscal year. The NIF Project TRR is very good compared to the CA State average TRR of 6.2 and the National average TRR of 5.9. In addition, good progress was made in the closeout of “Open Safety Related Findings. During FY 2006 261 new safety related findings were generated and 163 were closed out by 30 Sept. 2006, with 98 findings remaining. The contractor completed 100 percent [95 percent = outstanding] of the minimum line management safety “walkabouts” specified in the directorate procedures. Planning for the NIF Readiness Assessment and Critical Decision 4 was ramped up.

NIF Project technical progress during FY 2006 included

- Completed a Precision Diagnostics System (PDS) performance shot campaign of 86 shots, with 17 shots scaled to 1 MJ and 11 shots scaled to >1.6 MJ full-NIF equivalent
- Installed Laser Bay multi-bundle controls, and successfully used these controls on two-bundle (16 beam) shots
- Completed beampath utilities (electrical & mechanical systems) installation in the Laser Bays and Switchyards

- Completed performance qualification shots on a second Bundle of 8 laser beams in June 2006, with validation of the data collected in the PDS to be completed in FY07
- Continued to meet the optics production rate to support Line Replaceable Unit (LRU) production and installation requirements during FY 2006
- Installed an additional 27% of the 6,206 LRUs required for the NIF Project, for a total of over 2,700 LRUs installed, and
- At the end of FY 2006 the NIF Project was over 88% complete and on schedule with the baseline plan

All NIF Project monthly reports due to NNSA in FY 2006 were received on time and there were no surprises [outstanding]. NIF Project reviews were held 4 times (Feb, March, April, June) for DOE during FY 2006. In addition, an independent (Lehman) review of the NIF Project (and NIC Program) was completed in July 2006, with the conclusion that current project performance and plans for completion of the NIF Project are consistent with the approved baseline calling for completion in March 2009.

The NIF Project participated in the UC/LLNL Earned Value Management System (EVMS) certification review in September 2005, and in FY 2006 prepared responses to the two Corrective Action Requests related to the NIF Project. The UC/LLNL EVMS was certified in FY 2006.

Performance Measure 6.3	Outstanding
Improve and sustain the physical infrastructure needed to support Laboratory operations. <ul style="list-style-type: none"> • Execute the Facilities and Infrastructure Recapitalization Program. • Manage facilities in a manner consistent with NNSA's deferred maintenance goals and other objectives as stated in the approved Ten-Year Comprehensive Site Plan. • Sustain planned availability of mission essential facilities. • Implement the FY06 NNSA-approved Maintenance Implementation Plan (MIP). • Maintain 2%+ maintenance funding relative to Real Property Value for FY 2007. 	

The Contractor did an outstanding job of sustaining the physical infrastructure needed to support Laboratory operations including planned availability of mission essential facilities and executing the Facilities and Infrastructure Recapitalization Program (FIRP). The Contractor managed facilities in a manner consistent with NNSA deferred maintenance goals and other objectives as stated in the approved Ten-Year Site Plan. The Contractor effectively used FIRP funding and continued to reduce the FY03 deferred maintenance backlog. Five FIRP projects were started in FY 2006 including recapitalization, disposition and planning efforts. LLNL met HQ's spending goals for FY2006 for the FIRP program despite a six-month delay in the \$12M B431 Demolition Project. Work involving this project was stopped in mid-February following two safety incidents. A series of activities, including an Incident Analysis investigation and the replacement of the original demolition contractor, contributed to the delay of the project. Proactive baseline changes kept this project in green status.

The Contractor continued to adequately fund maintenance to sustain the Laboratory infrastructure. Despite reductions in FY 2006 FIRP funding, the Contractor achieved an overall

Facility Condition Index of 6.80 percent, which is better than the corporate goal of 8 percent for Mission Critical facilities and infrastructure.

Planned availability for RTBF Facilities was 99.2 percent through the fiscal year. LLNL addressed compliance issues identified in FY 2005 by the DNFSB, OA40 and self-reported Technical Safety Requirements (TSR) involving B332. All issues involving seven administrative programs were successfully completed in FY2006 helping allow B332 to safely return to full operations one month ahead of schedule.

The Contractor did an outstanding job of developing and implementing the FY 2006 NNSA approved Maintenance Implementation Plans (MIP). The MIPs were fully compliant with DOE O 433.1 requirements. LLNL was slightly behind schedule in producing the new MIP because of the superblock shutdown and restart process. During development of the MIPs, a gap analysis was conducted which uncovered some deficiencies and areas for improvement to achieve full compliance with all DOE O 433.1 requirements. These issues were addressed and the MIPs were approved in August 2006.

LLNL Plant Engineering staff revised the ES&H manual to include chapter 52.1, which was developed to establish a Nuclear Facility Service Center to focus attention on the specific needs of the nuclear facilities and to establish the highest level of craft skills and experience for work in these critical operational facilities. New procedures in Nuclear Materials Technology Program and Radioactive Hazardous Waste Management were also developed to better implement these activities. Maintenance tasks included surveillance, administrative checks, and Plant Engineering task codes used to identify, monitor and implement preventive maintenance tasks.

The Contractor also did a good job of maintaining 2 percent + maintenance funding relative to real Property Value for FY 2007.

Limited RTBF funding negatively impacts the Contractor's ability to meet RTBF objectives. Achieving objectives is contingent upon LLNL, LSO and HQ agreeing on the NMTP Resource loaded Project Plan and priorities.

Performance Measure 6.4	Good
Support planning, implementation, and execution of special nuclear material (SNM) consolidation and/or relocation activities, including reducing inventories of surplus and excess SNM consistent with DOE/NNSA approved plans.	

LLNL efforts provided for acquiring materials for the programs and providing for disposition of excess materials. LLNL programs had the tools needed to complete their mission and the excess materials were designated for removal albeit, a path and funding need still exists for completing the plan.

LLNL made excellent progress in stabilizing and packaging excess nuclear materials for long-term storage or off-site disposition. LLNL provided a good Nuclear Materials Inventory

Assessment submittal, and quickly resolved a few identified discrepancies. LLNL also provided an excellent Component Staging Report.

Each type of material at LLNL was listed and planned for disposition assuming that a pathway to SRS is available for the MOX plant for reactor fuel or the vitrification facility and using HB line and H-Canyon to process excess highly enriched uranium and plutonium that is not suitable for MOX or the vitrification facility. At present, there is no approved disposition pathway to SRS.

Packaging and storage of materials are also part of the management of the nuclear materials. In an ongoing effort, materials are removed from storage, consolidated and repackaged to site approved packaging configurations.

This year a study was initiated to use H-Canyon for processing of not only excess uranium, but excess plutonium not suitable for MOX use. Materials were identified and the bulk of Livermore excess holdings that don't meet MOX specs were being scheduled for processing and packaging for this disposition route. These materials will be processed and packaged to meet shipping container criteria and Savannah River Site Acceptance Criteria for disposition.

Seventy-four DOE standard 3013 cans have been created for long-term storage and off-site shipment. As many as 60 to 80 more cans will be filled during the continuation of the effort. The bulk of LLNL holdings have had new fields assigned in the NMIA data base identifying disposition paths for excess materials and programmatic descriptors.

Operations

Performance Objective 7	Outstanding
Utilize UC strengths to recruit, retain and develop the workforce basis.	

Performance Measure 7.1	Good
Maintain a skilled and diverse workforce that meets the Laboratory's long-range core and critical skills requirements by implementing a human resource strategy that leverages student programs and UC relationships.	

AHRD accomplished delivery against all milestones stated in the Implementation Guidelines. Specifically:

- The Workforce Executive Counsel (WEC) was established and chartered to address workforce restructuring, recruiting and succession management. Further, the WEC charter was expanded to include change management initiatives, and provision for talent management, as well. The WEC is now known as the Workforce & Communications Workgroup (WCG).
- At the beginning of FY 2006, the Staffing & Employee Development (S&ED) areas of HR initiated an internal review of how they generate and use metrics to evaluate what they do and to determine what they need to do. A set of metrics were developed to better position the organization to lead, partner, and address workforce needs in support of the scientific and technical mission and values of LLNL. FY 2006 data will be used at fiscal year end as a baseline to establish benchmarks and identify future priorities and focus areas for improvement.
- During this time of transition to a new contract, unusual trends (e.g., a 25% increase in overall separations, and a 24% increase in declines for "Base Salary" and "Other Job Offers" relative to external hires) were monitored. In addition, results of the management decision to effect strategic hiring were also monitored.
- In order to incorporate workforce diversity into all aspects of the directorate's HR and related functions, every AHRD organization was notified of its responsibility to accomplish diversity. As planned, a Diversity Strategic Plan was developed to provide an institutional framework for achieving diversity objectives.

The Laboratory demonstrated a systematic evaluation process and improvement orientation as demonstrated below:

- LLNL regularly assesses the readiness of the Workforce using multiple assessment methods. Findings confirm that the Lab has the appropriate skill mix to accomplish its mission, with a strong pipeline to maintain its readiness.
- An analysis was conducted in June 2006 for Flexible Workforce Planning to gain a better institutional understanding of flexible term (FX) and supplemental labor (SL) usage through 2007. As a result, the WCG is developing institutional guidance on how best to manage the flexible Workforce during transition so that the Lab can successfully retain current key talent in the FX population.

Additional Achievements included the following:

- Employees in Critical Skills (CS) positions comprise 48.7% of employees in technical classifications, illustrating that there is ample coverage to meet the Lab’s critical skill needs. The Lab believes that the large pool of individuals in the CS pipeline provides a strong buffer against single-year fluctuations.
- Various programs managed by the University Relations Program (URP) office are successfully feeding into the Lab’s pipeline for critical skills.
- The University Relations Programs continue to provide an important pipeline of talented students through their various programs.
- The Science and Engineering Alliance (SEA) Visiting Faculty Program, a diversity-inspired university outreach activity, was launched in September 2006 to help make students and faculty of minority-serving institutions more accessible to LLNL.
- The third quarter Objectives Matrix index for HR performance was in the “Excellent” range.

Performance Measure 7.2	Outstanding
Develop an institutional plan to manage the Defense Program’s full-time-equivalent reductions as specified in the “Defense Programs FY 2007 to FY 2011 Program and Resource Guidance.” dated March 4, 2005.	

The Laboratory initiated and subsequently implemented actions to achieve end-of-year manpower reduction consistent with the Defense Program FY2007 to FY2011 Program and Resource Guidance dated March 4, 2005. The goal was to reduce DP FTEs by 2 percent in FY07. The base for this performance measure was established to be the total DP line for FY 2005 average FTEs (4,807) in the LLNL/FIVR FTE staffing report submitted to NA-10 on October 18, 2005. This base has been adjusted by LLNL to reflect changes in DP funding and programmatic redirection at LLNL. The revised FTE was based on the following assumptions; the starting point of the base for this Performance Measure was the total DP line for FY2005 average FTEs (4,807) in the LLNL/FIVR FTE staffing report that was submitted to NA-10 on October 18, 2005 and for comparative purpose, year after year, 183 FTEs were added to the FY05 DP base for ERWM/Newly generated waste activities that moved to DP/RTBF in FY 2006; and also for comparative purposes, year over year, 125 FTEs were added to the FY05 DP base for DOD/WFO activities that moved to DP/DSW in FY 2006.

Based on the LLNL assessment, a 2 percent reduction appears consistent with an FTE level of 5,013 DP FTE’s in FY07. However, in FY 2006 LLNL has reduced the FTE number to 4,780 an approximately 7 percent reduction from the 5,115 base as outline in the Laboratory Institution Plan. The LLNL work in this area has been exemplary and clearly demonstrates commitment to exceed the DOE expectations from the 2 percent FTE reduction to 7 percent FTE reduction. The Laboratory achieved this objective by conducting rigorous work force reviews as well as continuous communication between the Lab Director and Associate Directors and DOE Program managers that assured that DNT Directorate exceeded the DP FTE reduction commitment, as outlined in the DP FY07-FY11 Program and Resource Guidance.

Issues and Concerns

LLNL needs to continually monitor, and if necessary, modify and update the current FTE reduction to reflect the NNSA future programmatic changes in the Defense Program like a potential selection of LLNL as the lead design Laboratory for RRW Program.

Performance Measure 7.3	Outstanding
Sustain leadership and management development programs that achieve workforce and diversity objectives.	

AHRD delivery against milestones established in the Implementation Guidelines included the following:

- Thirty three percent or more of the last three years’ graduates of the directorate leadership development program, or Management Institute, were to have assumed higher-level responsibilities. Per the Lab’s Year-End Self-Assessment, “... more than a quarter assumed increased responsibility”.
- Fifty nine percent of Laboratory leadership and management development program participants’ were to be females and/or minorities. The Lab’s Year-End Self-Assessment indicates participation essentially equal to the percentage of availability in total employee population (i.e., 45 percent female and 23 percent minority).
- LLNL also surpassed its expectation for at least 80 percent of all supervisors and managers to complete Sexual Harassment Prevention Online Training, by September 30, 2006, in that 98.2 percent completed the training.
- A competency model was developed in more than 50 percent of the Laboratory Directorates.

Evaluation strategies such as needs assessment, focus groups, and customer feedback were used to guide processes, address curriculum improvements, and assess need for new program development.

Further achievements included:

- The Lab’s Succession Development Framework was distinguished by a breadth of opportunities at all levels.
- Core competencies continued to be used to implement and identify talent development directions and guide priorities.
- A number of new programs were implemented based on Lab priorities and competency development needs. Many of the new programs were predicated by the need to address change and transition issues resulting from Lab contract competition as well as to achieve workforce and diversity objectives.
- 77 percent of Lab first-line supervisors have taken Supervision I, and 78.76 percent of Lab supervisors/managers have completed Supervision II.
- Directorate succession pool development was deployed thru directorate-specific leadership development programs, supported by HR organization development consultants.

- The Lab continued to conduct annual Workforce Reviews by which the Director meets with senior management from each directorate to discuss & evaluate succession pools and development results.
- The Laboratory's commitment to leading employee development practices continued, with major upgrades to the search engines and user authentication of its e-learning opportunities.

Performance Objective 8	Satisfactory
Maintain safe, secure, environmentally sound, effective, and efficient operations in support of mission objectives.	

Performance Measure 8.1	Satisfactory
Achieve continuous improvement in Integrated Safety Management System performance: <ul style="list-style-type: none"> • Assure consistent and effective application of ISM principles across all organization levels and across all Laboratory facilities. • Ensure effective implementation of an ES&H corrective action management program, including institutional corrective actions derived from violations enforceable under the Price Anderson Amendments Act. 	

LLNL continued to make progress in implementing the corrective actions for the ES&H inspection conducted by the office of Independent Oversight and Performance Assurance in 2004 (OA-40). Examples of major accomplishments include:

- LLNL line management conducted an assessment on ISMS implementation at the work activity level (ISM Certification) by reviewing and observing a representative sample of work activities. Several positive outcomes resulted from this assessment; for example, this was the most comprehensive review of ISMS implementation at the activity level that directly involved senior management. Major results of the review included:
 - Several directorates, especially those that were included in the OA-40 review, found that there were improvements in ISMS implementation within their program;
 - Several common problems/issues were observed by many directorates in the implementation of the Integrated Work Sheet (IWS) process; and
 - Some directorates identified systemic issues and recognized that more needs to be done to achieve full implementation of ISMS at the activity level.
- LLNL implemented a new Web-based Case Analysis Report (CAR) to replace the Supervisor's Accident Analysis Report. Data contained in the CAR is uploaded into the DOE injury/illness reporting system CAIRS.
- The policy regarding issues and deficiencies management (ES&H Document 4.2) was revised and issued.
- Modification was made to the ES&H Issues Tracking System (ITS) to expand access to the data which should facilitate improvement of the data analysis process.
- LLNL developed and released the online annual ES&H briefing with focus on ISMS principles and core functions.

LLNL's ISMS Certification (based on a 10 percent sample of the IWSs) identified several common issues across the directorates in the implementation of the work control process. This was one of the findings of the OA-40. Some directorates were taking initiatives to continue a similar type of review to other IWSs.

LSO reviewed all of the ISMS Certification reports from the directorates.

- LSO was concerned that LLNL's consolidation of the three issues was at too high of a level. As a result, several common issues related to the implementation of the work control process observed by the directorates, such as, inadequate work description, non-specific PPE included in IWS, pre-start review/readiness assessment not performed or documented, etc., did not appear to be captured in the corrective actions for these institutional issues.
- LLNL did not schedule to complete most of the corrective actions for the institutional issues until the end of 2006 and into 2007. Some actions appeared to be part of the OA-40 corrective actions; however, the completion dates for those actions are not consistent with OA-40 CAP completion dates. The corrective action also did not address the issue of the use of generic IWSs.

Roll-up results of external and LLNL's independent audits, assessments, as well as LSO's operational awareness activities conducted during FY 2006 found that improvement was made in the area of analyzing hazards; however, no improvements were made in the areas of develop/implement controls, feedback for improvements, and performing work within controls.

The LSO Management Self Assessment (MSA) and the Chief Defense Nuclear Safety (CDNS) biennial review of LSO/LLNL in 2006 identified weaknesses in the several ES&H areas, fire protection, radiation protection, conduct of operations, feedback and improvement, etc.

LLNL had taken actions to improve their PAAA program. These actions included active involvement of the LLNL Director, review of PAAA corrective actions by the Performance Review Board, reorganization of the PAAA Office, and an internal baseline review of the PAAA Program. These actions have led to improvements in the PAAA program, including improvements in Noncompliance Tracking System (NTS) reporting, timely completion of NTS corrective actions, and timely updating of the NTS database. However, the baseline review found that of the 44 deficiency statements evaluated from the 2004 Office of Enforcement PAAA Program Review, 18 were found to be uncorrected, another 18 were partially corrected, and 8 were fully corrected. Additional corrective actions were in progress. The PAAA program was rated as satisfactory for this fiscal year. (Note: The PAAA issues raised in the NOV issued this fiscal year were taken into consideration in last fiscal year's rating based on the Office of Enforcement's Investigation Report).

Issues and Concerns

In order to ensure a more robust and comprehensive ES&H self-assessment program, LLNL needs to ensure that assessment results are consistently and effectively being used across institutional elements as part of its feedback and improvement process.

Performance Measure 8.2	Satisfactory
<p>Improve the following programs within the criteria identified:</p> <ul style="list-style-type: none"> • The Institutional Contractor System Engineer Program within the NNSA-approved schedules. • An Emergency Management Program within the NNSA-approved schedules in the Emergency Readiness Action Plan (ERAP). • The relevant configuration management program tasks identified for implementation this year. 	

Institutional Contractor System Engineer Program within NNSA-approved schedules

The contractor’s progress in establishing a Contractor System Engineer Program (CSEP) is satisfactory. A gap analysis against DOE O 420.1A, *Facility Safety* was completed. Negotiated expectations for the contractor’s CSEP program included the completion of a gap analysis and “LLNL System Engineer Implementation Plan” (SEIP). The contractor’s SEIP deliverable was on schedule and met expectations for task completion and implementation schedule.

A rating of satisfactory was assigned because overall performance for FY2006 met the negotiated expectations. The contractor implemented the NNSA-approved schedule for the institutional Contractor System Engineer Program, and tasks and deliverables were on schedule and met expectations.

Emergency Management Program with the NNSA-approved schedules in the Emergency Readiness Assurance Plan (ERAP)

The contractor did a good job of implementing an Emergency Management (EM) Program within NNSA-approved schedules according to performance year deliverables stipulated in the LSO-approved Emergency Readiness Assurance Plan (ERAP). The contractor completed all fiscal year 2006 ERAP deliverables, including, but not limited to: annual updates to the LLNL Emergency Plan, Emergency Plan Implementing Procedures, Hazards Survey, and Emergency Planning Zone; Emergency Preparedness Hazards Assessment (EPHA) documents; Facility-Specific Emergency Plans; EPHA drills; annual exercise; and the annual self-assessment. All ERAP deliverables were of acceptable quality and were received on or ahead of schedule. This included the completion of all corrective actions from the June 2005 Office of Independent Oversight and Performance Assurance emergency management inspection that were due in the performance year to achieve short-term and ensure longer-term systematic changes.

The contractor completed several tasks and deliverables beyond the performance year ERAP requirements to improve the overall effectiveness and efficiency of the Emergency Management Program. These tasks and deliverables included:

- Participation and support of the Office of Independent Oversight Special Review of Chemical and Select Biological Agents, February 2006, and Chief of Defense Nuclear Safety review, March 2006. No systemic or programmatic deficiencies noted for emergency management activities.

- Development and support of the Office of Emergency Management and Policy (NA-41) No-Notice Exercise (NNX) at LLNL in August 2006, with contractor representatives serving as “Trusted Agents.”
- Formation of a Standards Identification Team (SIT) for DOE Order 151.1C, Comprehensive Emergency Management Program, resulting in DOE Order 151.1C being approved by the Work Smart Standards (WSS) Change Control Board in September 2006 for incorporation into the contractual WSS set.
- Planning and execution of two drills for LLNL bio-safety facilities to further enhance emergency response team training in managing incidents involving Select Agents (i.e., bio-hazardous materials) and support of the readiness review for Building 368, Bio-Safety Level III facility.
- Development of an EPHA document for bio-safety facilities beyond ERAP requirements.
- Streamlining of EPHA requirements by proactively removing Building 235, in conjunction with Facility Management, as an EPHA facility and by consolidating several EPHA facilities into a single EPHA complex document (e.g. Building 230s Complex); thereby, reducing programmatic costs associated with EPHA document maintenance and associated training/drills.
- Complete installation of Emergency Communication Network (ECN) equipment in the Emergency Operations Center, leading to classified communications certification.

The above tasks and deliverables were of acceptable quality and their attention by contractor management demonstrated an eagerness to ensure continual improvements in the Emergency Management Program.

Relevant Configuration Management Program tasks identified for implementation this year

The contractor made satisfactory progress in the implementation of configuration management institutionally. The directorates (DNT, CMS, ENG and NIF) have developed procedures for implementing configuration management within their facilities and as non-nuclear authorization basis documents were developed, configuration items were being identified and assigned. Additionally, several directorates have performed self-assessments to ensure continued improvement. NMTP revised the February 2006 resource loaded configuration management schedule in August 2006 and has made progress in completing milestones (i.e., system design descriptions, document control, etc.). RHWB is in the process of updating their program to ensure continued compliance. LLNL and LSO chartered a Standards Identification Team to evaluate the need for revision to the current configuration management standard in the LLNL Work Smart Standards. Revisions were made which served to further clarify the intent and expectations.

A rating of satisfactory was assigned because overall performance for FY2006 met the negotiated expectations. The contractor implemented the tasks identified for implementation this year, and tasks and deliverables were on schedule and met expectations.

Performance Measure 8.3	Satisfactory
<p>Comply with and achieve continuous improvement in nuclear safety and quality performance under 10 CFR 830 for both LLNL and LLNL operations at the Nevada Test Site.</p> <ul style="list-style-type: none"> • Implement the Building 332 Documented Safety Analyses and Technical Safety Requirements within the NNSA-approved schedules. • Implement the Unreviewed Safety Question process site wide within the NNSA-approved schedules. • Resume operations in Building 332 within the NNSA-approved schedules. 	

Nuclear Safety

LLNL made many improvements in FY 2006. These improvements included

1. Actions to correct B332 deficiencies identified in the prior year OA-40 inspection were completed; a readiness review confirmed the effectiveness of the corrective actions; in May 2006, LSO granted approval for resumption of full SAR authorized operations in B332.

2. In April 2006, LSO approved the B332 Rule-compliant DSA and TSRs.

Because resuming full operations in B332 was resource-intensive, completion of these two actions was expected to have a positive effect on balancing nuclear safety resources among all of the Category 2 and 3 nuclear facilities.

3. Also, the contractor's new institutional manager for nuclear safety basis made a positive impact on the quality of the safety basis documents, including the USQ program. The contractor developed guidance documents, formed a USQ Review Committee, and included a comprehensive lessons learned program in its mandatory USQ training to address the deficiencies in its safety basis program. A contractor USQ subject matter expert is now part of the safety basis team. He is the EFCOG USQ Chair and participates complex-wide on various nuclear safety matters.
4. In addition, the contractor submitted Revision 5 of its USQ Procedure for LSO approval in March of 2006. Only minor changes were required, and LSO approved the procedure in July 2006. The newly approved Revision 5 of the USQ procedure corrected deficiencies identified in the OA-40 inspection, focused on the seven specific USQD questions in the USQD section, and was better organized and streamlined compared to its predecessor.
5. Finally, there were improvements in some safety basis amendment submittals meeting the requirements of the Rule. However, the Preliminary Documented Safety Analysis (PDSA) for Nevada's Criticality Experiment Facility did not meet minimum requirements for a PDSA, and the NSO safety basis review team identified many significant issues with the PDSA. The contractor's ability to project future work needed improvement. Some safety basis amendments were submitted on short notice leaving little time for the LSO review and approval process.

Criticality Safety

LLNL Self-Assessments of Criticality Safety:

The LLNL CSS conducted three criticality safety self-assessments during the year. The first assessment, *Report of the Criticality Safety Audit for Radioactive and Hazardous Waste Management, dated January 25, 2006*, was of limited scope and focused on the flow of waste from a generator (B332) to storage in the RHWM facility. The second assessment was, *Report of the Annual Criticality Safety Audit for the Plutonium Facility – B332*, dated March 2, 2006. The review was of broader scope than in previous years with five team members (three members of the team were experts from other DOE sites.) A third self-assessment was also conducted of LLNL's implementation of its criticality safety program with regards to operations in the Device Assembly Facility at NTS, *Report of Annual Criticality Safety Audit for DAF*, dated May 9, 2006. The team determined that the criticality safety program at the DAF was adequate for the current low level of fissionable material operations. LSO assessment of these self-assessments was that overall they were very good.

Training

LLNL continued to do an outstanding job in ensuring that all personnel who work with or around fissionable materials receive the appropriate training.

Additionally, LLNL implemented a 4-day Criticality Safety Training class that involves hands-on work measuring multiplying assemblies of fissile material in support of the DOE complex criticality safety program. This effort was accomplished under severe time constraints and was an outstanding achievement.

Facility Implementation of Criticality Safety Controls

Several minor problems were noted with regards to implementation of criticality controls (see earlier section on infractions). Additionally, during a DNFSB assessment, material handlers demonstrated poor conduct of operations when moving SNM from one location to another. This was brought to the immediate attention of NMTP management who briefed personnel on the need to follow procedural steps as described in the Facility Safety Plan. Overall, implementation of criticality safety controls has been observed to be very good, however these criticality safety conduct of operations issues merit close LSO attention.

Quality Assurance

The contractor met the operational performance expectations for tasks and deliverables related to Quality Assurance (QA) and was therefore rated as satisfactory. The contractor met the majority of deliverables on time with an adequate degree of quality and comprehensiveness.

All OA-40 corrective actions related to QA were completed on time. The contractor completed the Work Smart Standards (WSS) process for updating the QA requirements-set to include the newly approved DOE Order 414.1C and incorporated the Contractor Requirements Document into Appendix G of contract W-7405-ENG-48. The contractor submitted a plan and schedule for implementing the software QA (SQA) requirements of the newly revised QA Order on time. The contractor did an outstanding job in submitting a revised QA Program Description Document (QAP) for addressing LSO comments, when only the submission of a plan and a

schedule was required. The contractor included institutional SQA requirements in the newly revised QAP and submitted the required SQA program description and selected a national consensus SQA standard for use as they had committed to. The contractor completed two safety software assessments: an internal assessment of COMATS and a joint LSO/LLNL assessment of Criticality Alarm System. The contractor did not meet dates for completing a HSC Outokumpo Chemistry corrective action and submitting an implementation plan as requested for implementing the SQA requirements of DOE O 414.1C. Overall, contractor performance against milestones met expectations.

Quality Assurance functional area reviews of the implementation of quality assurance requirements for Management Assessment, Independent Assessment, Quality Improvement, Personnel Training and Qualification, Software QA (SQA), DNT/NMTP Procurement, and NSO assessment of QA Implementation at DAF indicated overall compliance with requirements with some deficiencies and opportunities for improvement. Deficiencies did not substantively affect overall performance. Overall quality assurance program "health" met requirements and was steadily improving.

Issues and Concerns

Nuclear Safety

The contractor was slow in resolving NNSA Livermore Site Office (LSO) comments on the annual update to the B239 Documented Safety Analysis (DSA) and Technical Safety Requirements (TSR). For the annual updates to the B331 and B334 DSAs and TSRs, the contractor did not provide dispositions to the LSO comments during the performance period.

USQ implementation issues continued. Although a USQ procedure requirement, several safety basis supporting documents had not been through the USQ process. The contractor's timeliness in performing the required USQ Determination (USQD) for several Potential Inadequacies of the Safety Analysis (PISA) was less than adequate. The contractor's USQ procedure states that the time for the completion of a USQD is typically on the order of days not weeks. USQDs in many cases took months to complete.

There continued to be examples where the contractor inappropriately used new information (outside of the safety basis) to arrive at a negative USQD. After discussions initiated by LSO, the re-evaluations resulted in positive USQDs. For a number of positive USQDs associated with PISAs that were not restoration modifications, the contractor did not submit the required safety basis amendment.

In FY 2006, the NNSA/NSO performed an assessment of the implementation of the USQ process in the Device Assembly Facility at the Nevada Test Site. This assessment of the implementation of the USQ process for the Nevada site identified seven findings.

Criticality Safety

Infractions

There were three criticality safety infractions during the 2006 fiscal year (There were two during the previous year – both related to waste container labeling in B332.)

The first infraction, on 7/6/06, occurred when two pairs of items were moved to new locations in the vault. The items were approved for the new locations in the computerized material control and accountability system, but had not been approved in the operational safety plan. This infraction resulted in personnel failure to work strictly to the approved procedure and an over-reliance on the facility's mass tracking system (COMATS).

The second infraction, 8/29/2006, occurred when fissile material handlers underestimated the mass of plutonium salts that had been processed by a different method than usual, and transferred salts to a location that had a lower plutonium mass limit than was actually present in the salts. This infraction was the result of technical problems estimating the amount of plutonium residue in the salts associated with a new chemical process in the facility.

The third infraction, 9/12/2006, occurred when machinists drilling an approved item underestimated the mass of chips and fines produced by the process and violated the mass limit. Personnel conduct of operations problems contributed to this infraction.

LLNL filed an occurrence report due to the number of infractions.

Radiation protection corrective action and issues management processes need to be improved; there is a lack of formality and rigor in the implementation of the program and adherence to policies and procedures.

Quality Assurance

The contractor has not submitted an implementation plan for implementing the full requirements of Software Quality Assurance (SQA IP) as directed. As such, the contractor has not addressed when full implementation of the SQA requirements will occur.

In addition, some QA Calibration Program concerns which have PAAA implications were noted in FY06. These calibration issues included the radiation area monitors in B-235 and B-239; the photohelic DP gages in B-331; personnel contamination monitors in B-332; hand and foot monitors in B-321C; and the magnahelics on HEPA filter system at the RHWM.

Readiness Review

Although the recently performed readiness assessments were marginally adequate, LLNL has made improvements in their readiness review process. Concerns noted during FY 2006: The conduct of the LLNL RA team and the depth of their review were marginally adequate to support an independent verification of readiness for resumption of full SAR authorized operations. The team noted that LLNL B 332 management did not clearly document preparations for the review by providing updated evidence files and documenting results of recent management assessments and other reviews that provided the background to support their

declaration that procedures, equipment, and operator training were in place and effective for full SAR authorized operations. As a result, the LLNL RA team had to conduct additional activities and verification reviews to support an overall determination of program effectiveness and recommendation for subsequent removal of compensatory measures. Additionally, much of the LLNL RA team's conclusions appeared to be based on familiarity with line management's efforts from past reviews as support contractors and on interviews with management instead of review of documentation and comprehensive review of operations. Some items were not verified, and some were verified and identified as met but the supporting information did not support the conclusion. A lack of preparation by LLNL B 332 line management, coupled with a limited size and duration of the independent team, contributed to the inconsistent depth and quality of the LLNL RA team report.

The LLNL Legacy Item Readiness Assessment was suspended by the LLNL/NMTP Program Leader on the third day. The main reason for the suspension was the realization that the facility/program was not ready to perform the activity. This was due to lack of comprehensive preparation which would have included integrated dry runs (including facility participation). The radiological controls were ill-defined and inadequate, the conduct of operation including the development and use of procedures was lacking, field changes had not been appropriately vetted and authorized and the equipment specifically designed for the activity had not been evaluated to ensure that it could be installed. The Readiness Assessment was premature.

Performance Measure 8.4	Good
<p>Maintain an environmental management program consistent with the DOE-approved baseline, funding levels, policy, and negotiated regulatory requirements.</p> <ul style="list-style-type: none"> • Demonstrate performance of the ISO 14001 Environmental Management System. • Effectively manage the direct funded environmental restoration and waste management programs, including environmental compliance agreements. 	

8.4.A. Newly Generated Waste Subproject

The Contractor did an outstanding job operating the waste management facilities in a safe, compliant manner while maximizing available funds. The Contractor disposed of 1,421 m³ of mixed and low level wastes, 291 m³ above their NTS Forecast of 1,130 m³, a 26 percent increase beyond the measure. The Contractor's year end cost variance was 4.4 percent.

8.4.B. Legacy Waste Subproject

The Contractor did a good job in completing the Legacy Waste Project (LWP). The last shipment departed LLNL on November 30, 2005 with sufficient funds for payment of outstanding invoices. The project has been rated "Green" for the past year.

8.4.C Livermore Site Environmental Restoration Subproject

Livermore Site ER Project met all technical requirements of approved baseline by September 30 with a positive cost variance of 7 percent. The contractor also met all the requirements for the Critical Decision-4 process, meeting EM completion and allowing for transfer to NNSA for Long Term Stewardship. Based on that performance, the contractor is rated Satisfactory.

8.4. D Site 300 Environmental Restoration Subproject

Site 300 ER implemented cost savings in the B850 Removal action of approximately 13 percent. This required renegotiation of the removal action milestone from FY 2006 to FY 2007 based on regulatory direction (a justified adjustment of the technical requirements). All other technical requirements were met. Based on this performance, the contractor is rated Outstanding.

8.4.E. Cost Savings/Project Efficiencies Measure(WM)

The Contractor did a satisfactory job in pursuing cost savings and project efficiencies in accordance to their Plan of Action. More specifically, partial implementation of one recommendation (reducing footprint) enabled staff to consolidate office spaces and returned vacant office trailer to the institution. Although cost savings were minimal, they were "facility space charges" that no longer need to be funded and are recurring savings.

8.4.F Cost Savings/Project Efficiencies Measure (ER)

LLNL submitted a plan for cost savings that identified undetermined potential savings FY 2007 and beyond. In addition, Site 300 identified a revision to the B850 removal (see 8.4.D) that resulted in a savings of approximately \$2M to the Site 300 lifecycle cost. Based on the plan and the B850 savings, the contractor rated a Satisfactory.

8.4G Complete Self-Declaration and Demonstrate Performance of the ISO 14001 Environmental Management System

LLNL completed the self-declaration process for the ISO 14001 Environmental Management System (EMS) in December 2005. The declaration was based on an internal audit by LLNL, a DOE LSO ISO 14001 Audit, and a corrective action plan to address 13 minor non-conformances identified in the LSO audit. In addition, LSO initiated the effort to update the version of ISO 14001 in the WSS to the 2004 version of the standard. This was completed in August 2006. LLNL claimed it will take nine months to complete the corrective action plan and has also factored in the minor changes associated with the 2004 standard. LLNL completed 20 of 32 corrective actions to be completed in FY 2006 and outyears. LLNL developed objectives and targets as part of ISO 14001 and completed several of the targets identified for FY 2006. Based on the above the Contractor rated a Satisfactory.

Issues and Concerns

Livermore Site ER is expected to implement source area remediation strategies within the existing funding profile. This will require that cost savings/efficiencies be identified in order that all regulatory commitments are met.

Site 300 ER will carryover funds for the B850 removal action in FY07 and possibly FY08. These funds are necessary to complete the project but will be vulnerable to other departmental priorities.

LLNL has a major challenge of facilitating increased programmatic participation and obtaining commitments to reduce negative environmental impacts of significant environmental aspects related to the ISO 14001 EMS. LLNL needs to increase communication and awareness at the senior management and staff level across the Lab. LLNL needs to more effectively utilize

pollution prevention and sustainable design techniques as a prime tool in meeting the environmental stewardship commitments.

Performance Measure 8.5	Good
<p>Achieve continuous improvement in security performance through ISSM and risk management principles.</p> <ul style="list-style-type: none"> • Demonstrate continuous improvement in the implementation of ISSM including line management directed self-assessments. • Develop and implement appropriate plans and initiatives in accordance with DOE/NNSA policies so that NNSA expectations are addressed while balancing mission requirements with S&S resource allocations and new requirements. • Effectively manage accountable Classified Removable Electronic Media (CREM). • Effectively account for Special Nuclear Materials. • Implement corrective actions as a result of findings from external agencies in accordance with the approved timeline in the corrective action plan. 	

The contractor safeguards and security performance was given an overall Satisfactory rating by the LSO FY 2006 annual comprehensive survey evaluation. DOE HQ Office of Independent Oversight (SP-40) Special Review of Security and Emergency Management of Chemical and Select Biological Agents, conducted February 2006, found examples of innovative and effective security measures by the contractor that will be considered in national policy development. Inspections of the contractor’s Material Control and Accountability program and Cyber Security program by the DOE Office of the Inspector General found effective program implementations.

Contractor performance in planning and completing work to implement the 2003 Design Basis Threat (DBT) by October 2006 demonstrated initiative, innovation, and firm commitment to project completion. An aggressive schedule with budget reductions made this project particularly challenging. The work was completed on time and resulted in a significantly upgraded protection strategy.

Risk management principals were effectively applied by the contractor to respond to significant budget reductions in physical and cyber security programs.

Issues and Concerns

During the rating period, LSO found that the contractor had not implemented its Performance Assurance Program (PAP). The PAP is used to manage and test essential protection strategy elements. Findings were issued to the contractor for deficiencies in its program for protection strategy testing. Another finding was issued to the contractor for not fully implementing federal requirements for Protective Force fitness testing. The contractor’s self-assessment was not sufficient to identify and report these weaknesses. LSO recognizes the large volume of cyber requests and deliverables, but LLNL has been remiss in responding to these requests and in keeping LSO informed of milestone slippage. For example, the strategic plan for mitigating classified system vulnerabilities, 6 months late (date agreed to with LSO); revised cyber security NAP IP, 6 months late; and revising the cyber security program plan to reflect changes to sensitive country foreign national cyber access requirements is 4 months late (date agreed to with LSO).

Performance Measure 8.6	Outstanding
Detect, deter, and mitigate foreign intelligence collection and espionage and international terrorist threats.	

The University of California (UC) Counterintelligence Office (CI) Office, Lawrence Livermore National Laboratory (LLNL) performed outstandingly in FY 2006. The CI Office significantly exceeded the operational performance expectations including tasks and deliverables. The CI Office set the "Gold Standard" for collections by publishing 154 Intelligence Information Reports (IIRs), a number several times more than any other single office within the CI enterprise. These IIRs are the direct results of collection requirements set forth by not only CI but also those of the U.S. Intelligence Community (USIC). They were disseminated throughout the USIC and NNSA senior management with much positive feedback.

In FY 2006, the CI Office maintained a Suspicious Incident Chart in support of the overall counterterrorism (CT) effort at LLNL. The effort involves a cooperative arrangement between the Livermore Police Department, UC Police Department, Safeguards & Security Organization, the CI Program at Sandia National Laboratory-CA and the Federal Bureau of Investigation (FBI). During 2006, 45 Suspicious Incidents were reported and appropriately worked. It was the first such program to be developed and sustained throughout the CI enterprise. Analyses of the Suspicious Incidents Reports for possible indicators of pre-attack surveillance are conducted to detect or deter any terrorist's attacks directed at the NNSA facilities.

The CI Office's outstanding publication *Russian Outlook* distribution was expanded beyond the Material Protection, Control and Accountability Program (MPC&A). It is now distributed to the International Policy Initiatives for Proliferation Prevention (IPPP), Nuclear Cities Initiative (NCI), International Science and Technology Center (ISTC), and the Science and Technology Center of the Ukraine (STCU).

The CI Office's liaison efforts were superior with close relationships with external agencies of the USIC. It worked closely with the FBI, San Francisco Field Office, FBI's Bay Area Terrorism Working Group, Regional CI Working Group, and the Central Intelligence Agency.

During this year, all 15 employees of the CI Office attended advanced professional training courses beating the CI performance measure of sending 60 percent of CI personnel to advanced training.

NNSA, Office of Defense Nuclear Counterintelligence (ODNCI), has selected the CI Office and LLNL as the location for a "pilot" project in the area of Software Acquisition Risk Management (SARM). A SARM program is being coordinated by the CI Office and will involve LLNL Procurement, Security, Cyber and Counterintelligence representatives. At the conclusion of the pilot time-frame, NNSA and DOE anticipate implementing the LLNL model complex-wide.

During FY 2006, the CI Office conducted 374 personal travel briefings and 291 personal travel debriefings of LLNL personnel who traveled mostly to sensitive foreign countries. It conducted 79 personal briefings of hosts of foreign visitors to LLNL and 13 personal debriefings of these

hosts. It conducted 111 responsive contact debriefings. The CI Office conducted 261 personal CI/CT briefings to 2,185 personnel and five personal briefings to 51 System Administrators as a continuing effort to protect those sensitive resources. In addition, it provided CI annual awareness briefings to 100 percent of its 11,300 serviced personnel exceeding the CI enterprise goal of 85 percent.

After several years of effort and significant substantive work by the CI Office, LLNL's cyber security officer has developed the "Blue Network". In the immediate future, all foreign nationals to include sensitive country nationals, will be completely removed from the Yellow Network onto the completely unclassified Blue Network.

Performance Objective 9	Outstanding
Improve or maintain effective business processes and systems that safeguard public assets and support mission objectives.	

Performance Measure 9.1	Outstanding
Demonstrate effective internal business controls and processes to maintain acceptable Financial Management and Human Resources systems and approved Procurement, Personal Property Management, and Litigation Management systems. This includes the management of a risk-based, cross-functional, integrated, and credible assessment program.	

Financial Management

The Contractor performed its Financial Management duties in an outstanding manner during FY 2006. The contractor submitted accurate budget plans to HQ program offices as requested. The contractor's budget processes were reviewed by LSO during the annual NNSA Budget Validation. The conclusion of that validation was that the contractor's budgeting process was in accordance with DOE budget guidance and that the estimates were complete, consistent, reasonable, and documented.

The contractor was quite open in communication with LSO and the OFFM. Scheduled frank and open discussions were held at various levels of the LSO management and the contractor CFO staff. LSO is satisfied with the coordination between the two organizations.

The NNSA Service Center Office of Field Financial Management (OFFM) subject matter experts review specific Performance Measures to assess the quality of contractor financial management. The OFFM notified the LSO Business Manager that the contractor performed in an outstanding manner.

The contractor continued to make significant progress in the area of the A-123 internal controls. The OFFM assessment stated that the contractor's efforts in this area are "exemplary."

The Contractor implemented the first phase of the indirect rate restructuring which eliminated seven service centers, purified the General and Administrative (G&A) pool, and created an Institutional Facility Charge pool. The second phase was begun. The OFFM recommended approval of the Cost Accounting Standard Disclosure Statement that includes these changes.

The contractor made significant progress on the FY 2006 deliverables of the accounting system improvements. The Financial System Upgrade (FSU) is the first phase of the larger Enterprise Project Accounting and Reporting System. Implementation of the subsequent phases will be reevaluated at the completion of the FSU.

Human Resources

In addressing AHRD delivery against milestones established in the Implementation Guidelines, the following accomplishments were noted:

- A lesson learned process, relative to the conclusion of employment based litigation, was documented.
- Processes used to ensure appropriately consistent application of human resources policy across directorates were documented.

- Improvements in processes to ensure compliance with relevant employment law were identified.
- An improved termination/separation process was developed.
- Although a milestone was established for implementation of an electronic personnel action tracking system (ePAF) during FY 2006, ePAF capabilities will not be delivered until the end of first quarter FY07 (i.e., December 2006). AHRD was confident that efforts are and will continue to be on-track for full implementation.

A systematic evaluation process and improvement orientation was demonstrated by:

- Accomplishments in section "A" above.
- Response to an Internal Control Audit for the Start Program, resulting in future routine audits as a part of the Start process and instruction (during New Staff Orientation) by a Payroll representative.
- Development of a procedure for LAFIS to L Hire Control audit.

Overall, assessments and improvements were accomplished to ensure adequate controls are in place, or placed, to meet HR functional requirements.

Procurement

The contractor performed the procurement function at the outstanding level during the FY 2006 performance period. This rating was based primarily on procurement's performance under Objectives Matrix Balanced Scorecard Measures and also took into consideration the contractor's self-assessment, operational awareness activities conducted by the site office, and third party independent reviews. The Objectives Matrix provided the protocol for assessing the comprehensive performance of the Procurement System on a real time basis and has been in use since FY 2003.

The contractor has a well-developed, comprehensive self-assessment and evaluation program that ensures compliance with internal and external policies and procedures. This same program was reviewed by the NNSA Procurement Evaluation & Re-engineering Team (PERT) in August 2005 and reported as a "best practice." The contractor's internal information systems contributed to its ability to produce quality documents, implement and monitor internal controls, self-assess the transactions, and implement timely and effective corrective actions. The methodology, approach, and analysis performed by the procurement staff were exemplary and served as a sound basis for evaluating the contractor's purchasing system.

The results of the Objectives Matrix indicated the procurement system continued to perform at a very high level in FY 2006. Self-assessment reviews of purchase orders/subcontracts, UniCard transactions, and blanket release transactions disclosed relatively few findings. Procurement quality, which is the single most important measure, was measured at the outstanding level in FY 2006. The Objectives Matrix also disclosed that procurement continued to effectively manage its key suppliers and ensure that accurate information was available to its staff, resulting in improved expertise and increased number of quality procurements.

Procurement developed and successfully implemented a comprehensive training program for its employees. This training program is part of the FY 2004 employee satisfaction corrective action

plan and addresses concerns raised by NNSA regarding high employee turnover and the potential impact on procurement quality.

Overall, the contractor's procurement management organization had strong leadership and an effective management structure and in conjunction with an educated staff, maintained accurate and current policies and practices, fostered and maintained good relationships with internal and external customers, and developed and implemented innovative improvement projects to reduce procurement costs, which all contributed to a successful purchasing system. The contractor's procurement management system was mature, well managed, and supported organizationally by top management. The contractor's procurement department was the standard for other entities within the agency to benchmark.

Issues and Concerns

Although the procurement function is currently being performed at the "outstanding" level, the contractor's ability to attract, develop and retain a staff of highly qualified purchasing and subcontracting professionals for the future remains a concern. The employee turnover rate for procurement was 11% in FY 2006, excluding retirements, which is well in excess of the laboratory average or industry standards. High turnover has been a constraint on the efficiency of the procurement operation and the quality of some of the high dollar value complex procurements.

Real Property Management

The contractor performed the Property function at the Outstanding level during FY 2006. The Property Performance Assessment Model (PPAM) is the primary basis for evaluating the Personal Property Management System. Since its development in 1996, the PPAM provides the protocol for assessing, in real time, the comprehensive performance of the Personal Property Management Program. Federal staff throughout the fiscal year performed on-site validation reviews.

This evaluation took into consideration the contractor's self-assessment and operational awareness activities conducted by the NNSA Service Center (SC) as well as the existence of appropriate internal controls and compliance with applicable laws, regulations, and orders.

The single most important determinant in the evaluation of an overall Personal Property Management Program is the inventory results of attractive personal property. The contractor historically produced "best in class" results and the FY 2006 inventory continued the trend by accounting for 99.96 percent of the attractive property.

The equipment inventory resulted in a find rate of 100 percent. The results of both inventories were at the outstanding level of performance. Such results reflected the completeness of the contractor's overall Personal Property Management Program.

The contractor has the largest precious metals holdings with the largest amount of custodians of all the NNSA national laboratories, and they accounted for 100% of the precious metals holdings. NNSA compliments the contractor for outstanding achievement in the control and administration of their Precious Metals Program.

Percentage of Attractive and Equipment items correctly identified, flagged to be tagged, and recorded in the purchasing system were at the good level of performance. The Personal Property Management and the Procurement Divisions worked in partnership to identify and correct systemic issues affecting performance of this measure.

Percentage of subcontractor property management system reviews conducted for existing contracts were at the outstanding level of performance. The contractor continued to review subcontractor's systems to safeguard against waste, loss, unauthorized use or misappropriation; and review to ensure implementation of the applicable statutes, regulations, contract terms and conditions, programmatic needs, and good business practices.

When a contractor employee terminates, an active contractor employee is re-assigned the property items. The contractor's overall performance of this measure was good. Human Resources continued to report terminated employees to the Property Management database to identify terminated employees with personal property under their custodianship.

The contractor's performance was outstanding by exceeding the target threshold for attractive and equipment property items requiring high-risk reviews.

The contractor aggressively managed a decentralized vehicle management program that placed overall responsibility and accountability for vehicles with the directorates. The contractor's fleet management implemented and monitored to approved utilization standards. Directorate monitoring of utilization was highly encouraged, which resulted in routine intra-directorate vehicle rotation to avoid under utilized vehicles. Performance for the four classifications of vehicles reflected utilization well above the minimum 100 percent mark. In the area of preventive maintenance, the contractor performed over 4500 preventive maintenance work orders, with only two deadlines missed due to the unavailability of the vehicles. The contractor consistently demonstrated an outstanding level of performance on preventive maintenance of vehicles.

The contractor's Personal Property Management Program is a mature program. The program is well managed and supported organizationally by top management. The staff understands their role and possesses the necessary training in accomplishing the overall objectives of the program. The program is dynamic in nature and management is continuously working to improve performance. The contractor's property management and staff embrace and support change and is critically assessed to determine whether it makes good business sense. The contractor fully understands the concept of customer satisfaction and the organizational dynamics necessary to achieve it.

Litigation Management

The Contractor has done a good job of adhering to the requirements and procedures outlined in the approved "Litigation Management Policy and Procedures". The Contractor has consistently kept the LSO site counsel informed of developing issues over the past year, and has involved LSO in key litigation management decisions.

Performance Measure 9.2	Good
Demonstrate continuous improvement in the effectiveness of business processes and the information technologies that support these business systems (i.e., Financial Management, Human Resources, Procurement, Personal Property Management, and Information Management).	

Financial Management

The Contractor has shown outstanding progress in continuing to improve its efforts in Financial Management. The OFFM review letter stated that the contractor "A-123 team member efforts have been exemplary in meeting changing requirements imposed during the first year of the implementation process." OFFM continued by saying that "the contractor's A-123 Site Assessment Team has been extremely cooperative in supporting the OFFM review of self assessment data on the status of internal controls for high risk financial accounts identified by DOE HQ. We believe the contractor's efforts in this area are exemplary." The contractor met all A-123 commitments for FY 2006.

The Contractor implemented the first phase of the indirect rate restructuring. This process improvement eliminated seven service centers, purified the General and Administrative (G&A) pool, and created an Institutional Facility Charge pool. The second phase has begun to simplify and restructure the indirect charges within the contractor operation. OFFM recommended approval of the Cost Accounting Standard Disclosure Statement that includes these changes.

The contractor moved forward on the FY 2006 deliverables in the area of improving the accounting system. The overall Enterprise Project Accounting and Reporting System was broken into four phases. The first of those phases is called Financial System Upgrade (FSU). Implementation of the following phases will be reevaluated at the completion of the FSU.

Human Resources

The Administration and Human Resources Directorate was leading the People Information Program (PIP) to create a single source/repository of people information. Phase 1 of PIP was scheduled for release in FY 2006. However, In April of 2006 the PIP program was redirected to the new LAPIS Project, an upgrade to existing PeopleSoft capabilities. Scope included reusing the process improvements identified during PIP for automating the creation, routing, and approval of personnel actions and creating a view of employee supervisor data. This is now on track for delivery in FY 2007 first quarter. In addition, Human Resources developed strategic metrics for institutional human capital management and measurements with the intent of effecting continuous improvement. These measurements will provide information to assist in determining how to more effectively run HR operations and programs. Finally, Human Resources, in partnership with Business Services and Accounting, implemented a system to reimburse, track and process employee relocation costs.

An IG audit identified badge security as an issue. A multi-directorate task group was formed to address the audit findings. The Administration and Human Resources Directorate (AHRD) expanded on this project and overhauled its termination process. AHRD developed new guidelines for Laboratory employee and non-employees who are terminating their assignment with LLNL. These guidelines were the result of an institutional process action team that analyzed the current process and recommended changes to the termination policy and procedures.

Procurement

The contractor demonstrated continuous improvement in the effectiveness of business processes and information technologies that support the procurement function and earned a rating of Good for the period. The rating was based on the Improvement Initiatives Measures set forth in the Procurement Objectives Matrix as well as the development and implementation of information systems in support of procurement.

Development work to upgrade the various procurement IT systems under the Laboratory Integrated Network for Contracts and Supplies (LINCS) project, which began in FY 2002, continued. Four major LINCS maintenance releases were deployed to implement system enhancements, new functionality (e.g., the ChemTrack interface), and bug fixes. In March 2006, the expanded ChemTrack punch out interface with EOS was released to production, providing real time approval of chemical orders and enhanced safety basis inventory management.

Issues and Concerns

The development and implementation of the replacement (LINCS Subcontract) for the Procurement, Accounting, and Receiving Information System (PARIS) is three years behind schedule. Senior LLNL management has decided to postpone the implementation of new systems, including LINCS Subcontract, until the second quarter of FY2008, after the new contract is awarded. The current PARIS system is obsolete and creates inefficiencies in subcontract reporting and administration. LSO expressed its concerns over these delays in the FY2005 Appendix F Performance Evaluation and again during the FY2006 period.

Personal Property Management

The contractor performed the Property function at the outstanding level during FY 2006 performance period. The contractor re-aligned its FY 2006 Property Performance Assessment Model (PPAM) dividing it into two sections: System Effectiveness and Operational Effectiveness. This evaluation took into consideration the contractor's self-assessment and operational awareness activities conducted by the NNSA Service Center (SC) as well as the existence of appropriate internal controls and compliance with applicable laws, regulations, and orders. The contractor successfully controlled and accounted for personal property in the Sunflower Assets (SFA) database through the life cycle of the property and there was clear linkage and interface with Human Resources and Procurement departments through several cross-functional measures.

Performance Measure 9.3	Good
Demonstrate improvement in cost effectiveness of both institutional processes and management systems.	

To improve institution-wide processes and systems, LLNL engaged an integrated approach to diagnose, measure, and improve institutional operations. Accordingly, reductions in overall operating costs and/or improved performance in key institutional processes and systems were realized through the following:

Safety and Security

- WS&HA 10CFR851 Program Development Mapping
- Timeliness of Priority 1 – 3 ES&H Manual Revisions
- ES&H Manual Web Publishing Improvements
- Issues Tracking System Upgrade
- Locks, Keys, and TESA Installation
- Healthy Heart Program (HHP)
- Return to Work (RTW) Requirements Just In Time Training
- Early Intervention Program
- VISION – Clearance Termination Database and Electronic Access (Badge Request)
- Occupational Health Information (OHI) Business Process Analysis
- Institutional Computer System Improvements (including cyber-security).

Quality operations and scientific and technical excellence

- NMTP Unreviewed Safety Question Determination (USQD) Approval Process
- CMLSD-JGI Bioscience Freezer Farm Work Manager Effort Reduction
- NIF Project Line Replaceable Units (LRUs) Process Improvements
- NIF Production Optics Reporting & Tracking (PORT) System
- E&E Facility Maps and Operations Database
- NHI MPC&A Pass-Through Contract Process Improvement
- NMTP Maintenance Schedule Process Improvement

Business Processes & Systems, Infrastructure Management and Administrative Functions

- Facility and Infrastructure (F&I) Investment Processes
- Design-Build Space Optimization
- Replacement Office Building and Space Consolidation Processes
- Assets for Value Strategy
- Institutional Facilities and Infrastructure (F&I) Management Process
- TRR Order Limit Increase
- Electronic Ordering System (EOS) Agreements
- Streamlining CMLSD Procurement Process
- Computation Process Cost Realization, and Consolidation of Computation Facilities
- Integrated Work Sheet Business Process Development
- Institutional Roles & Responsibilities Business Process

- New Employee Start Program
- LAPIS Project for People Information
- Open Requisition Business Process
- ISO 9000 Standards for Computer Operations
- Financial System Upgrade (FSU) Project

Issues and Concerns

In addressing delivery against milestones/projects identified in the Implementation Guidelines, the self-assessment lacked a clear crosswalk between the many described accomplishments, listed projects and the four established IG milestones/projects. Description of correlation between the two would be helpful.

Performance Measure 9.4	Outstanding
Demonstrate an effective integrated monitoring program that documents and tracks corrective actions and which addresses all internal and external business system review findings and recommendations.	

LLNL did an outstanding job in demonstrating the effectiveness of its integrated tracking system used to track management corrective actions (MCA) related to internal and external business system review findings and recommendations. To satisfy the intent of the measure, external reviews and other internal reviews required integration into a monitoring system that could be used by management to assure MCAs were being resolved timely and provide visibility to senior management to intervene and take appropriate action when items were not being timely resolved. Overall, the expanded and enhanced Audit Tracking System (ATS) successfully tracked MCAs responsive to findings and recommendations from external reviews, reportable self-assessments and internal audits.

LLNL demonstrated the effectiveness of its monitoring program by including measurable results relative to closure of MCAs. During FY 2006 LLNL closed 89, or 76 percent, of all outstanding MCAs being tracked in ATS. To include measurable data, LLNL had to refine its data integrity process. In addition, LLNL included an aging schedule for the 28 open MCAs at September 30, 2006. Of the 28 open MCAs only one was more than 6 months past due. LLNL's business practice is to avoid establishing corrective actions exceeding a year and to complete any MCA in less than a year unless the agreed to corrective action involves extensive system changes. A summary table with the MCA data follows:

SUMMARY OF FY 2006 MCA ACTIVITY

Status		External	Internal	Self-Assessment	Combined
Open:	MCAs as of 10/1/05	13	40	1	54
Additions:	MCAs Issued	12	51	0	63
Less:	MCAs Closed	(15)	(73)	(1)	(89)
Total:	MCAs as of 9/30/06	10	18	0	28

The contractor implemented an effective process to identify and capture external findings and recommendations. MCAs responsive to open external audit findings were negotiated with the Laboratory point of contact (POC). LSO was consulted to ensure that applicable findings were captured. In addition, the contractor developed criteria and requested the directorates to identify “reportable” self-assessment findings.

The contractor developed procedures to independently validate corrective action plans based on discussions with the Laboratory POC and LSO. The procedures require a joint agreement between the Laboratory’s Audit & Oversight Department (A&O), LSO and the POC on planned MCAs. Once entered into the ATS, the POC is responsible for completing the MCA and updating the status.

The contractor also developed processes and procedures to determine whether implementation of corrective actions is effective. One of the key features and an enhancement to the system was an on-line, real-time tool allowing assigned POCs the ability to input the status of MCAs. Once identified as complete by the POC, an automated email is generated and sent to the assigned auditor in A&O who is required to complete validation within 10 working days. This process is noteworthy since the validation is performed by an organization independent of the organization responsible for the MCA.

Performance Objective 10	Outstanding
Sustain and/or implement effective Community Initiatives.	

Performance Measure 10.1	Outstanding
Leveraging the UC expertise and mission in science education, the laboratories will establish and maintain science education outreach programs with the joint goals of community outreach and substantive contribution to science education.	

The contractor did an outstanding job establishing and maintaining science education outreach programs with the joint goals of community outreach and substantive contribution to science education.

Two organizations contributed to the accomplishments of this performance measure, the Science & Technology Education Program (STEP) and the Public Affairs Office (PAO). Working in partnership, STEP led the Laboratory's efforts in K-14 science, technology, engineering and mathematics (STEM) while PAO led the educational outreach programs. Both organizations established close working relationships with Tri-Valley and Central Valley Schools, UC campuses and other universities and colleges. Feedback from the educational community was positive.

Accomplishments in this area included the following:

- LLNL and the UC Edward Teller Education Center partnered with the San Ramon school district to pilot the Lab's middle school "CSI" forensic science program.
- To meet demand, the Laboratory expanded "Science on Saturday" from one lecture each Saturday to two back-to-back lectures. With two lectures a day, about 900 people attended each Saturday, a 300-person per day increase over last year.
- The contractor was the organizing sponsor of the Tri-Valley Science & Engineering Fair (TVSEF). For TVSEF 2006, 312 students entered 227 projects, an increase from 200 projects last year.

Performance Measure 10.2	Outstanding
The Laboratory will develop local community initiatives to include those programs or responses addressing mutual goals and concerns.	

Public Affairs Office (PAO) did an outstanding job in developing a number of community outreach initiatives to address areas of potential concern to the community. These activities were developed in partnership with LSO and UC. PAO worked closely with LSO on matters related to Public Affairs. Achievements included the following:

The contractor coordinated press conferences for the Secretary of Energy, the Secretary of Homeland Security, and the NNSA Administrator during visits to the Lab.

- The contractor informed local neighbors and community leaders about issues of potential concern. For example, the contractor's community newsletter, Discover LLNL, is distributed to more than 3,000 residents and organizations, providing information on LLNL programs and events.

- The contractor provided environmental restoration tours to the public, including activist groups, for its Superfund sites at both the Livermore Site and Site 300.

Appendices
Appendix A
Ratings

Overall LLNL Rating

Mission (Performance Objectives 1-6) **Outstanding**
Operations (Performance Objectives 7-10) **Good**

Rating by Performance Objective

Mission		
1.	Conduct warhead certification and assessment actions using the Quantification of Margins and Uncertainties (QMU) methodology.	Outstanding
2.	Develop with NNSA and implement long-term, balanced, integrated stewardship.	Outstanding
3.	Develop with NNSA and implement near-term balanced weapon programs that are coordinated with the other NNSA M&O site contractors and DoD customers and that foster complex-wide solutions to meet the needs of the U.S. nuclear deterrent.	Outstanding
4.	Implement an integrated science- and technology-based program aimed at preventing the proliferation or terrorist acquisition of weapons of mass destruction as well as detecting and responding to their deployment or use.	Outstanding
5.	Enhance and nurture a strong science, engineering, and technology base in support of national security strategic objectives.	Outstanding
6.	Optimize current and evolving mission performance by providing effective and efficient facilities and infrastructure.	Outstanding

Operations		
7.	Utilize UC strengths to recruit, maintain, and develop the workforce.	Outstanding
8.	Maintain safe, secure, environmentally sound, effective, and efficient operations in support of mission objectives.	Satisfactory
9.	Improve or maintain effective business processes and systems that safeguard public assets and support mission objectives.	Outstanding
10.	Sustain and/or implement effective Community Initiatives.	Outstanding

Appendix A Ratings Ratings by Performance Measure

1	Conduct warhead certification and assessment actions using the Quantification of Margins and Uncertainties (QMU) methodology.	Outstanding
1.1	Use progress toward quantifying margins and uncertainties, and experience in application to further refine and document a common certification/assessment methodology with Los Alamos National Laboratory.	Outstanding
1.2	Demonstrate application of the common certification/assessment methodology, (QMU) in major warhead assessments and the certification of Life Extension Program (LEP) warheads.	Outstanding
1.3	Complete the annual assessments of the safety, reliability, and performance of all warhead types in the stockpile, including conclusions on whether nuclear testing is required for resolution of any issue, the adequacy of Stockpile Stewardship tools, and other issues as required by law. Support NNSA as required during interagency and community coordination of the Annual Assessment Process.	Outstanding

2	Develop with NNSA and implement long-term, balanced, integrated stewardship.	Outstanding
2.1	Support the needs of warhead assessment, certification, and simulation validation by executing a coordinated program of targeted small- and large-scale experiments and mining of archival UGT data to improve predictive capability. In cooperation with LANL, develop and execute a program of hydrotests and subcritical experiments that addresses assessment and certification needs.	Outstanding
2.2	Conduct design and analysis of nuclear weapons that address the future needs of the U.S. nuclear deterrent.	Outstanding
2.3	Develop and demonstrate Science Campaign models, experiments, and capabilities that support the ongoing needs of stockpile assessment and certification.	Outstanding
2.4	Develop and demonstrate Advanced Simulation Computing (ASC) capabilities that support the ongoing needs of stockpile assessment and certification.	Outstanding
2.5	Improve and apply tools and models for prediction of systems, subsystems, and/or component lifetimes. By the end of FY 2006, determine a technically defensible estimate of the pit lifetime for the primary of each of the weapons systems for which LLNL is responsible.	Outstanding
2.6	Develop and implement a collaborative and complementary program of experiments at High Energy Density (HED) facilities that supports assessment and certification needs.	Outstanding
2.7	Develop, implement, and lead an integrated national program (National Ignition Campaign (NIC)) with the goal to achieve ignition at NIF in 2010.	Outstanding
2.8	In cooperation with LANL and NNSA HQ, continue the development and implementation of an integrated program and governance model for plutonium capabilities of LANL and LLNL to support the overall NNSA strategic requirements.	Outstanding
2.9	In support of Responsive Infrastructure (RI), develop and execute projects to improve the responsiveness of the design, manufacturing, and testing infrastructure of the integrated nuclear weapons complex.	Outstanding

3	Develop with NNSA and implement near-term balanced weapon programs that are coordinated with the other NNSA M&O site contractors and DoD customers and that foster complex-wide solutions to meet the needs of the U.S. nuclear deterrent.	Outstanding
3.1	Conduct stockpile surveillance activities, investigate significant findings and issues identified in technical assessment reports on a prioritized basis, and establish closure plans for Significant Finding Investigations (SFIs).	Outstanding
3.2	Deliver on the major milestones for the LEP for the W80-3 in accordance with the joint DOE/DoD phase 6.x process. Continue to support LANL on the LEPs for the W-76 and the B61-7/11.	Outstanding
3.3	Deliver on Pit Manufacturing and Certification Project major milestones.	Outstanding
3.4	Meet directive schedule requirements.	Outstanding
3.5	Provide technical support to production complex operations, including the Integrated Weapons Activity Plan (IWAP), the weapons point of contact programs, and weapons response analyses.	Outstanding
3.6	Continue to implement and execute, in accordance with NNSA-approved plans, a weapons design and manufacturing quality assurance program consistent with NNSA requirements (QC-1, Rev 10).	Outstanding
3.7	Develop and implement streamlined, multi-site, technical business practices with other Nuclear Weapons Complex partners.	Outstanding

4	Implement an integrated science- and technology-based program aimed at preventing the proliferation or terrorist acquisition of weapons of mass destruction as well as detecting and responding to their deployment or use.	Outstanding
4.1	Provide technical capabilities to limit or prevent the spread of materials, technology, and expertise relating to weapons of mass destruction (WMD); eliminate or secure inventories of surplus materials and infrastructure usable for nuclear weapons; and enable the implementation of U.S. nonproliferation policy.	Outstanding
4.2	Provide scientific research capability that produces cutting-edge R&D as well as the testing and evaluation needed to detect, identify, and monitor proliferation and terrorist-related WMD activities.	Outstanding
4.3	Support the needs of the intelligence community by providing intelligence analysis capabilities and science and technology that improve the nation's ability to detect and thwart proliferation and terrorism.	Outstanding
4.4	Develop and support the deployment of technologies and analytical capabilities that strengthen the nation's ability to protect against and respond to terrorist use of WMD and other threats against the U.S. homeland.	Outstanding
4.5	Apply advanced science and technology to meet immediate and long-term U.S. defense community needs.	Outstanding
4.6	Maintain and deploy, as required, nuclear emergency response teams for CONUS and OCONUS response to radiological and nuclear threats.	Outstanding

5	Enhance and nurture a strong science, engineering, and technology base in support of national security strategic objectives.	Outstanding
5.1	Nurture and maintain the Laboratory science and engineering excellence in disciplines and capabilities needed to support our national security missions and emerging national needs.	Outstanding
5.2	Develop and implement an integrated and balanced strategy for investing LDRD, programmatic and institutional resources to ensure the long-term vitality of the Laboratory science, engineering, and technology base in support of national security missions and emerging national needs.	Outstanding
5.3	Execute non-NNSA sponsored projects and programs that make use of the Laboratory's unique expertise, capabilities, and facilities; and that enhance the Laboratory's ability to accomplish its current and future national security missions, including those related to homeland security and homeland defense.	Outstanding
5.4	Foster active participation in the broad scientific and technical community, leveraging unique Laboratory expertise and capabilities; develop strategic collaborations with other national laboratories, industry, and academia.	Outstanding

6	Optimize current and evolving mission performance by providing effective and efficient facilities and infrastructure.	Outstanding
6.1	Operate mission essential and user facilities as national capabilities, including National Ignition Facility, Device Assembly Facility, Superblock, Site 300, and High Performance ASC Computers.	Good
6.2	Execute construction projects as identified and agreed between NNSA and the Laboratories within scope, schedule, and budget; and develop and implement a site-wide Earned Value Management System (EVMS), and have that system certified by an independent auditor.	Outstanding
6.3	Improve and sustain the physical infrastructure needed to support Laboratory operations. Execute the Facilities and Infrastructure Recapitalization Program. Manage facilities in a manner consistent with NNSA's deferred maintenance goals and other objectives as stated in the approved Ten-Year Comprehensive Site Plan. Sustain planned availability of mission essential facilities. Implement the FY06 NNSA-approved Maintenance Implementation Plan (MIP). Maintain 2%+ maintenance funding relative to Real Property Value for FY 2007.	Outstanding
6.4	Support planning, implementation, and execution of special nuclear material (SNM) consolidation and/or relocation activities, including reducing inventories of surplus and excess SNM consistent with DOE/NNSA approved plans.	Good

7	Utilize UC strengths to recruit, maintain, and develop the workforce.	Outstanding
7.1	Maintain a skilled and diverse workforce that meets the Laboratory's long-range core and critical skills requirements by implementing a human resource strategy that leverages student programs and UC relationships.	Good
7.2	Develop an institutional plan to manage the Defense Program's full-time-equivalent reductions as specified in the "Defense Programs FY 2007 to FY 2011 Program and Resource Guidance," dated March 4, 2005.	Outstanding
7.3	Sustain leadership and management development programs that achieve workforce and diversity objectives.	Outstanding

8	Maintain safe, secure, environmentally sound, effective, and efficient operations in support of mission objectives.	Satisfactory
8.1	Achieve continuous improvement in Integrated Safety Management System performance: <ul style="list-style-type: none"> Assure consistent and effective application of ISM principles across all organization levels and across all Laboratory facilities. Ensure effective implementation of an ES&H corrective action management program, including institutional corrective actions derived from violations enforceable under the Price Anderson Amendments Act. 	Satisfactory
8.2	Improve the following programs within the criteria identified: <ul style="list-style-type: none"> The Institutional Contractor System Engineer Program within the NNSA-approved schedules. An Emergency Management Program within the NNSA-approved schedules in the Emergency Readiness Action Plan (ERAP). The relevant configuration management program tasks identified for implementation this year. 	Satisfactory
8.3	Comply with and achieve continuous improvement in nuclear safety and quality performance under 10 CFR 830 for both LLNL and LLNL operations at the Nevada Test Site. <ul style="list-style-type: none"> Implement the Building 332 Documented Safety Analyses and Technical Safety Requirements within the NNSA-approved schedules. Implement the Unreviewed Safety Question process site wide within the NNSA-approved schedules. Resume operations in Building 332 within the NNSA-approved schedules. 	Satisfactory
8.4	Maintain an environmental management program consistent with the DOE-approved baseline, funding levels, policy, and negotiated regulatory requirements. <ul style="list-style-type: none"> Demonstrate performance of the ISO 14001 Environmental Management System. Effectively manage the direct funded environmental restoration and waste management programs, including environmental compliance agreements. 	Good
8.5	Achieve continuous improvement in security performance through ISSM and risk management principles. <ul style="list-style-type: none"> Demonstrate continuous improvement in the implementation of ISSM including line management directed self-assessments. Develop and implement appropriate plans and initiatives in accordance with DOE/NNSA policies so that NNSA expectations are addressed while balancing mission requirements with S&S resource allocations and new requirements. Effectively manage accountable Classified Removable Electronic Media (CREM). Effectively account for Special Nuclear Materials. Implement corrective actions as a result of findings from external agencies in accordance with the approved timeline in the corrective action plan. 	Good
8.6	Detect, deter, and mitigate foreign intelligence collection and espionage and international terrorist threats.	Outstanding

9	Improve or maintain effective business processes and systems that safeguard public assets and support mission objectives.	Outstanding
9.1	Demonstrate effective internal business controls and processes to maintain acceptable Financial Management and Human Resources systems and approved Procurement, Personal Property Management, and Litigation Management systems. This includes the management of a risk-based, cross-functional, integrated, and credible assessment program.	Outstanding
9.2	Demonstrate continuous improvement in the effectiveness of business processes and the information technologies that support these business systems (i.e., Financial Management, Human Resources, Procurement, Personal Property Management, and Information Management).	Good
9.3	Demonstrate improvement in cost effectiveness of both institutional processes and management systems.	Good
9.4	Demonstrate an effective integrated monitoring program that documents and tracks corrective actions and which addresses all internal and external business system review findings and recommendations.	Outstanding

10	Sustain and/or implement effective Community Initiatives.	Outstanding
10.1	Leveraging the UC expertise and mission in science education, the laboratories will establish and maintain science education outreach programs with the joint goals of community outreach and substantive contribution to science education.	Outstanding
10.2	The Laboratory will develop local community initiatives to include those programs or responses addressing mutual goals and concerns.	Outstanding

Appendix B Acronyms Used in This Report

CI	Counterintelligence
DBT	Design Basis Threat
DHS	Department of Homeland Security
DOE	U. S. Department of Energy
DWTF	Decontamination/Waste Treatment Facility (DWTF)
ETCU	Engineering Technology Complex Upgrade
FIRP	Facility and Infrastructure Recapitalization Program
HED	High Energy Density
ISM	Integrated Safety Management
ISSM	Integrated Safeguards and Security Management
IWAP	Integrated Weapons Activity Plan
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
LSO	Livermore Site Office
MC&A	Material Control and Accountability
NIF	National Ignition Facility
NNSA	National Nuclear Security Administration
NTS	Nevada Test Site
PISA	Potential Inadequacies to the Safety Analysis
QMU	Quantification of Margins and Uncertainties
RHWM	Radioactive and Hazardous waste management
RRW	Reliable Replacement Warhead
RTBF	Readiness in Technical Base and Facilities
SAFE	Security Awareness for Employees
SCIF	Sensitive Compartmented Information Facility
SECON	Security Condition
SEMI	Safety and Emergency Preparedness Inspection
SFI	Significant Finding Investigation
SNM	Special Nuclear Material
TSF	Terascale Simulation Facility
TSR	Technical Safety Requirements
TYCSP	Ten Year Comprehensive Site Plan
UC	University of California
USQ	Unreviewed Safety Question