

**FY 2007**

*October 1, 2006 – September 30, 2007*

**Performance Evaluation  
of  
Jefferson Science Associates, LLC**

**for the  
Management and Operations of the  
Thomas Jefferson National Accelerator Facility (TJNAF)**

**Contract No. DE-AC05-06OR23177**

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## SUMMARY

JSA has continued to improve its performance on all fronts during this Fiscal Year. The S&T Review conducted in July 2007 was complimentary of all scientific, technical and management areas reviewed. The committee members and DOE made many positive observations and comments regarding our skilled, hard-working staff; our much-improved safety performance; our strong and highly invested users community; Lab management; and the passionate students we are preparing for the future. In the transmittal letter of the final report DOE states:

*“The TJNAF research program and CEBAF operations have made outstanding progress during the past year. The quality, productivity and significance of the research and technical programs continue to be impressive. The efforts of the TJNAF staff to realize more cost-efficient operations, both at CEBAF as well as other laboratories, are outstanding.”*

All the recommendations from the previous S&T Review were completed, except one which is ongoing. In addition, no new recommendations were made making this the most successful S&T Review in JLab history.

We have also continued to make significant progress on the 12 GeV Upgrade Project over the last year. The recently completed External Independent Review (EIR), in support of OECM's validation of CD-2 Approved Performance Baseline, was a great success and as a result we expect DOE approval of CD-2 before the end of this calendar year. In addition, the 12 GeV Project emerged as the first recommendation of the 2007 NSAC Long Range Plan. It has been a long sustained effort to bring the 12 GeV project to this critical milestone and the team of JLab management, staff, users and corporate owners, along with strong participation and support from DOE, is moving JLab toward an outstanding scientific future.

We are especially proud of our efforts to keep our employees, users, visitors, and subcontractors safe, as evidenced by the achievement of DART and TRC rates that exceeded the challenging goals set by DOE SC and through our efforts to strengthen the safety culture at the Lab. We continue to focus on behavior based safety to reduce potential for injury through a variety of activities. As a result, the Lab achieved 330 days (over 1,150,000 hours worked) without a lost or restricted workday.

The improvement of our business processes and systems was impressive and included numerous activities such as: implementation of JLab Insight; development of the first ever Lab-wide Annual Work Plan; enhancement and automation of the performance appraisal process and system; implementation of Maximo for maintenance work order tracking; integration of Automated Quality Information System (AQIS) tracking and trending features into the Corrective Action Tracking System (CATS); and obtaining access to a comprehensive list of computer based training via Skillport. The long-term benefits of these activities are yet to be determined as processes continue to evolve and new business data is obtained for analysis and identification of efficiencies. But the implementation effort during this period has resulted in a strong foundation upon which we can build a business and management structure that is truly aligned with and supportive to the scientific program.

The leadership of the Lab demonstrated innovation and determination in achieving project status (CD-0) for the upgrade of the 50 year old Test Lab and construction of a 100,000 square foot technology and engineering facility. As a result of coordinated efforts between JSA and the Site Office, Jefferson Lab was the only single purpose Lab to receive Science Laboratory Infrastructure (SLI) funding for Laboratory modernization beginning in FY09.

Under the strategic guidance of the JSA Board, JLab continues to deliver excellent science and technology results, contribute substantially to DOE/SC goals including the production of new scientific knowledge and preparation of the next generation of scientists and engineers, develop new and exciting technology applications, and build a culture of performance where excellence in safety and business practices is a critical enabler for scientific leadership. We have continued to meet and exceed DOE goals as demonstrated in the following report.

**Table 1. FY 2007 JSA Evaluation Score Calculation**

S&T Performance Goal	Numerical Score	Letter Grade	Weight	Weighted Score	Total Score
1.0 Mission Accomplishment	3.94	A	40%	1.58	
2.0 Construction and Operations of User Research Facilities and Equipment	3.95	A	40%	1.58	
3.0 Science and Technology Research Project/Program Management	3.90	A	20%	0.78	
<b>Total Score</b>					<b>3.94</b>
M&O Performance Goal	Numerical Score	Letter Grade	Weight	Weighted Score	Total Score
4.0 Leadership and Stewardship of the Laboratory	3.66	A-	25%	0.92	
5.0 Integrated Safety, Health, and Environmental Protection	3.68	A-	30%	1.10	
6.0 Business Systems	3.59	A-	25%	0.90	
7.0 Operating, Maintaining, and Renewing Facility and Infrastructure Portfolio	<del>3.70</del> 3.68	A-	10%	0.37	
8.0 Integrated Safeguards and Security Management and Emergency Management Systems	3.76	A-	10%	0.38	
<b>Total Score</b>					<b>3.67</b>

**Table 2. FY 2007 JSA Letter Grade Scale/Numeric Score Scale**

Total Score	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
Final Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F

**Table 3. Final Percentage of Performance-Based Fee Earned Determination**

Overall Fee Determination	
Percent S&T Fee Earned from Table C	97%
M&O Fee Multiplier from Table C	X 100%
Overall Earned Percentage of Performance-Based Fee	97%

**GOAL 1.0 PROVIDE FOR EFFICIENT AND EFFECTIVE MISSION ACCOMPLISHMENT (QUALITY, PRODUCTIVITY, LEADERSHIP, & TIMELINESS OF RESEARCH AND DEVELOPMENT)**

Goal Requirement:

The Contractor produces high-quality, original, and creative results that advance science and technology; demonstrate sustained scientific progress and impact; receive appropriate external recognition of accomplishments; and contribute to overall research and development goals of the Department and its customers.

**Objective 1.1 Science and Technology Results Provide Meaningful Impact on the Field**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by progress reports, peer reviews, Field Work Proposals (FWPs), Program Office reviews/oversight, etc.:

- The impact of publications on the field;
- Publication in journals outside the field indicating broad impact;
- Impact on DOE or other customer mission(s);
- Successful stewardship of mission-relevant research areas;
- Significant awards (R&D 100, FLC, Nobel Prizes, etc.);
- Invited talks, citations, making high-quality data available to the scientific community; and
- Development of tools and techniques that become standards or widely-used in the scientific community.

Performance Level Achieved:

Performance Level	Grade	Score
Changes the way the research community thinks about a particular field; resolves critical questions and thus moves research areas forward; results generate huge interest/enthusiasm in the field.	A	4.0

JSA Performance:

FY2007 S&T Review findings and comments:

- JLab employees serve on important committees and have received a number of awards, including the White House Closing the Circle Award for the cryoplant operations improvements.

**Experimental Program:** The quality, productivity and significance of the research program continue to be very impressive. A large body of significant experimental results was presented, of which only a few are highlighted here:

- Results from the PrimEx experiment provide the most precise determination of the neutral pion lifetime, better than the world's presently accepted value by approximately a factor of two.
- Recent results from scattering off carbon along the theoretical studies indicate that the proton-neutron short-range correlation dominates dramatically over the neutron-neutron and proton-proton correlations in the region of study.
- Hall A and Hall B have produced dedicated measurements of Deeply Virtual Compton Scattering (DVCS) and Deeply Virtual Meson Production (DVMP), which are important for the new generalized parton distribution (GPD) program. Results from Hall A on the spin dependent DVCS cross sections indicate an early approach to scaling, an important first test of factorization. GPD studies are a major component of the 12 GeV program. The initial JLab results on GPDs are complementary and competitive with results from the higher energy HERMES, H1 and ZEUS experiments. COMPASS is proposing precision measurements on DVCS and DVMP on a similar timescale, providing complementary results to the JLab program.
- Results from the Bound Nucleon Structure (BONUS) experiment at the CEBAF Large Acceptance Spectrometer (CLAS) are approaching a first measurement of the free neutron mass spectra by tagging the outgoing proton on electron-deuteron scattering. The BoNus approach is ground breaking and shows promise as a method for studies of interactions requiring free neutrons in the future.
- First online results of the elastic scattering off  $^3\text{He}$  and  $^4\text{He}$  were presented.
- A recent global analysis of parity violation data by the JLab theory group in conjunction with experimenters was featured on the cover of Physical Review Letters. The work led to an increase in precision for the determination of the neutral weak quark couplings by a factor of five and raised the lower limit on the mass scale for possible new particles which could produce such a force by a factor of two, to 0.9 TeV. The results also indicated the discovery potential of the Qweak experiment, as well as future parity violation experiments at 12 GeV, showing that they can provide complementary information to new physics searches at the LHC.

**Theoretical Program:** The theory group continues to demonstrate strong leadership in advancing the research program of the Laboratory and is well integrated with the experimental program.

- The theory group, in conjunction with experimenters, extracted a new upper limit on possible  $Z'$  bosons masses from an analysis of world parity violation data providing a factor of two improvement over existing limits.
- In the past year, the theory group played the leading role in formulating a world-wide strategy for GPD studies that was summarized in the GPD White Paper for the NSAC Long Range Plan process. JLab efforts in the investigation of GPD functions, both experimental and theoretical, are at the frontier of this new strategy for studying nucleon structure.
- The JLab Lattice QCD group is recognized internationally and is an integral part of the local intellectual environment, guiding studies of hadron structure and is well integrated with the experimental program.
- The Excited Baryon Analysis Center (EBAC) group has made good progress in their studies. Most importantly, they have established broad world-wide collaborations focused on significant aspects of the problem. This is essential to ensure that the future results of the center receive broad acceptance.
- The recent progress in the studies of the microscopic nuclear structure in the JLab experiments

requires strengthening of the nuclear component of the activity of the theory group in the field of high energy electron-nucleus interactions.

In addition to these S&T Review comments, the following items also demonstrate JLab's meaningful impact in the scientific community:

**Strange Quark Content of the Proton:** While the proton is most simply described as a bound state of three quarks, a more complete description includes a sea of gluons and virtual quark/anti-quark pairs arising from interactions between the three quarks. In particular, strange quark/anti-quark pairs are present in this quark sea even though the proton has, on average, no net strangeness. The effect of this intrinsic strangeness on the charge and magnetism of the proton can be studied by using the weak interaction (Z-boson exchange) as a probe. The HAPPEX-II collaboration at Jefferson Lab recently reported the highest precision measurements yet achieved on parity violation in elastic scattering from the proton and the  $^4\text{He}$  nucleus. By combining the two measurements we can separate the strange quark contributions to the electric and magnetic form-factors. These new results place extremely tight constraints on possible non-zero strangeness contributions, with strange quarks shown to contribute less than 3% of the charge radius and less than 5% of the magnetic moment of the proton.

**Radial Excitation of the Nucleon:** The nucleon's internal shape and structure is of fundamental importance for our understanding of the strong force in nature. Current experiments provide information on the nucleon's internal shape and the contributions of quarks to the total momentum and the spin of the nucleon. One major missing piece that has been difficult to access is the radial structure of the nucleon where we probe the internal structure through the transition to an excited state with the same spin and flavor quantum number as the ground state nucleon, such as the famous Roper resonance. Preliminary data from CLAS, covering a large range in photon virtuality, reveal unexpected behavior, which offers new insight into this mysterious state. Qualitatively the following picture of the Roper resonance emerges: at large distances, pion contributions are important and obscure the view of the quark core; with increasing  $Q^2$ , the virtual photon probes shorter and shorter distances, and allows a more direct view of the quark core. The excitation of the quark core is consistent with that of a radial excitation of the nucleon.

**Precision *ab initio* Calculations using Lattice QCD: the Axial-vector Charge of the Nucleon and Insight into the Origin of Nucleon Spin:** Understanding how the structure of hadrons emerges from QCD is one of the central challenges of contemporary nuclear physics. Recent advances in lattice field theory, developments in computer technology and investment in computer resources for fundamental QCD research have now made lattice QCD a powerful quantitative tool that provides an unprecedented opportunity to understand the phenomena arising from QCD from first principles, and to make precision calculations of the predictions of QCD. An important benchmark quantity of this ability is the axial-vector charge of the nucleon. Using resources in large part located at JLab, as part of a national collaboration with essential JLab involvement, this quantity has been computed at pion masses far smaller than previously achieved, and at sufficiently large volumes to allow comparison with experiment; the agreement is remarkable and gives us growing confidence that we can reliably compute and predict the unexplored features of hadron structure.

**Short-Range Nucleon-Nucleon Correlations:** From the early days of using an electron probe to knock a proton out of a nucleus, it has been known there is far more going on inside nuclear matter than a simple ideal gas type model could explain. This is primarily due to the short-range part of the nucleon-nucleon potential. An earlier CLAS experiment had studied inclusive scattering from a variety of nuclei and concluded that two-nucleon correlations contributed ~20% to the  $^{12}\text{C}$  wave function. The recent data from Hall A showed that when two nucleons were close together they were almost always a proton-neutron

pair. Recent theoretical work has shown that this result is most likely due to short-range tensor correlations.

**Density Dependent Effective NN Force from the Quark Level:** One of the great challenges facing nuclear physicists is to understand the structure and properties of atomic nuclei and eventually the dense matter at the core of neutron stars in terms of Quantum Chromodynamics, the fundamental theory of the strong force. The last year has seen a major step in this direction. Starting not from QCD but from a quark model description of nuclear matter, the Quark Meson Coupling Model, physicists at Jefferson Lab, together with collaborators at the CEA in France have been able to derive a density dependent effective force of the Skyrme type. Such Skyrme forces are widely used in nuclear structure calculations to describe the binding energies, excitation spectra and shapes of atomic nuclei. The resulting density dependent force gave excellent agreement with the properties of finite nuclei derived from far more sophisticated, phenomenological Skyrme forces with many parameters adjusted directly to data from finite nuclei. Given that the density dependence derived in the quark level treatment is rather different from the more phenomenological forms usually used, this deeper approach to the problem may have important consequences over a wide range of applications in nuclear physics, particularly for rare ions and neutron stars.

**Invited Talks:** JLab staff had a total of 134 invited talks during FY2007. Some of the more significant talks included:

- “Parton Distributions at High x” (J. Chen) – QCD and Hadron Physics Town Meeting
- “Opportunities in Hadron Structure” (R. Ent) – QCD and Hadron Physics Town Meeting
- “Advances in Medical Imaging Using Nuclear Physics Techniques” (S. Majewski) – American Competitiveness Workshop

**Objective 1.2 Provide Quality Leadership in Science and Technology**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by progress reports, peer reviews, Program Office reviews/oversight, etc.:

- Willingness to pursue novel approaches and/or demonstration of innovative solutions to problems;
- Willingness to take on high-risk/high payoff/long-term research problems, evidence that the Contractor’s previous risky decisions proved to be correct and are paying off;
- The uniqueness and challenge of science pursued, recognition for doing the best work in the field;
- Extent of collaborative efforts, quality of the scientists attracted and maintained at the Laboratory;
- Staff members visible in leadership position in the scientific community; and
- Effectiveness in driving the direction and setting the priorities of the community in a research field.

Performance Level Achieved:

Performance Level	Grade	Score
Laboratory staff led Academy or equivalent panels; Laboratory’s work changes the direction of research fields; world-class scientists are attracted to the Laboratory, Laboratory is trend setter in a field.	A	4.0

JSA Performance:

FY2007 S&T Review findings and comments:

- The users' representatives state that they were well served by the Laboratory, and indeed that the Laboratory's performance and attitude (as well as its world-class capabilities) are significant factors in attracting the large user community.

**Nuclear Science Advisory Committee (NSAC) Long Range Planning:** JLab actively participated in four pre-meetings, two town hall meetings, and the Resolution Meeting during FY07. The outcome of the meetings placed the 12 GeV Upgrade of Jefferson Lab as the top priority of the community's five major recommendations for the future of the field. This strong support by a diverse community of scientists is an important affirmation of the world-class 12 GeV science program planned.

Other JLab contributions to the NSAC Long Range Plan process included:

- Submittal of eight White Papers:
  - EIC/eA Position Paper
  - A High Luminosity, High Energy Electron Ion Collider
  - Accelerator Physics
  - Science and Experimental Equipment for the 12 GeV CEBAF Upgrade
  - RIBF Task Force Draft Report
  - New (g-2) Experiment
  - IUPAP Facilities Handbook
  - Excited Baryon Program at JLab
- Four Jefferson Lab scientific leaders were appointed to the NSAC Resolution Committee including Dr. Anthony Thomas, Dr. Larry Cardman, Dr. Rolf Ent, and Dr. Lia Merminga.
- Twelve of the approximate 60 participants at the Resolution Meeting were JLab staff and users. In addition, four were JLab PAC members as well.
- Eight participants from JLab attended the Structure of Nuclei Town Meeting that was held in Chicago, including Dr. Larry Cardman, Associate Director, Experimental Nuclear Physics, who also served on the organizing committee.
- JLab attended the Joint Quantum Chromodynamics Town Meetings, held at Rutgers University, on "Phases of QCD" and "QCD and Hadron Physics, including Dr. Larry Cardman, who also served on the organizing committee. Invited talks on broad overviews of the science and accelerator designs were presented by JLab staff.
- Dr. Rolf Ent, 12 GeV Upgrade Science Lead, was a member of the NSAC Advisory Committee.
- Dr. Lia Merminga was appointed to the Committee of Visitors (COV) for the Office of Nuclear Physics, which was formed and charged as a subcommittee of the NSAC to assess ONP practices.

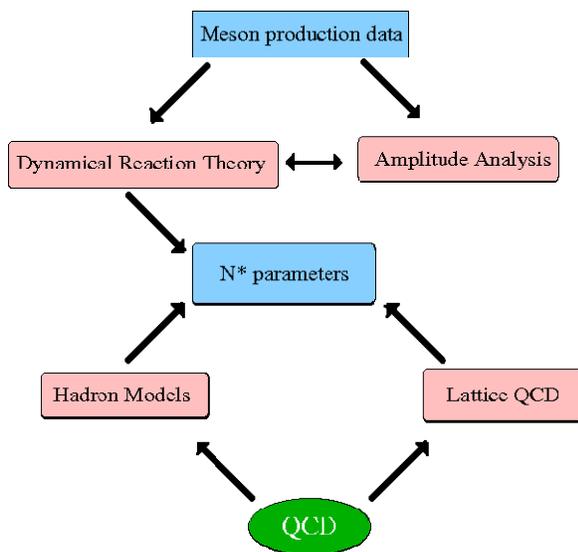
**IUPAP Working Group on International Cooperation in Nuclear Physics (WG.9):** The JLab Chief Scientist is the chair of this new working group of the International Union of Pure and Applied Physics (IUPAP). Under his leadership the group has prepared a report on the user facilities used worldwide by the nuclear physics community. The report also set out the key scientific questions being addressed by those facilities as well as facilities planned for the near future. This report served as an important source of information for the OECD Global Science Forum working group on nuclear physics which was convened at the request of the United States to set out the international landscape for nuclear physics for the next 10-15 years. Dr. Thomas was invited to serve on that working group and is playing a significant role in this important international activity. Meanwhile, WG.9 has embarked on a number of important new initiatives which are intended to increase the level and quality of international cooperation.

These activities represent leadership in the field at the highest level.

**INCITE Award:** A JLab project was allotted 10 million hours of processing time by DOE’s 2007 Innovative and Novel Computational Impact on Theory and Experiment (INCITE) Program on the Cray XT3 located at Oak Ridge National Laboratory. This program has awarded 45 projects a total of 95 million hours of computing time and JLab’s selection to get the most amount of time indicates that the Lab’s science and mission are both very compelling.

**Dynamical Coupled-Channel Analysis at EBAC**

*Theory Center, LAB*



**Excited Baryon Analysis Center (EBAC):** The EBAC is conducting dynamical coupled-channel analyses of JLab data and other relevant data in order to extract  $N^*$  parameters and to investigate the reaction mechanisms for mapping out the quark-gluon substructure of  $N^*$ . This effort is also providing theoretical input to the data analyses by the experimental groups, especially by the CLAS collaboration at JLab. In a series of papers, members of EBAC have succeeded in extracting information on the nucleon resonances ( $N^*$ ) from pion-nucleon scattering and single pion electroproduction data within a dynamical coupled-channel approach. The results are challenging the theoretical community to understand the structure of  $N^*$ s within quantum chromodynamics.

**Precision Test of the Standard Model:** Determination of the Weak Charges of the Quarks through Parity-Violating Electron Scattering: The Electroweak Standard Model (SM) has to date been enormously successful. The search for a fundamental description of nature, which goes beyond the SM, is driven by two complementary experimental strategies. The first is to build increasingly energetic colliders, such as the Large Hadron Collider (LHC) at CERN, to excite matter into a new form. The second approach is to perform extremely high precision measurements where an observed discrepancy with the SM would reveal the signature of new forms of matter. The state-of-the-art measurements of parity-violating electron scattering (PVES) at Jefferson Lab, which have led to the most precise determination of the weak charges of the quarks hitherto possible, severely constrain the possibility of new physics to an energy scale of order one TeV or higher — a factor of two above previous limits, which were dominated by atomic parity violation (APV) data.

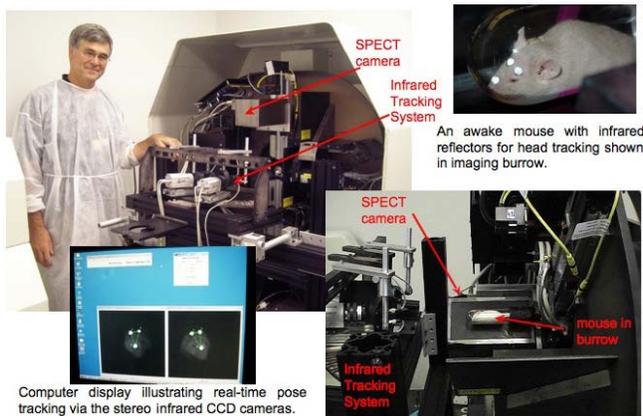
**Color Transparency in  $\rho^0$  Production off Nuclei:** Color transparency is a fundamental phenomenon predicted in Quantum Chromo Dynamics (QCD). In electron scattering and at sufficiently high energies and space-time resolution ( $Q^2$ ) it is expected that a nucleus should become completely “transparent” to the final state hadron which then can travel freely through the nuclear medium. A recent CLAS experiment is the first to observe the onset of color transparency in exclusive diffractive  $\rho^0$  production at the rather low energy of 5 GeV.

**Low-Temperature Radio-Frequency Feed-through for CW Applications:** Jefferson Lab continues to develop innovative solutions to problems shared by the accelerator community. A common challenge in accelerators based on superconducting radiofrequency technology (SRF) is the presence of additional radiofrequency waves inside the accelerator cavities, in addition to the primary frequency needed for accelerating particles. These so-called higher-order modes (HOMs) can seriously degrade beam quality. Jefferson Lab staff developed a novel solution. The modified design allows heat generated in the coupler to bleed away from the accelerator cavity, using a superconducting niobium RF probe that is kept thermally anchored via a single-crystal sapphire dielectric that is brazed between the niobium probe and an externally accessible copper collar.

**Cavity Processing and Procedure Improvements:** Jefferson Lab continues to integrate the fruit of superconducting radio-frequency (SRF) R&D into the production of higher-performing accelerator components. Capital improvements made possible by work-for-other projects such as the construction of cryomodules for the Spallation Neutron Source (SNS) and an enhanced level of rigor and specificity in the assembly procedures have yielded a dramatic improvement in particulate contamination control. This new, automated equipment made possible clean acid etching of cavities and rinsing them with high-pressure, ultra-pure water. The contamination responsible for the performance-limiting field emission phenomenon was thus eliminated. This evolution of the technology provides a foundation for the successful implementation of the 12 GeV upgrade and all other high-performance SRF accelerator applications.

**Awake Animal SPECT Imaging System:** Basic research into human disease states and pharmaceutical development for cancer detection and treatment depend heavily on biomedical investigations using small animal models. Recent advances in nuclear medicine based small animal imaging technology have enabled researchers to acquire *in vivo* images of radioactively tagged bio-markers in Laboratory mice and rats. Jefferson Lab and Oak Ridge National Lab are making use of technological competencies not available in

university or industrial settings to meet this challenge. Jefferson Lab has built high resolution gamma cameras ideally suited for small animal Single Photon Emission Computed Tomography (SPECT) with x-ray computed tomography (CT) capability. Tracking of the awake mouse's head is done through the use of infrared (IR) reflectors attached to the mouse's head. A dual CMOS IR camera system built by Oak Ridge National Lab is used to determine the position and orientation of the mouse's head during SPECT image acquisition. The real-time determination of the head pose and location of awake mice has been accomplished. SPECT reconstruction of moving radioactive phantoms is successful. Analysis of SPECT scans of awake mice is underway.



**Collaborative Efforts:** The FY07 S&T Review final report commented “The laboratory has developed broad collaborations in experiment, theory and accelerator R&D that serve to advance both the JLab and the national and international science programs.” Some examples include:

- JLab is working with Hampton University to develop the theoretical tools needed to further analyze data in the resonance-scaling transition region and in conjunction with the CTEQ Collaboration, a national collaboration of high-energy and nuclear theorists and experimentalists, incorporate the new data into global fits of parton distributions.

- A collaboration of theorists from JLab, the University of Adelaide and Edinburgh University has performed a detailed search for the Roper resonance, the first positive parity excitation of the nucleon, in lattice QCD. The analysis extends earlier work by including an expanded basis of nucleon interpolating fields, increasing the physical size of lattice, including more configurations to enhance statistics, and probing closer to the chiral limit.
- A collaboration between the University of Bonn, Forschungszentrum Juelich and the JLab EBAC group recently completed a global analysis of charged pion photoproduction data above 2 GeV within the framework of Regge theory. This will provide an important complement to the coupled channel analysis at lower energies that is expected to become impractical as the energy increases. The analysis revealed some interesting behavior in the 2 GeV region that may be associated with new resonances.

**Fellowships and Other Scientific Community Involvement:**

**Eugene P. Wigner Postdoctoral Fellowship:** Ross Young, Ph.D., University of Adelaide, Australia, (and currently a Post Doc at Jefferson Lab) was awarded the Eugene P. Wigner Postdoctoral Fellowship and will join the Physics Division at Argonne in October 2007. Candidates display superb ability in scientific or engineering research and show definite promise or become outstanding leaders in the research they pursue.

**2007 USPAS Prize for Achievement in Accelerator Physics and Technology:** Yaroslav Derbenev, Accelerator Division (CASA), was one of two winners of the 2007 USPAS Prize for Achievement in Accelerator Physics and Technology. Yaroslav received the award for his seminal contributions to the theory of beam polarization in accelerators and its control with "Siberian snakes", the theory of electron cooling and the inventions of "round-to-flat" beam optics transformations and novel six dimensional muon cooling schemes.

**2006 APS Fellowships:** Five 2006 APS fellowships were awarded to two JLab staff members and three members of the Users Group.: Wolodymyr Melnitchouk "for his theoretical and phenomenological contributions to the study of quark structure of nucleons and nuclei, in particular that underpinning the nuclear physics program at JLab"; Nikolitsa (Lia) Merminga "for leadership in designing and developing energy recovery linacs, and applications to light sources and electron-ion colliders"; Dinko Pocanic "for leading contributions to measurements of rare decays, structure and interactions of the pi meson"; Calvin Howell "for precision measurements of the nucleon-nucleon interaction in few-body systems using polarization observables and for service to the scientific community, especially by mentoring students at historically black colleges and universities"; and Keith Griffioen "for definitive experimental studies of the spin structure of the proton and neutron, both in perturbative, deep-inelastic regime, and in non-perturbative resonance region".

**APS DPB Committee participation:** Goeffrey Krafft - Fellowship Committee; Rui Li - Doctoral Research Award Committee; Jean Delayen - Publications Committee; Lia Merminga and Andrew Hutton - Nominating Committee (2006 and 2007 respectively).

**DEPS Fellow:** George Neil, Acting Associate Director for FEL Division, was named a Directed Energy Professional Society (DEPS) Fellow in November 2006. DEPS Fellows, who represent one percent of the DEPS membership, are esteemed members of the DE community, noted for their creative contributions and distinguished service. George was cited for constructing and bringing into operation the world's most powerful continuous-wave Free-Electron Laser (FEL) at 10 kW, and also the world's first FEL to lase at the second and fifth harmonics. He also performed the first

demonstration of FEL oscillation with a tapered wiggler for high efficiency and the first measurement of optical beam quality in an FEL.

**DOE Outstanding Junior Investigators:** Dr. Anthony Thomas, Chief Scientist at Jefferson Lab, was a member of the DOE Outstanding Junior Investigators Award Panel Review held January 23, 2007. Two JLab staff members were nominated for this award. In addition, Dr. Thomas has been appointed as an Adjunct Professor of Physics at Louisiana State University and as a board member of the Old Dominion University Research Foundation.

**DNP Committee Participation:** JLab staff are actively involved in the Division of Nuclear Physics (DNP) Executive Committee and the Program Committee (Larry Cardman – Vice Chair), the 2007 Home Page Committee (Cynthia Keppel – Chair), the 2007 APS Nominations Committee (Larry Cardman – Chair), and the 2007 Publications Committee.

The Annual Fall Meeting of the DNP hosted by JLab was held October 11<sup>th</sup> – 13<sup>th</sup> with more than 700 attendees, which included international participation. In conjunction, the ninth Annual Conference Experience for Undergraduates (CEU) was also held. The goal of the CEU is to provide a “capstone” conference experience for undergraduate students who have conducted research in nuclear physics, by providing them the opportunity to present their research to the larger professional community and to one another.

**Opportunities for Improvement:**

As noted in FY2006 S&T Review recommendations → *The Lattice Gauge group’s White Paper that was written in response to last year’s review should be re-written in light of the group’s preliminary three part proposal and new science goals. This should be done in a timely fashion so that it can influence policy decisions in the near term.*

**Status:** Submitted January 31, 2007 – Marked “Completed” in FY2007 S&T Review

**Objective 1.3 Provide and Sustain Science and Technology Outputs that Advance Program Objectives and Goals**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured through progress reports, peer reviews, Field Work Proposals (FWPs), Program Office reviews/oversight, etc.:

- The number of publications in peer-reviewed journals;
- The quantity of output from experimental and theoretical research; and
- Demonstrated progress against peer reviewed recommendations, headquarters guidance, etc.

Performance Level Achieved:

Performance Level	Grade	Score
Pass	A	3.8

JSA Performance:

FY2007 S&T Review findings and comments:

- The Laboratory continues to be highly productive in terms of publications.
- The theory group has one of the strongest hadron physics programs in the country with an impressive record of publications during the past year.
- The Accelerator Division staff provides leadership in operation of accelerators and the continuing development of new technological advances that are important to JLab and the DOE Mission. The number of publications, conferences, and invited talks is indicative of their productivity.

In addition to the S&T Review comments, the following activities demonstrate additional achievements in this performance area.

Numerous JLab publications have been submitted to arXiv during FY07, an e-print service in the field of physics, mathematics, non-linear science, computer science, quantitative biology and statistics that is funded by Cornell University and the National Science Foundation. Publication statistics for FY07 are as follows:

TYPES OF PUBLICATIONS	JLAB STATISTICS
Journals	115
Theses	25
Invited Talks	134
Contributed Papers	60

Work carried out at JLab’s Theory Center revealing the role of strange quarks in nucleon structure was featured in the Australian news; an Australian Broadcasting Corporation article discussed the predictions for the strangeness electric radius of the proton.

**Objective 1.4 Provide for Effective Delivery of Science and Technology**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by progress reports, peer reviews, Field Work Proposals (FWPs), Approved Financial Plans (AFPs), Program Office reviews/oversight, etc.:

- Efficiency and effectiveness in meeting goals and milestones;
- Efficiency and effectiveness in delivering on promises, and getting instruments to work as promised;
- Efficiency and effectiveness in transmitting results to the community and responding to DOE or other customer guidance.

Performance Level Achieved:

Performance Level	Grade	Score
Pass	A	3.8

JSA Performance:

FY2007 S&T Review findings and comments:

- JLab staff has organized important workshops in the past year, including a workshop on single crystal niobium and a workshop on Exclusive Reactions at High Momentum Transfers.
- The Laboratory has very active seminar, visitor and conference programs and takes its role in training students very seriously.

In addition to the S&T Review comment above, the following activities demonstrate effective delivery of Science and Technology.

**Theory-Computing Capacity:** Jefferson Lab put into operation a new 400 node cluster that tripled the theory-computing capacity at the Lab from 1 to 3 Teraflops (sustained) and supports the work of the national USQCD (quantum chromodynamics) collaboration, including Nuclear Physics and High Energy Physics researchers. This new cluster will continue the work of its JLab predecessors, running powerful computer simulations to shed light on how one of the basic forces of nature, the strong force, builds protons, neutrons and other particles out of the basic building blocks of matter, quarks and gluons. During August, we evaluated quad core processors as an upgrade for the 396 node 7n cluster, a part of the LQCD National Computing Facility. Based upon successful and excellent test results, all nodes were upgraded to quad cores in September, increasing JLab’s capacity to over 4 Teraflops sustained on science applications.

**Table 4. Goal 1.0 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>1.0 Efficient and Effective Mission Accomplishment</b>					
1.1 Impact	A	4.0	40%	1.60	
1.2 Leadership	A	4.0	30%	1.20	
1.3 Output	A	3.8	15%	0.57	
1.4 Delivery	A	3.8	15%	0.57	
<b>Performance Goal 1.0 Total</b>					3.94

**Table 5. Goal 1.0 Final Letter Grade**

<b>Total Score</b>	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
<b>Final Grade</b>	A+	A	A-	B+	B	B-	C+	C	C-	D	F

**Goal 2.0 Provide for Efficient and Effective Design, Fabrication, Construction and Operation of Facilities**

Goal Requirement:

The Contractor provides effective and efficient planning; fabrication, construction and/or operations of Laboratory research facilities; and is responsive to the user community.

**Objective 2.1 Provide Effective Facility Design(s) as Required to Support Laboratory Programs (i.e., activities leading up to CD-2)**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by scientific/technical workshops developing pre-conceptual R&D, progress reports, Lehman reviews, Program/Staff Office reviews/oversight, etc.:

- Effectiveness of planning of preconceptual R&D and design for life-cycle efficiency;
- Leverage of existing facilities at the site;
- Delivery of accurate and timely information needed to carry out the critical decision and budget formulation process.; and
- Ability to meet the intent of DOE Order 413.3, Program and Project Management for the Acquisition of Capital Assets.

Performance Level Achieved:

Performance Level	Grade	Score
In addition to meeting all measures under B <sup>+</sup> , the Laboratory is recognized by the research community as the leader for making the science case for the acquisition; Takes the initiative to demonstrate the potential for revolutionary scientific advancement. Identifies, analyzes and champions novel approaches for acquiring the new capability, including leveraging or extending the capability of existing facilities and financing. Proposed approaches are widely regarded as innovative, novel, comprehensive, and potentially cost-effective. Reviews repeatedly confirm potential for scientific discovery in areas that support the Department's mission, and potential to change a discipline or research area's direction.	A	3.8

JSA Performance:

FY2007 S&T Review findings and comments:

- The 12 GeV Upgrade has been ranked as the top priority in nuclear physics by the NSAC Long Range Plan – a major accomplishment for the Laboratory.

In addition to this S&T Review comment, below are some accomplishments on the 12 GeV Upgrade Project in this period:

**SCIENTIFIC LEADERSHIP:**

As noted in Objective 1.2, the 12 GeV Upgrade of Jefferson Lab was once again affirmed as the top priority of scientists active in hadronic physics by representatives of the community gathered at Rutgers University in January for a "Town Meeting." This meeting, which focused on QCD and Hadron Physics, was one of four that have been organized by the APS Division of Nuclear Physics to gather community

input for the Long Range Plan for Nuclear Science that the DOE and NSF have charged the Nuclear Science Advisory Committee (NSAC) to develop. The outcome of the Town Meeting placed the 12 GeV Upgrade as the top priority of the community's five major recommendations for the future of the field. This strong support by a diverse community of scientists is an important affirmation of the world-class 12 GeV science program planned.

Through the leadership of the JLab Chief Scientist, Associate Director (AD) for Physics, and 12 GeV Science Lead, and the significant effort of the JLab user community, the 12 GeV Upgrade project is the top priority in the 2007 NSAC Long Range Plan. As a proof of this leadership, the JLab AD for Physics and the JLab Chief Scientist were elected to give the presentations on the ongoing and 12 GeV Upgrade physics research programs at the Long Range Plan Working Group meeting in Galveston, TX in May 2007. Also, a collaboration of JLab scientists including the Chief Scientist outlined the impact of the current and the discovery potential of the future 12 GeV JLab precision electroweak program, complementing the anticipated measurements of physics beyond the Standard Model at the Large Hadron Collider and beyond. In the highest NSAC recommendation it was acknowledged that "The Upgrade will enable new insights into the structure of nucleons, the transition between the hadronic and quark/gluon descriptions of nuclei, and the nature of confinement." In all, the science portfolio of the 12 GeV Upgrade has been largely extended over the last few years, as acknowledged by independent science reviews, science advisory committees, and our peers. Additionally, a special Program Advisory Committee (PAC32) was held in August 2007 dedicated to identifying the highest quality science experiments for the 12 GeV era. During the FY2007 S&T Review, the review committee findings included the following: "The 12 GeV Upgrade has been ranked as the top priority in nuclear physics by the NSAC Long Range Plan – a major accomplishment for the laboratory."

#### **ACQUISITION APPROACH:**

The JLab leadership and the 12 GeV Team have vigorously pursued novel approaches to this acquisition. In addition, activities are ongoing to secure additional non-DOE contributions to the 12 GeV Upgrade project including NSF MRI proposals, commitments from international collaborations and the Commonwealth of Virginia. Some of the notable FY2007 accomplishments are listed below:

- PED effort resulted in preliminary design which reuses all of the existing accelerator components and nearly all of the existing experimental equipment.
- Successfully secured \$500k of Commonwealth of Virginia funding in July 2007 for design and initial construction of Hall D Complex.
- In support of a JLab user collaboration, successfully secured NSF MRI grant for construction of 12 GeV Hall C detector components.
- Together with user collaborators, successfully secured donation of existing HERMES lead glass blocks for 12 GeV Hall C calorimeter.

#### **PROJECT REVIEWS:**

The 12 GeV Upgrade Accelerator Arc Magnet Review was held November 8, 2006. Two safety experts and two magnet experts from three national laboratories and NASA's Langley Research Center were part of the committee onsite to critique any possible issues with safety and long-term accelerator reliability/performance. The committee was impressed by the baseline approach for the accelerator and the conventional facilities aspects of the arc magnet project that was developed to assure safe and reliable long-term operations. They concluded that following implementation of three small enhancements, the present plan responsibly addresses all safety and reliability issues. Those enhancements have been

implemented.

The DOE 12 GeV Upgrade FPD-led Project Status Review took place throughout December 2006 and January 2007 to evaluate preparations for the Critical Decision 2 (CD-2) approval process scheduled for summer 2007. The 12 GeV Project Team submitted substantial pre-brief material to the review committee in early November and in early December which documented the significant progress in developing a well supported resource-loaded schedule and critical path; responding to and documenting resolutions to the 2005 and 2006 IPR recommendations; and developing a credible “Path to CD-2” schedule. The onsite portion of the review was held January 9<sup>th</sup> – 10<sup>th</sup>, and the primary conclusion of the committee was that “The 12 GeV Upgrade Project is on track in their preparations and readiness for the SC IPR (DOE Office of Science Independent Project Review), OECM EIR (Office of Engineering and Construction Management External Independent Review) and September 2007 CD-2 approval.” The committee made several recommendations for further developing the project plan. A summary was formally presented to the DOE Office of Nuclear Physics (DOE-NP) and the Office of Project Assessment on January 30<sup>th</sup>.

On February 2<sup>nd</sup> and 3<sup>rd</sup>, Hall B hosted an international workshop to discuss the CLAS12, the 12 GeV upgrade of the CEBAF Large Acceptance Spectrometer (CLAS), detector hardware and software developments and to devise future activities in preparation for upcoming detector reviews in March/April and the CD-2 review in the summer of 2007. Over 70 participants from 32 institutions, among them eight institutions from Europe and Asia, attended the workshop. The participants discussed in two plenary sessions and in four parallel sessions the status of R&D and design projects for the CLAS12 detector.

The 12 GeV design and safety review of the drift chamber detectors for Halls B and D was conducted on March 6<sup>th</sup> through 8<sup>th</sup>. The review committee consisted of three experts on this technology (one from MIT, FNAL, and SLAC) as well as the retired Hall B Leader. The committee concluded that both designs use “well established technologies with low associated risks and predictable costs.”

The 12 GeV Upgrade Project Design and Safety Review of the Hall B CLAS12 Calorimeter and Cerenkov Counter was held at JLab on April 23-24, 2007. The review panel consisted of one expert from JLab and two experts from FNAL and BNL, respectively. They critiqued all project design and safety aspects of the CLAS12 Preshower Calorimeter (PCAL) and High Threshold Cerenkov Counter (HTCC) detectors. The committee was impressed with the design of both detectors and the particular attention given to safety at this stage of the project.

The 12 GeV Upgrade Peer Review of the Hall D Complex (Conventional Facilities) was held at JLab on May 7, 2007. The review panel consisted of one expert from LLNL, ANL, and MSU NSCL, respectively. The reviewers critiqued the requirements of the Hall D experimental program, the design process for the conventional facilities, and whether the current Hall D Civil design supports the experimental requirements. Formal talks were presented by members of the 12 GeV Project Team, ESH&Q Division, and Facilities Management. The committee was impressed with the overall design development and the identified requirements for space, utilities, and safety in support of the approved experimental program. During the close-out, the Review Panel complimented JLab on the open communication between the Physicists, Facility Owners, and the Design Team. No formal recommendations were made.

During FY2007, all 12 GeV Accelerator subsystems held preliminary design and safety reviews of their major elements. More than 15 reviews took place and in all cases the review committee membership included subject matter experts external to the design effort, often from other Laboratories. Recommendations arising from these reviews have been incorporated into the designs and the baseline project plan.

The Independent Project Review of the 12 GeV CEBAF Upgrade was held on June 26<sup>th</sup> – 28<sup>th</sup>, the first of two reviews necessary to determine project readiness for CD-2, Approve Performance Baseline. The project received high marks for the technical plan, the cost and schedule estimates, and for satisfying the requirements for all 16 OECM lines-of-inquiry for CD-2 approval. Concern was raised about an inadequate level of cost contingency and the relatively low OMB escalation rates used in the calculation of the TPC. In response to this, an updated project plan addressing these concerns was developed in coordination with DOE.

An External Independent Review (EIR) of the 12 GeV Upgrade Project was held at Jefferson Lab on September 10<sup>th</sup> to 14<sup>th</sup> by the DOE Office of Engineering and Construction Management (OECM). This major review was the second summer review leading to CD-2, Approve Performance Baseline. The 12 GeV Project team presented to the five-member review panel the documentation delineating the information and processes used to establish the project costs and schedule, as well as assessments of hazard and risk, and management processes and procedures. During the outbrief, the panel commended the “qualified and capable project team” who has “extensive experience with the technology”, and concluded that “it is highly likely that the project can be successfully executed once the baseline is validated”. Four major recommendations were identified in the review report, and responses were drafted for each and submitted to the Federal Project Director and Federal Program Manager. Resolution of the EIR recommendations is an ongoing process, with conclusions expected in November 2007 and formal CD-2 Approval in calendar 2007.

**STAFFING ADDITIONS:**

The new 12 GeV Assistant Project Manager and Hall D Leader joined the Lab in December 2006. Dr. Elke Aschenauer was a spokesperson for the HERMES experiment at DESY for the past three years, and has also worked at HERA-B and PSI. She has a wide range of expertise in scientific management, major scientific instrumentation installation, hardware development, data analysis, and simulation work.

The position of 12 GeV Safety Manager within the Jefferson Lab ESH&Q Division was filled on March 1, 2007. Ms. Cindy Saban holds a Bachelor’s degree in Biology as well as advanced degrees in Environmental Health Science and Industrial Health, and is certified as both a Certified Industrial Hygienist (CIH) and a Certified Safety Professional (CSP). She has worked for more than ten years in the safety arena of DOE Laboratory facilities.

**R&D HIGHLIGHTS:**

As part of the 12 GeV accelerator R&D plan, the assembly and cool-down of the “1/4 cryomodule”, which incorporates all the design features of the 12 GeV cryomodules, was completed on December 21<sup>st</sup>. The initial data analysis indicated that the cavities operated at 17.7 Megavolts per meter (MV/m), exceeding the minimum specification for the cavities and, more importantly, demonstrating successful correction of the thermal management problems identified during Renaissance cryomodule testing in 2005. An interim R&D report on this activity was submitted to the DOE FPD on Feb 2<sup>nd</sup>. In subsequent testing, the cavities appeared to perform better when they were re-tested in the Vertical Cryogenic Test Area (VTA) than they had in the Horizontal Test Bed (HTB). Analysis of all the data and of model predictions of signal strengths showed that there was a flaw in the analysis of the HTB data. Specifically, one of the terms used to convert measured radiofrequency (RF) signals into cavity gradients was incorrect. After correction, the resulting HTB performance was significantly better than had been previously thought, with both cavities actually exceeding the stretch goal of the test (19.25 Megavolts per meter [MV/m] with the intrinsic Q exceeding the 12 GeV specification). This corresponds to ~10%

operating headroom. Both cavities had quench-limited maximum gradients of 24 MV/m in the HTB as they did in the re-testing in the VTA.

The first digital self-excited loop (SEL) for radiofrequency (RF) controls has been developed as part of the 12 GeV R&D. The SEL is of interest to the 12 GeV Project, because it can energize a cavity even if it is not on resonance. Use of a SEL would thus eliminate the cavity turn-on challenge created by the large Lorentz-force detuning seen with cavities operating at the gradients planned for 12 GeV. The demonstrator has been able to achieve phase control in closed loop over a limited detuning range during this portion of the R&D work. Further development is planned to demonstrate the final phase and amplitude control specifications for 12 GeV. A recent demonstration by the low-level RF team indicated successful performance of the SEL on a superconducting RF (SRF) cavity in the FEL. This control algorithm provides greatly increased flexibility for the RF system when powering up a cavity, which will be of particular value for the high-gradient cavities planned for the 12 GeV accelerator. This is a “world’s first” development in RF control technology.

The 12 GeV Upgrade Accelerator R&D task known as the integrated “Vertical Slice Test” has been completed. The purpose of the test was to demonstrate successful field control of an SRF cavity operating at  $>17.5$  MV/m using the JLab-developed digital low-level RF (LLRF) controls. Tests were run at 20 MV/m using one of the cavities in the Renaissance cryomodule. The system met the 12 GeV Upgrade phase and amplitude specifications using the generator-driven-resonator algorithm. Additional tests of the self-excited-loop algorithm demonstrated its capability to ramp a cavity from 0 MV/m to 20 MV/m in  $\sim 7$  ms.

The Hall D Forward Drift Chamber (FDC) is one of eight detector systems being prototyped for 12 GeV Physics this year. Following a smaller scale prototype that was built and tested over the last two years, the new prototype is a full-scale design which addresses fabrication questions as well as detector performance. Two full-sized support rings have been fabricated from the materials planned for the final module, and thin foils have been stretched over these to form flat planes that define the electric fields needed for charge collection. Precision opto-mechanical measurements at over 100 points on the large, 3-foot diameter surface indicate a typical flatness of 100 microns, a very good result for the initial effort. Next steps include stretching similar foils with conductive traces and developing detailed designs for interfacing the traces to on-board electronics.

Optimization studies of the calorimeter for the Super High Momentum Spectrometer (SHMS) in Hall C were completed. These studies validated that the performance of an alternative calorimeter geometry maintained the good energy resolution and pion rejection capabilities of the original design. The alternative geometry is under consideration because it permits use of lead glass blocks that currently exist at other Laboratories and have been contributed to the 12 GeV Project by foreign collaborators.

The Horizontal Bend magnet for the Super High Momentum Spectrometer (SHMS) in Hall C will be a small superconducting dipole magnet located close to the target that will allow measurements at the smallest scattering angles. Its proximity to the target causes radiation-induced heating of the magnet that must be accommodated in the design of the magnet's cooling system. Following simulations of this effect, a copper test device was fabricated to directly measure this radiation-induced heat load. Parasitic measurements using this device with electron beam in Hall C were completed in Summer 2007.

Five of the seven new superconducting magnets for the 12 GeV Upgrade will be built for the Super-High Momentum Spectrometer (SHMS) in Hall C. The most critical component of these magnets is the multi-strand superconducting wire which is used to make the high magnetic fields of several Tesla in

magnitude. For these magnets, Jefferson Lab will make use of wire originally fabricated for the SSC accelerator. For optimal use in two of the magnets, some of the wire has been slightly re-shaped from a keystone to a rectangular cross-section. Samples of the wire have been tested at a highly specialized facility at Brookhaven National Laboratory, and all test results indicate that both the original and the re-shaped wire are more than adequate to handle the required current.

A critical requirement for operating large acceptance detectors with fixed-target electron beam experiments is to shield the detector from the low-energy elastically scattered electrons from the target. The technical solution to this problem depends uniquely on the characteristics of the detector being shielded and it requires extensive and detailed simulations. This issue is being studied for CLAS12 as part of an ongoing 12 GeV R&D program in a collaboration between Jefferson Lab and the Russian institute ITEP. The studies to date indicate that a combination of a high-field solenoid magnet, as planned for CLAS12, and a precisely-shaped dense metal absorber will adequately shield the critical first layer of drift chambers from this background. In addition, the studies have determined the optimal location and geometry for the central tracking detector, which is very close to the beamline.

Prototyping of the Hall B Region I drift chamber is proceeding well. A full-scale prototype of one sector is under construction in a collaboration between JLab and Old Dominion University (ODU). Mechanical parts have been purchased, assembled and surveyed, and testing of mechanical assembly procedures has been finished. The completed detector frame has been transported to ODU where a clean room has been constructed for the stringing process. Fabrication and testing of custom circuit boards by the JLab Fast Electronics Group is complete; these boards will allow full instrumentation of hundreds of channels of the prototype. Detailed tests with cosmic ray tracks will begin following the chamber stringing, gas system fabrication, and completion of the data acquisition system.

**PED HIGHLIGHTS:**

On January 24<sup>th</sup> and 25<sup>th</sup>, Lab personnel met with the architect-engineering (A-E) design team for the Hall D Complex (conventional facilities) to discuss comments generated from the 60% design and safety review. Preliminary review comments were provided to the A-E a week in advance of this review meeting to allow preparation of responses. During the two days, over 30 engineers and facility users participated in a series of discussions highlighting the different parts of the Hall D Complex. With the results of the discussions, the finalized review comments were provided to the A-E for incorporation into the next design submittal.

On August 2<sup>nd</sup>, the CHL Addition 100% Design and Safety Review Meeting was held with the A-E's design team and JLab representatives from Cryogenics, Facilities Management, and the ESH&Q Division.

On August 7<sup>th</sup>, the Construction Management firm, Alpha, met with the Hall D Complex Designers (HSMM) and JLab Facilities maintenance personnel to collect data for development of the Commissioning Plan for the mechanical, electrical, fire protection, and material handling systems. Alpha will develop the functional performance checklists based on the testing requirements. Then, HSMM will incorporate these checklists into the specifications to clearly define the commissioning requirements for the construction contractor. Also in August, Alpha completed the validation of the designers' estimated costs for the CHL Addition and the Civil Accelerator Projects and determined them to be reasonable.

The Architect-Engineering (A-E) firm, HSMM, continues with their design effort on the Hall D Complex (Civil) and plan to submit the 100% design document to Jefferson Lab in October. In conjunction with this design effort, the Construction Management firm, Alpha, is developing a detailed construction schedule for the Hall D Complex. This schedule will detail the scope and interfaces for three construction phases, and establish a constructible logic for the civil construction contract. Upon completion of the

schedule, HSMM will document these three phases on the design drawings to establish the schedule requirements for the construction contractor. On August 30<sup>th</sup>, the 12 GeV Civil project team met with Alpha for a preliminary review of the construction schedule and identified the funding and operational constraints that need to be included in the schedule.

Also in August, Jefferson Lab Facilities Management personnel started the 100% design effort on the 12 GeV Upgrade North and South (N&S) Access Building Addition and the Civil Beam Switchyard (BSY) Addition.

For all of FY2007, the 12 GeV EVMS system has been in full operation; a year earlier than required by the DOE Order 4.13.3A. The 10 year Resource Loaded Schedule was completed. There were 33 formal FY07 Change Requests processed and implemented. Earned Value was tracked. Variance Reports were written, analyzed, and acted upon. Contingency was tracked and trended. Monthly EVMS Reports were written.

#### **SUMMARY:**

- Scientific leadership – 12 GeV Upgrade top ranked priority in 2007 NSAC LRP.
- Novel approaches for acquiring new capability demonstrated.
- All requests for project and budget information fulfilled in a timely and comprehensive manner. A timeline for activities leading up to CD-2 Approval was developed. Project progress regularly reported to DOE through written R&D reports, weekly IPT meetings, monthly written reports, and monthly video-conferences. Daily interaction with Federal Project Director.
- Preliminary designs and project documentation were highly praised by all project review committees. Set new standard for pre-brief documentation and logistics of IPRs and EIRs, highly praised by both review committees.
- Successfully modified project plan in July 2007 in close coordination with DOE to achieve increased financial contingency and incorporate increased escalation rate. Demonstrated strong commitment to achieving all project goals within cost and schedule.
- Cost, schedule, and performance baseline validated by DOE OPA IPR and DOE OECM External Independent Review. Satisfied all 16 OECM criteria for CD-2 approval. Resolution of EIR Corrective Action Plan in progress.
- CD-2 Approval anticipated by end of calendar 2007.

DOE Midyear Feedback:

*The Laboratory has demonstrated effective planning as it prepares for CD-2 approval. The January 2007 FPD-led Project Status Review and the SC Office of Project Assessment Review both concluded the project is on track with CD-2 preparations.*

#### **Objective 2.2 Provide for the Effective and Efficient Construction of Facilities and/or Fabrication of Components (execution phase, Post CD-2 to CD-4)**

##### **Objective Requirement:**

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by progress reports, Lehman reviews, Program/Staff Office reviews/oversight, etc.:

- Adherence to DOE Order 413.3 Project Management for the Acquisition of Capital Assets;
- Successful fabrication of facility components
- Effectiveness in meeting construction schedule and budget; and
- Quality of key staff overseeing the project(s).

*Note: Objective not applicable to this period per PEMP.*

**Objective 2.3 Provide Efficient and Effective Operation of Facilities**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by progress reports, peer reviews, Program/Staff Office reviews/oversight, performance against benchmarks, Approved Financial Plans (AFPs), etc.:

- Availability, reliability, and efficiency of facility(ies);
- Degree the facility is optimally arranged to support community;
- Whether R&D is conducted to develop/expand the capabilities of the facility(ies);
- Effectiveness in balancing resources between facility R&D and user support; and
- Quality of the process used to allocate facility time to users

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Performance of the facility exceeds expectations as defined before the start of the year in any of these categories: cost of operations, users served, availability, beam delivery, or luminosity, and this performance can be directly attributed to the efforts of the Laboratory; and /or: the schedule and the costs associated with the ramp-up to steady state operations are less than planned and are acknowledged to be 'leadership caliber' by reviews; Data on ES&H continues to be exemplary and widely regarded as among the 'best in class'.	A	4.0

JSA Performance:

FY2007 S&T Review findings and comments:

- Facility operations have been highly effective and appropriate for optimizing scientific productivity.
- The facility delivered beam polarizations of up to 85% and an average reliability of 94%, compared with ~80% in FY06.
- Despite Continuing Resolution and significant redirection of funds toward the 12 GeV Upgrade, the facility exceeded the Congressional Budget target of 4,985 hours and delivered 5,434 hours in order to complete major experiments before the summer shutdown.
- At present, CEBAF is operated at maximum beam energy of 5.1 GeV, constrained by cryomodules damaged during the thermal cycling in the aftermath of Hurricane Isabelle in 2003.
- The Operations staff is to be congratulated for significant achievement given the complexity of the operations and the demands for high beam performance and stability.
- These achievements reflect well on the control room staff and management for maintaining a high degree of operational discipline, motivation and training.
- The sources of unplanned downtime are well identified and plans are ongoing or under development to address the most significant of these interruptions.

- CASA added significantly to the ability of operations to delivery high quality beams to experiments through proactive interaction with the 6 GeV program. The degree of integration of the accelerator physics group into current operations is outstanding.
- The Polarized Electron Source Group has been very successful in their role in the transition of Polarized Sources from an art to a well understood, predictable technology. This group is a world leader in this technology, as evidenced by the relatively large number of refereed journal and conference proceedings publications. This shows that the Polarized Source Group is creative and productive in helping the facility achieve its overall goals.
- JLab has developed short and long term plans for the facility. The energy upgrade program seems well matched to the needs of the experimental program. The new C100 modules present state of the art technology in respect of module design and cavity processing methods.
- The SRF Institute, with its broad range of expertise, has developed into a world-leading center of excellence for superconducting cavity accelerator systems.
- The FEL/ERL is a first class accelerator physics accomplishment and the JLab staff is to be congratulated. The FEL/ERL has demonstrated benefits to JLab and DOE, including the maintaining of important expertise in accelerator physics, optics and engineering.
- The development of the Ganni Cycle is a fine example of JLab’s staff leadership, creativity, and productivity, which will have an impact on operations of facilities world-wide.

In addition to these S&T Review comments, below are additional facts that demonstrate the effectiveness of facility operations.

**Effective Polarization:** In an effort to optimize polarized beam running, we scheduled many weeks of operation at energies that are consistent with good polarization in multiple halls. In the worst case, the effective polarization delivered to a hall is typically reduced to no less than ~90% of the nominal maximum available from the cathode. We are now operating routinely with the superlattice photocathode, delivering better than 85% polarization fro all Halls requiring polarization. In addition, the delivery of parity quality 362 MeV beam for G0 and beam of the same energy simultaneously to Hall A is a notable accelerator achievement.

**New Load Lock Gun:** A new load lock gun was commissioned at the Injector Test Cave in building 58 and will enhance the operating lifetime of the CEBAF photoinjector, speeding replacement of photocathode material and providing more opportunities for photocathode research using the 5 MeV Mott polarimeter. First

Status as of 24:00 Sunday, September 30, 2007	Total Fiscal Year		
	Planned	Actual	DOE Goal
Weeks of Ops (Running wks)	36.6	36.0	33.3
Reliability	90%	94%	90%
Acc Availability	73%	81%	74%
Max Energy	5.16 GeV	5.06 GeV	5.0 GeV
Polarization	75-85%	85%	-
Research Hrs	5,385	5,161	4,426
Beam Studies Hrs	473	256	349
Tuning/Setup (Restore)	288	302	259
Unsch Shutdown	-	329	559
Unsched Down/Total Ops	<15%	5.75%	10%
Phys Output Wks	55.7	65.4	52.4
Hall Multiplicity	2.47	2.45	2.50
Hall A Availability	84%	90%	85%
Hall B Availability	93%	96%	85%
Hall C Availability	91%	90%	85%
Hall Availability	85%	92%	85%
Hall A Performance	-	113%	-
Hall B Performance	-	107%	-
Hall C Performance	-	116%	-
Hall Performance (Wtg Avg)	-	112%	-

beam out of the new injector load lock gun was accomplished within the first two weeks of installation. The Quantum Efficiency of the new bulk wafer was tested and measured very high. The Cryogenics Group successfully accomplished the task of bringing the operation temperature of the Central Helium Liquefier (CHL) from 2K to 4K, enabling a significant savings in electrical power during the down period.

**Large-Grain/Single-Crystal Niobium Cavity Technology:** Many particle accelerators require accelerating cavities made of niobium operating at temperatures between -271 and -269 degrees centigrade, when niobium becomes superconducting with near- zero electrical resistance. Two years ago, Jefferson Lab started to explore the use of large-grain/single-crystal high-purity niobium for superconducting cavity applications. Like salt crystals, niobium crystals, or grains, can be grown in either larger or smaller sizes; hence, large-grain niobium consists of larger niobium crystals. Traditionally, only small-grain niobium has been available for use in accelerator cavities. However, the potential benefits offered by using large-grain or single-crystal niobium include lower material costs, streamlined procedures for fabrication and qualification, and potentially significant cost savings for large accelerators, such as the International Linear Collider (ILC). Eight of the cavities built at JLab have exceeded the ILC design goal of  $E_{acc} = 35$  MV/m, corresponding to a peak magnetic field of  $H_{peak} = 149$  mT.

**Superlattice Photocathodes and Fiber-Based Drive Lasers:** Nuclear physics experimenters conducting high-precision electron scattering experiments often require a polarized electron beam with the spin of most of the electrons in the beam oriented in a single direction. Higher beam polarization means experimenters obtain the desired statistical accuracy in less time, allowing Jefferson Lab's CEBAF to conduct more experiments each year. CEBAF can also conduct more demanding experiments that would not have been possible with a lower-polarization beam. Jefferson Lab recently improved the quality of its polarized electron beam with a new technology developed by SVT Associates through the DOE Small Business Innovation Research (SBIR) program. The company successfully engineered a new photo-cathode material (the source of the electrons in CEBAF's electron beam), which provides significantly higher beam polarization compared to conventional material: 85% versus 75%. This new, superlattice photocathode was then adapted by Jefferson Lab scientists for use in CEBAF. The result of these improvements has been to produce a highly reliable photo-injector capable of routinely producing up to 200  $\mu$ A of electrons with a polarization level of 85%.

### Opportunities for Improvement

As noted in FY2006 S&T recommendations and also noted as an FY06 PEMP weakness  $\rightarrow$  *Deterioration in cryomodule performance has limited the flexibility of the facility to carry out the full research program. Upon the completion of the re-installation and testing of the three cryomodules currently under refurbishment, generate an interim report and submit to DOE. Also, generate a ten year strategy which articulates the plans and resources needed to refurbish cryomodules and submit to DOE.*

### Status:

- A cryomodule refurbishment program has been established to rebuild weak/inoperative cryomodules. This program's goal is 3 cryomodules annually that includes replacing cold RF windows with a modified window. This window eliminates RF trips that were inherent in the original design. This action plan with appropriate scheduling was put into place in September 2006. In addition, the ten-year strategy was submitted on May 3, 2007.
- Five cryomodules are in process or complete. One cryomodule has been completed, reinstalled in the north linac, commissioned and is accelerating beam under normal operating conditions. Commissioning data for that cryomodule sets a limit for the total energy gain of 49.2 MeV. This limit included 2 cavities with limits that can reasonably be expected to increase resulting in a total energy

gain of ~ 51 MeV for the cryomodule. We are very pleased with this result for the first refurbished cryomodule. The cavity pairs from the second and third cryomodules have been qualified with all meeting or exceeding specification. These cavity pairs will be re-installed into the cryomodules and completed and ready for installation this summer. The fourth and fifth cryomodules are proceeding as planned and no problems are expected.

- FY07 S&T Review includes one recommendation carried over from FY06 which states “Upon the completion of the re-installation and testing of the three cryomodules currently under refurbishment, generate an interim report and submit to DOE.” This recommendation is ongoing.

**Objective 2.4 Utilization of Facility to Grow and Support Lab's Research Base and External User Community**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by peer reviews, participation in international design teams, Program/Staff Office reviews/oversight, etc.:

- The facility is being used to perform influential science;
- Contractor’s efforts to take full advantage of the facility to strengthen the Laboratory’s research base;
- Conversely the facility is strengthened by a resident research community that pushes the envelope of what the facility can do and/or are among the scientific leaders of the community;
- Contractor’s ability to appropriately balance access by internal and external user communities;
- There is a healthy program of outreach to the scientific community.

Performance Level Achieved:

Performance Level	Grade	Score
Reviews document that multiple disciplines are using the facility in new and novel ways, that the facility is being used to pursue influential science, that full advantage has been taken of the facility to enhance external user access, and strengthen the Laboratory's research base. A healthy outreach program is in place.	A	4.0

JSA Performance:

FY2007 S&T Review findings and comments:

- The high efficiency in machine and detector operations and extensive experimental results are impressive, and indicate a highly professional and technically capable experimental staff.
- The Laboratory currently has one of the largest nuclear physics users base of any facility world wide, with over 1,200 active users. The user community continues to be generally satisfied with the Laboratory’s support. The user community would like to see a scientific program plan that would allow the users to effectively distribute their efforts between 6 and 12 GeV experiments.
- The Laboratory program produces about 30% of the U.S. Ph.D.’s in nuclear science.
- The Program Advisory Committee (PAC) chair reported that the PAC continues to see strong proposals for Physics at 6 GeV, and found the 12 GeV program extremely exciting.

- A total of 12 experiments were successfully completed. These experiments required an unusually high number of machine configuration changes which went smoothly. Notable achievements include the completion of the G0 experiment's back angle measurement which required the development of a half-pass beam.
- The backlog of 6 GeV proposal has risen to 5 years, compared to 4 last year (partially a consequence of reducing the annual operations budget to redirect funds to the 12 GeV Upgrade).
- Over the past year, 22 proposals were considered for the 12 GeV program; 13 were approved and 4 were conditionally approved.
- While the 12 GeV Upgrade project is rightly the highest priority of the Laboratory, the Laboratory should carefully balance available resources to ensure that the highest priority 6 GeV experiments are completed while the upgrade is ongoing.

In addition to these S&T Review comments, below are additional accomplishments in this area.

JLab serves 2,000 active researchers from 180 institutions (35 states and 27 countries) and is responsible for over a quarter of all Ph.D.s awarded in the U.S. in Nuclear Physics which are based on JLab research (226 awarded, 181 in progress). During FY07, 27 Ph.D.s were awarded of which 6 were women. This is one more awarded than the previous fiscal year and represents a 50% increase in Ph.D.s awarded to women. JLab is cited more than 10,000 times in scientific literature; including several of the top most-cited papers in the field.

JLab ran a total of 11 experiments in Halls A, B, and C during FY07. The accelerator operations schedule was derived by looking at the requests for major installation work in the experimental halls, evaluating the number and kinds of people needed, and then scheduling to minimize overlap. Hall leaders took requests for running time submitted by the experiment spokespersons and developed a plan for their hall's program by considering the scientific priority of each experiment, together with the long-term goals of the research program, the accelerator's ability to deliver the beams desired reliability, the availability and reliability of the necessary experimental apparatus, the time necessary to mount each major experiment, and other constraints as appropriate. Scheduled time for all three halls was prepared using an estimated overall efficiency of simultaneous hall and accelerator operations of 50%, which is consistent with last year's experience. The final schedule was reached by a series of compromises in running order within each experiment and between halls to work around incompatibilities.

**HALL A:** A total of four experiments ran in this hall during FY07. Experiment E03-104, polarization transfer in  $4\text{He}(e,e'p)$  was successfully completed on November 2<sup>nd</sup> and during the low-energy running for G0, a short run was successfully completed in Hall A to measure the elastic form factors of Li and B. Next, in March E06-007, proton knock-out from 208Pb was run to completion in parallel with the approved running time extension of G0, after which E04-018, measuring the elastic form factors of  $3,4\text{He}$  up to large  $Q^2$  values resumed data taking to completion in June. This was followed by E03-101, hard photodisintegration of a proton pair. During the three-month summer down a NaI calorimeter was installed in the focal plane of HRS-right. This will be used in FY08 during the running of the Coulomb Sum Rule experiment E05-110 scheduled to run October through December. In February and March the Big Bite spectrometer was installed in Hall A and used first in E04-007, a study of  $\pi^0$  electroproduction on the deuteron near threshold scheduled to run in March and April 2008. Following that, the polarized  $3\text{He}$  target was installed for a total of five experiments intended to be completed in 2008. The first of those, E06-011, measuring the transverse target spin asymmetry in semi-inclusive pion production is tentatively scheduled to start running in late July 2008. Experiment E04-018 was successfully completed and the data accumulated will provide results for all three form factors of the helium isotopes with much higher  $Q^2$  – values than the existing data.

**HALL B:** The g13 run E06-103, a search for new baryon states in hyperon production from neutrons (deuterium), was completed using polarized photons scattered off liquid deuterium, the first part (g13a) using only circularly polarized real photons. Hall B was down after the holiday break in December until the middle of March 2007 due to low energy running for the G0 experiment. The g13a run group was followed by the second portion of the same run group (g13b) using linearly polarized photons generated by coherent bremsstrahlung of high energy electrons on an appropriately oriented diamond crystal. The same liquid deuterium target was used also for this part. G13 was followed by two test runs, one using a low energy real photon beam to study background conditions for a possible experiment to measure the pion polarizability with CLAS. The second aimed at studying the feasibility of operating a fission fragment detector in CLAS to measure lifetimes of hypernuclei. Both tests were successfully completed – the second part (g13b) using energy-tagged circularly and linearly polarized photon beams scattered off a liquid deuterium target. In addition, three test runs were completed before entering into the long maintenance period. The extended summer shutdown was used for the installation of FROST, the upgrade of the large angle time-of-flight detectors in CLAS, and maintenance and repair work on the drift chamber system. The schedule after the summer down shows the commissioning and execution of the first part of the g9-FROST program with a longitudinally polarized target and using a variety of different beam energies and combinations of photon beam polarizations (circular and linear). This experiment will begin in October 2007 and will run until mid January 2008.

**HALL C:** A total of six experiments ran in this hall for FY07. The backward-angle phase of the G0 experiment E06-008/E04-115 and the n-delta phase E04-101 measurement of parity-violating electron scattering in the Delta resonance region were successfully completed in March 26th. Note that since the first G0 engineering run in 2002, 10 graduate students have obtained their Ph.D.s from work on these experiments, and six more are expected. A merged program of L/T separations of elastic electron-proton scattering, E05-017, and of resonance region measurements for both deuterium, E06-009 and heavier nuclei, E04-001 was successfully completed on July 12th. E04-001 is a continuation of experiments with phase-I already completed, in close collaboration with the neutrino community. At present, most of the major installation cabling work for the GpE experiment has been completed. In addition, the newly constructed BigCal large EM calorimeter and the new Focal Plane Polarimeter for HMS will be installed to prepare for the polarization-transfer program of elastic electronproton scattering experiments E04-108 and E04-019. These experiments will start in October 2007 and continue into 2008.

**Table 6. Goal 2.0 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>2.0 Construction and Operations of User Research Facilities and Equipment</b>					
2.1 Provide Effective Facility Design(s)	A	3.8	25%	0.95	
2.2 Provide for the Effective and Efficient Construction of Facilities and/or Fabrication of Components	N/A	N/A	N/A	N/A	
2.3 Provide Efficient and Effective Operation of Facilities	A	4.0	60%	2.40	
2.4 Effective Utilization of Facility to Grow and Support the Laboratory's Research Base	A	4.0	15%	0.60	
<b>Performance Goal 2.0 Total</b>					<b>3.95</b>

**Table 7. Goal 2.0 Final Letter Grade**

<b>Total Score</b>	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
<b>Final Grade</b>	A+	A	A-	B+	B	B-	C+	C	C-	D	F

**GOAL 3.0 PROVIDE EFFECTIVE AND EFFICIENT SCIENCE AND TECHNOLOGY PROGRAM MANAGEMENT**

Goal Requirement:

The Contractor provides effective program vision and leadership strategic planning and development of initiatives; recruits and retains a quality scientific workforce; and provides outstanding research processes, which improve research productivity.

**Objective 3.1 Provide Effective and Efficient Stewardship of Scientific Capabilities and Program Vision**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by peer reviews, existence and quality of strategic plans as determined by SC and scientific community review, Program Office reviews/oversight, etc.:

- Efficiency and Effectiveness of joint planning (e.g., workshops) with outside community;
- Articulation of scientific vision;
- Development of core competencies, ideas for new facilities and research programs; and
- Ability to attract and retain highly qualified staff.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Providing strong programmatic vision that extends past the Laboratory and for which the laboratory is a recognized leader within SC and in the broader research communities; development and maintenance of outstanding core competencies, including achieving superior scientific excellence in both exploratory, high-risk research and research that is vital to the DOE/SC missions; attraction and retention of world-leading scientists; recognition within the community as a world leader in the field.	A	4.0

JSA Performance:

FY2007 S&T Review findings and comments:

- The Laboratory’s priorities and strategic plan are well aligned with DOE and national nuclear physics priorities.
- The organization of the Laboratory core competencies in elements such as the SRF Institute, CASA, the Collins Cryogenics Institute, the Center for Injectors and Sources and the separation of the Engineering Division seems to have effectively concentrated the resources, and provided increased opportunity to showcase their competencies while retaining strong commitment to operational performance.

In addition to these S&T Review comments, below are additional accomplishments.

**NSAC Long Range Planning:** As discussed in Objective 1.2, JLab has actively participated in the NSAC Long Range Planning process during this period. This included attending and participating in town hall meetings, providing key scientific staff for membership on multiple committees, and development of multiple white papers supporting the planning process. In addition, a draft ELIC design was presented in the Zeroth Order Design Report (ZDR). Two major successes that resulted from these meetings and activities included the completion of the 12 GeV Upgrade as the top ranking recommendation and the allocation of resources to develop accelerator and detector technology necessary to lay the foundation for a polarized Electron Ion Collider.

**APS Invited Talk:** Jefferson Lab conducted an invited session on November 10<sup>th</sup> at the 73rd Annual Meeting of the Southern Section of the American Physics Society titled “Jefferson Lab: Plans for the Future” that provided a strong programmatic vision beyond JLab. A presentation was given on the 12 GeV Upgrade describing the key elements of the project, including a status of the progress made thus far, and the key experimental measurements the Lab intends to carry out in the first five years of operation. Presentations were also given on the GlueX Project and the future of Generalized Parton Distributions (GPDs) at double the energy of CEBAF’s current electron accelerator.

**Nuclear Structure Community Meeting:** A community meeting held at SURA Headquarters in October encouraged Jefferson Lab and nuclear structure communities to develop a mutual understanding of common scientific interests. The results of this meeting led to a series of white papers that fed into the NSAC Long Range Planning process. A similar meeting with the RHIC community was also held at SURA Headquarters in December.

**Workshops:** Some examples of effective joint planning (e.g., workshops) with the outside community are cited below.

- Hall B sponsored a 12 GeV workshop entitled *CLAS12 Detector* at Jefferson Lab February 2nd - 3<sup>rd</sup> that involved participants from countries nation wide. Topics included physics opportunities of CLAS12, a proposed upgrade of the CEBAF Large Acceptance Spectrometer (CLAS) in Hall B, and the work required to design and build the upgraded spectrometer.
- The HEPiX 2006 Workshop held at Jefferson Lab October 9<sup>th</sup> – 13<sup>th</sup> as a forum to unify the IT system support engineers from High Energy Physics (HEP) Laboratories and institutes such as BNL, CERN, DESY, FNAL, IN2P3, INFN, NIKHEF, RAL, SLAC, and TRIUMF in addition to JLab.
- Hosted the Annual Users Group Workshop on June 18-20th → attendance was at a record high and is attributable in part to scheduling of Hall A and Hall B collaboration meetings on each end of the workshop.

### **Objective 3.2 Provide Effective and Efficient Science and Technology Project/Program Planning and Management**

#### Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by peer reviews, existence and quality of strategic plans as determined by SC and scientific community review, Program Office and scientific community review/oversight, etc.:

- Quality of R&D and/or user facility strategic plans;
- Adequacy in considering technical risks;
- Success in identifying/avoiding technical problems;

- Effectiveness in leveraging (synergy with) other areas of research; and
- Demonstration of willingness to make tough decisions (i.e., cut programs with sub-critical mass of expertise, divert resources to more promising areas, etc.).

Performance Level Achieved:

Performance Level	Grade	Score
Research plans are proactive, not reactive, as evidenced by making hard decisions and taking strong actions; plans are robust against budget fluctuations – multiple contingencies planned for; new initiatives are proposed and funded through reallocation of resources from less effective programs; plans are updated regularly to reflect changing scientific and fiscal conditions; plans include ways to reduce risk, duration of programs.	A	3.9

JSA Performance:

FY2007 S&T Review findings and comments:

- Lab management has developed a prioritized strategic plan for the facility for the next 5 years: 1) the 12 GeV Upgrade; 2) delivering outstanding science; 3) world leading theoretical support for the experimental program; 4) world leadership in SRF and ERL technology; 5) exemplary management and stewardship; 6) working safely and in compliance with federal regulations.
- The Laboratory has begun to implement a full project planning environment with the development of a work breakdown structure for the Laboratory and the creation of an annual work plan for each element.
- The Lab is pursuing an Office of Science Infrastructure Initiative, the Technology and Engineering Development Facility (TEDF), which will provide more cost effective, efficient, improved and safe operating space and technical infrastructure for several groups.
- JLab expressed interest in becoming full partners in projects that fit core competencies rather than “job shopping”, including increased involvement in ILC, RIA/FRIB R&D and SNS projects.
- TJNAF is playing a leading role in developing next generation SRF accelerator cavities and it is the only national SRF cavity manufacturing facility.
- SRF is also leading participation in high gradient cavity R&D for ILC.
- There is effective sharing of expertise between the CEBAF and the FEL that provides clear benefits to both facilities.
- Specific developments at the FEL include high current injectors and cryomodules able to handle the large HOM power. Collaborations have developed with Cornell, UK, FSU and BNL for the purpose of advancing FEL/ERL technology.
- The concepts for the program beyond the 12 GeV Upgrade are only now being developed. The development of a physics case for the Electron-Light Ion Collider (ELIC) proposal is at a very early stage.

In addition to these S&T Review comments, the following are additional examples of effective project planning/management and leveraging other areas of research.

**Validating Processing Methods to Build ILC Accelerator Cavities:** Drawing on world-class expertise in SRF technology, JLab scientists are assisting in validating the processing methods used to build and prepare ILC accelerator cavities -- the components that will store the radiofrequency waves used to

accelerate the electrons and positrons -- for installation. Jefferson Lab scientists have developed a program designed to consistently test the absolute limit of an accelerator cavity's performance, and one baseline design cavity they tested, manufactured by ACCEL Instruments GmbH, and achieved an accelerating gradient of 42 MV/m, a result consistent with the theoretical limit of this particular cavity design. The cavities have so far performed well in response to the processing program, with one not only surpassing the design goal, but also reaching, within measurement uncertainty, the theoretical limit of this cavity design's performance. Additionally, Accelerator Operations implemented a new energy reconfiguration procedure. Hall C energy was setup for 5<sup>th</sup> pass (4.475 GeV) and high-current beam delivery followed, resulting in a record 16 coulombs of polarized electrons delivered in a twenty-four hour period. This high-current, high-energy run pushes the design limit of the radiofrequency RF system and is approaching the maximum accelerator operational power limit of 800 kilowatts.

**Free Electron Laser:** On October 30<sup>th</sup>, the FEL produced a record breaking 14.2 kilowatt (kW) beam of laser light at an infrared wavelength of 1.61 microns. This milestone supports the Department of the Navy's Office of Naval Research vision for the development of a very high powered FEL that would serve as part of a ship-based weapon system. The Navy continues to rate the Lab's progress towards meeting the goals as excellent. In addition, JSA worked with the US Army and Department of Homeland Security to produce the first ever THz movie that was made using the powerful FEL THz beam.

The FEL Annual Review was held January 17<sup>th</sup> - 18<sup>th</sup>. The review committee congratulated the FEL Team for their achievement of 14.3 kW at 1.6 microns, an achievement which raised the Technological Readiness Level of the FEL for a 100 kW oscillator. The program received \$3.5 million to continue efforts through the remainder of FY07 along with a negotiated Statement of Work (SOW). The review team provided a prioritized list of tasks for the on-going program which have been incorporated into the revised SOW.

The FEL Annual User's meeting was held in May and included more than 40 outside users from various agencies (i.e. DOE, NSF, NASA, VA, industry, etc.). Other FEL user activities included tests supporting a NASA Program producing carbon nanotubes and a basic particle physics effort involving the search by a collaboration involving Yale and Hampton Universities for dark matter called axions or pseudo-scalar particles. Other experiments involved looking at THz resonances in bio-molecules by Southampton University and producing far off-resonance optical traps by Old Dominion University. A Users Workshop was held for the development of a proposal to the National Science Foundation (NSF) for an FELK at Florida State University's (FSU's) National High Magnetic Field Laboratory (NHMFL). The Design and Applications of FELs for Research with High Magnetic Fields Workshop was conducted on January 22-23<sup>rd</sup>. This workshop is the 3<sup>rd</sup> in a series intended to help guide evolution of an FEL facility at the NHMFL. The NHMFL-FEL is an ongoing collaboration between Florida State, JLab, UCSB and others. This particular workshop focused on the scientific opportunities afforded by the combination of FEL light sources and high magnetic fields.

#### **FY07 Challenges:**

Securing stable funding for FEL program. Status: Congressional plus up funds maintained the FEL program through an agreement with NAVSEA through the end of FY07. In anticipation of ONR funding of approximately \$4M versus the \$7M historical average, FEL reduced staff by 40% through transfers to the 12 GeV project. We can maintain the current level of staff at the expected funding. Potential \$630K from State funding may be used to provide 2 ½ weeks of operating for the users.

**Objective 3.3 Provide Efficient and Effective Communications & Responsiveness to Customer Needs**

Objective Requirement:

In determining the performance of the Objective the DOE evaluator(s) shall consider the following as measured by Program Office reviews/oversight, etc.:

- The quality, accuracy and timeliness of response to customer requests for information;
- The extent to which the Contractor keeps the customer informed of both positive and negative events at the Laboratory so that the customer can deal effectively with both internal and external constituencies; and
- The ease of determining the appropriate contact (who is on-point for what).

Performance Level Achieved:

Performance Level	Grade	Score
Communication channels are well-defined and information is effectively conveyed; important or critical information is delivered in real time; responses to HQ requests for information from Laboratory representatives are prompt, thorough, correct and succinct; Laboratory representatives <i>always</i> initiate a communication with HQ on emerging issues.	A-	3.7

JSA Performance:

FY2007 S&T Review findings and comments:

- The users do communicate through the Users Group Board of Directors their priorities for the Laboratory, including the strong desire for the near term return of operation at full 6 GeV.

In addition to these S&T Review comments, below are examples of effective communication with customers and timely response to DOE requests for information.

Effective communication and responsiveness to customers' requests for critical information are delivered in real time to HQ. Some examples include the Lab Director's monthly interface meetings with the Associate Director of the Office of Nuclear Physics and the weekly meetings with the Site Office Manager as well as ongoing timely responses to customer requests.

One area in particular that required serious effort this period was the updating of the 2005 SC/Laboratory Five year plan. From the period of October 31 through March 9, the Lab responded to requests for and provided updated information to many sections of the plan in a thorough, accurate and timely manner, meeting several stringent deadlines in the process. Lab and HQ staff effectively exchanged information and ideas on a very frequent basis, which contributed to the successful completion of a quality document for the Lab, DOE HQ, and OMB for Congressional submittal.

Another example of JLab's quick response to DOE requests was the Science Lab Infrastructure (SLI) Initiative project conducted by the Office of Science COO during March. The exercise required preparation of a 10-year plan to modernize JLab's general purpose infrastructure. In close coordination with the DOE Site Office, JSA assigned a team of experts to assess each infrastructure system and to perform a gap analysis and needs identification from which four proposed SLI projects were developed. The prescribed SLI summary table, detailed project data sheets, presentation, and our GPP list were all

prepared and submitted to DOE ahead of schedule, despite the extremely short turnaround period, and the material was well received by DOE.

Two new links have been added to the homepage – “Research Highlights” which lists summaries from physics experiments and “Current Experiments” which presents information about the experiments running in each hall and provides quick access to the running schedule.

JLab’s input for DOE’s Annual Summary Report of Work for Others Activities submitted to TJSO May 29th. The number of active agreements (CRADAs, WFOs, MOUs, etc.) more than doubled from 14 to 31.

Other examples of improving communications and supporting DOE requests for information are: the JLab COO participated on the TEAM initiative with other Lab COOs and provided consolidated input from Labs on status satisfying criteria of EO 13423 in portfolio approach; JLab has a senior leader JLab representative on NLIC to ensure the Lab’s needs and priorities are voiced; and the Lab Director is participating on the Lab Directors Council formed by Orbach.

### **Opportunities for Improvement**

Noted as an FY06 Weakness → *1. As noted in the FY06 DOE Performance Evaluation Report and in the 2006 S&T Review, some members of the user community are concerned that they are not being integrated into the overall decision making processes. 2. User community integration into overall decision making processes.*

### **Status:**

- A meeting of the User Group Board of Directors was specifically requested by management for February 22<sup>nd</sup>. At that meeting, extensive discussions were held with key senior managers (Director, Chief Scientist, Physics AD) present. The budget situation was explained in detail and possible options and responses explored. User Group Board of Directors (BOD) meetings are now held immediately prior to presentations for Dennis Kovar. This is a positive step that has increased User Group BOD communication, especially in the 12 GeV upgrade decision making area. Lab Management continues to meet with DOE’s Office of Nuclear Physics on a monthly basis providing highlights of scientific program and the 12 GeV Upgrade. Lastly, the Lab weekly electronic newsletter, the “Weekly Briefs”, is now provided to all users. This action enhanced communication for all users.
- Continue to interface with users on 12 GeV Upgrade Project and other Lab planning activities as appropriate:
  - Reports on 12 GeV progress and issues provided at:
    - UGBOD meetings (10/20/06 and 02/22/07)
    - 2007 User’s Annual Meeting (06/19/07)
    - Hall Collaboration Meetings: Hall D (10/12/06 and 03/29/07); Hall C (01/25/07); Hall B (11/02/06, 02/28/07 and 06/14/07)
  - Discussion and guidance on non-DOE equipment proposals → successful NSF MRI grant for Hall C SHMS detectors (June 2007), and starting coordination efforts for the January 2008 NSF MRI proposals.
  - Meetings with UGBOD Chair and Past-Chair → up-to-date 12 GeV information on plans and developments.

- Additional user interface activities are under discussion: Identify 12 GeV Steering Committee User representatives for each Hall, establish relationship and information flow with respective Hall CAM and Hall Leader, and hold Quarterly meetings with Hall 12 GeV Steering Committee representatives and 12 GeV Project Management representatives. The 12 GeV Deputy Project Manager and the 12 GeV Science Lead have met with the User Group Board of Director Chair to discuss these plans, which were met favorably. Informal discussions with members of the Hall’s steering committees have started. For Hall B, the 12 GeV user co-chair would automatically fill this role. Formal roles are being defined and follow-on meetings will be arranged. Information flow has improved with frequent attendance at the weekly 12 GeV Physics Team meetings by the 12 GeV CAMs, Hall Leaders, and Hall Lead Engineers.
- Users were actively involved in organization of the NSAC Long Range Plan Town Hall meetings in January as well as making critical contributions to the development of the 12 GeV science program and authoring sections of the final plan.

**Table 8. Goal 3.0 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>3.0 Science and Technology Research Project/Program Management</b>					
3.1 Effective and Efficient Stewardship	A	4.0	40%	1.60	
3.2 Project/Program Planning and Management	A	3.9	40%	1.56	
3.3 Communications and Responsiveness	A-	3.7	20%	0.74	
<b>Performance Goal 3.0 Total</b>					<b>3.90</b>

**Table 9. Goal 3.0 Final Letter Grade**

<b>Total Score</b>	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
<b>Final Grade</b>	A+	A	A-	B+	B	B-	C+	C	C-	D	F

**Goal 4.0 Provide Sound and Competent Leadership and Stewardship of the Laboratory**

Goal Requirement:

The Contractor’s Leadership effectively provides direction in strategic planning to meet the mission and vision of the overall Laboratory; is accountable and responsive to specific issues and needs when required; and corporate office leadership provides appropriate levels of resources and support necessary for the overall success of the Laboratory.

FY2007 S&T Review findings and comments:

- Laboratory management is strongly commended for maintaining a high level of operations, advancing the 12 GeV project towards CD-2 and promoting core competencies.
- The organization of engineering resources appears to be an effective one; however matrix management requires diligent communication and leadership involvement.
- The annual work planning process has been implemented in a staged fashion which appears to be flexible and reasonable; but, it has not yet been used in resource prioritization or performance evaluation, where the process will be put to the test.
- Management will face several challenges in the coming year with the current director leaving and the turnover of several Laboratory higher management positions.
- Management satisfactorily responded to all of last year’s recommendations, except one in which the work is still ongoing (cryomodule refurbishment). There are no new recommendations.

**Objective 4.1 Provide a Distinctive Vision for the Laboratory and an Effective Plan for Accomplishment of the Vision to Include Strong Partnerships Required to Carry Out those Plans**

Objective Requirement:

In measuring the performance of this Objective the DOE evaluator(s) shall consider the following:

- Quality of the Vision developed for the Laboratory and effectiveness in identifying its distinctive characteristics;
- Quality of Strategic/Work Plan for achieving the approved Laboratory vision;
- Quality of required Laboratory Business Plan;
- Ability to establish and maintain long-term partnerships/relationships that advance/expand ongoing Laboratory missions and/or provide new opportunities/capabilities; and
- Effectiveness in developing and implementing commercial research and development opportunities that leverage accomplishment of DOE goals and projects with other federal agencies that advance the utilization of Laboratory technologies and capabilities

Measure 4.1.1 Requirement: The vision (20-year outlook) addresses outstanding science questions of national priority to DOE. The vision informs and is aligned with that of the DOE Office of Science and the NSAC long range plan and is maintained in a dynamic way to carry out and adapt to changes in these plans, and to allow for innovative initiatives that maximize the benefit to the Office of Science.

Performance Level Achieved:

Performance Level	Grade	Score
JSA takes extra measures, such as drawing on outside expertise (e.g. JSA Board’s Science Council and Programs Committee, NSAC Long Range Plan subcommittee, JLab User Group, Global Sciences Forum Working Group on Nuclear Physics, WG9 of IUPAP, IM and S&T peer review experts) to ensure a proper level of involvement of Laboratory’s staff and users in activities that affect the future of nuclear physics in general and the science of the Laboratory in particular. Including especially the NSAC planning process; service on relevant committees of the American Physical Society (Nuclear Physics Division, especially); participation in conferences and workshops that relate to the Laboratory’s scientific mission, engagement with working groups focused on next-generation accelerators and related technologies; coordination of the Laboratory’s 12 GeV upgrade and eLIC goals with the OECD Nuclear Science Working Group; and more generally assisting, as appropriate and as called upon by DOE, to help advance the DOE’s broader agenda.	A	4.0

JSA Performance:

JSA established several committees through which the eleven-member Board is fulfilling its responsibility to ensure successful performance of the contract by providing an effective level of corporate oversight of the Lab programs, operations, and activities. The Science Council and the Programs Committee are responsible for ensuring that the Lab's vision is aligned with the Office of Science and that innovative measures are considered to maximize benefits to the DOE. The Operations Committee is responsible for ensuring that Lab facilities and infrastructure, IT management and cyber security, procurement, project management, human resources, and DOE contract management and relations are operated using best business practices and result in maximum program effectiveness. The membership of the JSA Science Council, chaired by an eminent scientist Thomas Appelquist, includes the chief executive of SURA Jerry Draayer, a former senior government official Ernest Moniz, the chair of the Programs Committee Stephen Wallace, and eight at-large scientists from the national and international scientific community including Al Mueller, Helen Edwards, Barry Barish, Gordon Cates, Gerry Garvey, Bernard Frois, Bill Zajc, and the Lab Director Christoph Leemann as an ex officio/non-voting member. Of the 12 members of the Council, five are Board Directors. This composition ensures that the full Board is cognizant of significant scientific discussions, deliberations, and issues of the Lab. At its April meeting, following a review of the scientific programs of the Lab and the status of the 12-GeV project and the FEL program, the Council discussed the impact that the science of the Lab is having on the broader physics community and how this impact can better influence DOE's larger science agenda. The Council strongly endorsed the current nuclear physics program and saw no reason for any change in direction. This is consistent with the finding of the S&T review a few months later. In the case of the FEL, the Council asked for a detailed review, setting out the plans for the future navy program as well as fundamental science applications of the FEL. This meeting is set for November 27<sup>th</sup> at JLab. Lastly, following the Lab Director's announcement that he would be stepping down from his position, the Council has played a key role in advising the Board on the selection of the new Director. In the deliberations of the Search Committee, whose membership includes six Council members, the Committee is supporting the JSA Board in its responsibility to ensure that the new leader of the Lab will continue to innovatively maximize its scientific and operational resources while staying on track with its vision and the Department's long-range plan.

The JSA Programs Committee monitors and promotes Jefferson Lab programs and the Lab's relations with the user community. The committee administers the JSA Initiatives Fund, monitors the Lab's use of non-DOE support, and assesses the Lab's technology transfer and commercialization initiatives. During the performance period, the Programs Committee discussed with the Lab Director the state of the Lab's programs and the 12-GeV project, the continuous efforts to minimize potential adverse effects of the cultural changes brought about by organizational changes and heightened attention to safe work practices and cyber security, and the active support of the American Competitiveness Initiative as a critical factor for the future of the nuclear physics budget. The Committee reviewed and acted on several requests of the user community for Initiatives Fund proposals, proposals which stimulate and support the Lab's relations with its user community. See discussion under 4.3.1.

The JSA Operations Committee is responsible for advising and assisting the JSA Board in setting policies to ensure the Lab's operations and support systems are in accordance with best management practices and foster maximum productivity and program effectiveness. In helping to formulate and implement the Lab's strategic plan, the Committee has been involved with the review and shaping of several processes and documents including the 10-Year Site Plan, 5-Year Business Plan, the PEMP and Lab self assessment, the annual budget submission and Annual Work Plan (AWP), Lab staffing and HR plans and policies, and operational efficiencies. During the performance period, the Committee reviewed the Lab's infrastructure, overhead and cost efficiencies as well as a demonstration of the Lab's new budget planning

and execution tools and Project Management Certification of JLab employees using CSC and SkillPort. The Operations Committee also agreed to conduct a review of the Lab's Cost of Doing Business which started in late September and a report is due in early FY08. The Committee reviewed the status of JSA performance against the FY2007 PEMP as well as the draft proposed FY2008 PEMP, offering its expectations with respect to the final FY2007 performance results particularly in areas where the mid-year assessment indicated the need for attention, as well as its feedback and input into the changes in the FY2008 PEMP. A new member of the Committee, and President of East/West Engineering, offered to establish contacts between the Lab and DARPA. We believe this will open more avenues for additional research opportunities and funding, particularly in the FEL.

To ensure an effective level of involvement of Lab staff and users on Lab- and user-related matters that affect the future of nuclear physics and the science of the Laboratory, members of the Board meet with the User Group regularly to discuss concerns, provide input and guidance. Additionally, SURA sponsored two science community meetings at the JSA principal office location in Washington, DC. Participants included researchers from broad sectors – beyond the Lab's specific scientific focus – of the nuclear physics community who convened to discuss and develop a mutual understanding of common scientific interests. The two-day *Workshop on the Physics of Nucleons and Nuclei*, organized by JSA Board Director Jerry Draayer, brought together over 50 participants representing several national Labs (Argonne, LLNL, ORNL, Jefferson Lab) as well as major research universities (e.g., University of Washington, Michigan State, Yale, MIT, University of Virginia, University of North Carolina, University of Massachusetts, etc.) who presented in six different science topics (see <http://www.sura.org/events/physworkshop101606.html>). A series of white papers from this meeting was fed into the NSAC long range planning process. The two-day *Workshop on Future Opportunities in QCD*, co-organized by the Lab's Chief Scientist with organizers from Brookhaven, University of Maryland and Duke University, was the forum for over 30 participants including several Lab science leaders, to address and discuss issues and opportunities in QCD (see <http://www.sura.org/events/QCDWorkshop.html>). Meetings such as these encourage collaboration among the national Labs and the universities so as to maximize the collective contribution of the Lab system to DOE and the nation.

In JSA's affirmative efforts to engage in conferences and workshops that focus on the Lab's scientific mission and related technologies, SURA hosted the 4th Annual Terahertz Symposium (see [http://www.sura.org/commercialization/thz\\_symp07.html](http://www.sura.org/commercialization/thz_symp07.html)), bringing together world leaders from academia, corporate, and government sectors specializing in terahertz research, development and product creation. Ongoing work of the Terahertz Research Group at the Lab was featured at the Symposium. Several collaborations at the Lab have resulted from previous symposia. One such collaboration is an ongoing project with the Air Force Research Lab (AFRL) to study the effects of terahertz radiation on biological organisms. AFRL researchers first met Lab FEL representatives at the first SURA THz symposium and have since completed two rounds of investigation thus far at the FEL to look at high-energy THz waves' effects on various skin emulators. A second collaboration resulting from the SURA THz symposium was between researchers at the University of Delaware and Lab researchers. Working together, they have recorded and recently published results detailing the first ever full-frame, real-time video imaging using true terahertz radiation. As a consequence of his involvement with this series of symposia, Gwyn Williams, the Lab's FEL science program leader, recently addressed over 40 CEO's and leaders of the nation's top companies involved in medical imaging and in developing technology for DOD and Homeland Security.

It should also be noted that JSA took steps to ensure its involvement in activities that affect the future of nuclear physics through the participation of Jefferson Lab staff in the NSAC planning process and in other activities affecting the future of science. These involvements are reflected under Objective 1.2.

**Opportunities for Improvement**

As noted in DOE FY07 Midyear Feedback → *The JSA self-assessment performance narrative did not provide a compelling demonstration that performance met the performance level for A level performance. Although there were committees formed, results from these committees were not evident.*

**Status:**

- The Lab's 20 year vision continues to address the scientific questions of national priority to DOE. JLab is responsible for fulfilling 8 of 10 strategic milestones for the Office of Science. An effective plan for carrying out the Lab's vision of world leadership in hadronic physics is demonstrated most notably, by the recent intense participation (presentations by JLab physicists at NSAC LRP town meetings) and influencing of the NP community and NSAC to rank the JLab 12 GeV Upgrade as its top priority in its long range plan for nuclear science. JLab's dynamic partnering in the support of the RIA community through innovative workshops sponsored by SURA, as a JSA owner, led to the FRIB as an NSAC Long Range Plan recommendation. This partnership is an example of benefits of Laboratory synergy that directly enables SC's ability to carry out its mission.
- In addition to the Operations Committee's involvement with and review of the 5-year agenda for the Lab, other committee involvement during this performance period include:
  - Finance and Audit Committee in ensuring that the Lab's financial planning, reporting, and cost and internal control processes are effective and compliant with relevant financial regulatory and professional requirements and standards. This Committee monitors performance against budget, and especially given the continuing resolution status of funding this fiscal year, has been actively involved in discussions to minimize effects of this situation to the Lab's programs, including the 12-GeV project. The Committee receives, reviews, and provides input to the activities and audits of the Lab's Internal Auditor. During this performance period, the Committee approved the charter for the JLab internal audit function.
  - Safety and Risk Management Committee in monitoring and assisting Lab management to ensure that best efforts made to develop and maintain a culture that effectively manages contract performance risk and protects the health and safety of the Lab's workers and the public. For example, JSA provides safety leadership coaching and mentoring for Lab staff, periodically reviews areas of potential issues (emergency management, material handling, etc.), and monitors various safety initiatives and safety performance including any lessons learned.
  - Compensation Committee in reviewing the performance of the Lab Director and the Lab Director's review of the performance of his key staff. A primary activity of this Committee during this performance period has been the review of succession planning for Lab leadership, including monitoring the results of the departures of key staff members, and the filling of the Director position (currently in progress).

**Measure 4.1.2 Requirement:** The Business Plan (5-year) establishes the management agenda and identifies the opportunities, risks and required resources needed to realize Laboratory goals. The business plan sets the framework to optimize scientific output in a cost effective manner. Integrally, JSA develops a 5 year budget plan as a mechanism by which the Laboratory can ensure its goals are met.

Performance Level Achieved:

Performance Level	Grade	Score
<p>JSA takes extra measures, such as drawing on outside expertise (e.g., the JSA Board’s committees on Operations, Finance and Audit, Safety and Risk Management, and Compensation as well as ad hoc reviews as deemed appropriate by the Board) to ensure that the Laboratory’s 5-year Business Plan is credible and relevant in light of constraints on the Laboratory. The Laboratory’s plans identify ongoing methods to maximize effective use of available funds and ways to assure that the Laboratory’s goals are met. These may include, for example, utilizing appropriate expertise from its owner members (SURA and CSC) and developing tools such as annual work plans with complementary work breakdown structures for project management.</p>	A-	3.5

JSA Performance:

Jefferson Lab submitted updates to its 5-year Business Plan to DOE on March 1<sup>st</sup>. All information and updates were provided in a timely manner. The Lab worked closely with HQ to respond to requests for data, meeting several stringent deadlines in the process. We effectively exchanged information regularly contributing to the successful completion of a quality document for the Lab, DOE HQ, and OMB for Congressional submittal.

JLab’s presentation at the annual Kovar Budget Meeting also sets the 5-year agenda for the Lab and aligns with the 5-year business planning process. This activity is discussed in detail in Measure 6.1.2.

**Opportunities for Improvement**

As noted in DOE FY07 Midyear Feedback → *The JSA self-assessment performance narrative did not provide a compelling demonstration that performance met the performance level particularly in the use of outside expertise. For example, the contribution of the JSA Operations committee to the current Business Plan was not clear.*

**Status:**

- The format and content of the Laboratory 5-year business plan is highly prescribed by the Office of Science. In 2007, only minor (not strategic) updates to the plan were requested; these updates were submitted to SC, in several cases, within a one-to-two day turn-around time constraint by SC. The JSA Operations committee is chartered to review and provide guidance on Laboratory plans. The JSA Operations Committee conducted their first formal meeting at Jefferson Lab on March 26<sup>th</sup>, after the submittal of this year’s 5-year Business Plan. The upcoming cycle of the Laboratory plan will allow time for inclusion of the JSA Operations Committee input who will be engaged as soon as DOE guidance becomes available.

Measure 4.1.3 Requirement: The Laboratory has formalized vital collaborations and understandings within and among institutions in academe, users of the Laboratory, other national Laboratories, and private sector entities for advancing priority issues in science, scientific workforce, and applications of science and technology.

Performance Level Achieved:

Performance Level	Grade	Score
<p>JSA takes extra steps (e.g., conferring with the JSA Board’s Science Council and Programs Committee) to assure that the Laboratory optimizes opportunities to develop and promote effective collaborations with other organizations such as: entering into new MOUs for financial or in-kind support of the 12 GeV upgrade; partnering to offer JLab SRF expertise that adds measurable value to the Office of Science ILC initiative. The degree of JSA’s influence in the NSAC planning process is notable and the number and quality of joint and bridged faculty appointments is extensive.</p>	A	4.0

JSA Performance:

An agreement between Old Dominion University (ODU) and JSA created an accelerator physics group at ODU, one of a handful of institutions in the U.S. that have comprehensive programs in this field - three members of the Accelerator Division were appointed professors. In addition, ODU’s 12-person nuclear physics research group, which includes six JLab professorships, is one of the strongest and their success is largely attributed to its ties with JLab. This agreement also anticipates the creation of another joint ODU-JLab physics professorship within the next three years.

There are currently 14 Joint and 5 Bridge Appointments. The joint faculty appointments include thirteen nuclear physics positions and one materials science position. Four of the appointments exist at a Historically Black College or University (HBCU) and thirteen, including the HBCU appointments, are affiliated with a SURA-member university. In addition, the five bridge appointments include one with an HBCU and four, including the HBCU appointments, affiliated with a SURA-member university; all are tenure eligible. There was one new bridge appointment in September from Hampton University.

There are currently 66 active MOUs/MOAs of which five are new: Christopher Newport University, The Cockcroft Institute, Peking University, the University of Lancaster, and the University of Virginia.

**CHRISTOPHER NEWPORT UNIVERSITY – *signed October 9, 2006:*** This MOU is intended to enable the Christopher Newport University (CNU) Department of Physics, Computer Science and Engineering (PCSE) to become an important center for research in the physics of strongly-interacting matter and to strengthen the community of physicists in the region that will work at JLab. CNU and JLab have worked cooperatively for over twenty years with the scientists and engineers from the Lab serving continuously as adjunct professors at CNU and the faculty and students from CNU participating continuously in JLab research. There are currently two faculty members from CNU whose research program is based at JLab – Dr. Edward Brash and Dr. David Doughty. Dr. Brash is pursuing a research program at the Lab that includes high priority experiments in Hall C, as well as significant development work in the areas of software and offline computing for the GlueX/Hall D project – a central component of the planned upgrade of the CEBAF accelerator facility. Dr. Doughty has made major contributions over the years to the physics program in Hall B at JLab, and will continue to do so in the coming years. In addition, he has been heavily involved in the development of the trigger system for the GlueX/Hall D project. To address the possibility of a future expanded program of research at JLab, this MOU also covers up to four additional full-time salaried CNU faculty members working at the Lab at least 25% of full time.

**THE UNIVERSITY OF LANCASTER – signed December 4, 2006:** This MOU is intended to broaden and strengthen the cooperation between the University of Lancaster and JLab by facilitating an exchange of Research Scholars. These scholars will aid the Department of Physics and Accelerator Research Group of JLab and will be supported in pursuit of their doctoral study.

**THE COCKCROFT INSTITUTE – signed December 14, 2006:** This is a mutual benefit for both Laboratories to collaborate on scientific research and development related to future colliders, light source facilities and related novel accelerator projects and the necessary R&D. The Cockcroft Institute is actively involved in advanced accelerator R&D in colliders, light sources, FELs, ERLs and 4GLS projects, all of which are relevant to JLab's Accelerator and FEL programs. These groups have agreed to collaborate in a program of theoretical, computational, and experimental work supporting the development of capabilities in physics and technologies for future colliders and light-source facilities. Specific areas of collaboration will include the following:

- RF Superconducting structure development and fundamental research
- High Gradient cavity performance and processing
- RF Thin film structures research
- High Power Photonic band Gap structures
- Beam Breakup in energy recovering linacs for 4 GLS
- Staff and student exchange program

**PEKING UNIVERSITY – signed January 26, 2007:** This MOU is to broaden and strengthen the cooperation between Peking University (PKU) and Jefferson Lab by facilitating the support, research efforts and focus on theoretical physics of direct relevance to the Lab's research programs. It is also meant to encourage the participation of other staff and students of PKU in research of relevance to the research programs at JLab. PKU will provide the equivalent of a full-time staff member to collaborate on theoretical physics in support of 6 and 12 GeV for a period of six months beginning September 1, 2007.

**UNIVERSITY OF VIRGINIA – signed August 16, 2007**

This MOU is to facilitate the development of a compact, intense, broadband THz source at the University of Virginia. JLab pioneered the large grain – single crystal niobium SRF cavities that are required for the envisaged compact THz source (for which JLab holds a patent) working closely with industrial partners and agrees to collaborate with UVA to develop the compact THz source for use at UVA. UVA is very keen to enhance its scientific, educational and technological capabilities in the THz arena and agrees to closely work with JLab scientists, engineers and technologists to bring this common vision to a reality. JLab and the Department of Physics at UVA will jointly work to provide the proof of concept of a compact THz source based on JLab's core SRF Technology for enhancing homeland security, material science, pharmaceutical research, medical imaging, environmental diagnostics and telecommunications. Specifically, UVA and JLab agree to collaborate on the development of concept of compact, intense, broadband THz source for various scientific, educational and technology development activities at UVA.

**Opportunities for Improvement**

As noted in DOE FY07 Midyear Feedback → *The JSA self-assessment performance narrative did not provide a compelling demonstration that performance met the performance level particularly with optimizing opportunities to develop and promote effective collaborations. The narrative indicates that no new bridge or joint appointments were made in FY07. It was not clear the significance of the 4 new MOU's/MOA's developed in FY07.*

**Status:**

- JLab recently demonstrated a successful collaborative initiative with the RIA community in support of the FRIB. Innovative workshops with both JLab and RIA communities, sponsored by SURA, were held with excellent results. These collaborative efforts raised the visibility of the FRIB project and contributed to its placement among the top 4 NSAC LRP recommendations. JLab will continue to play an integral roll by providing its Superconducting RF technology expertise in the development of the FRIB linac.
- During this performance period, SURA voted into its membership two universities, including an HBCU, North Carolina A&T State University. NC A&T became a SURA member as part of SURA’s MSI (Minority Serving Institutions) program, the purpose of which was to increase minority representation in science at the PhD level, particularly in physics, by building a consortium of research universities, including MSI’s with significant research programs at the PhD level. In addition to working with SURA MSI members, this program invited all MSI’s to participate. Consequently, other notable schools including Fisk, Grambling, Tennessee State, Xavier, etc., participated in the program, gaining exposure to collaborative science with non-MSI’s. While there was no collaboration affiliated with the Lab in this performance period, this affirmative effort of the corporate owner to seek out MSI’s, including HBCU’s, contributes to the groundwork for potential future collaborations. More immediate and direct examples of the corporate owner’s efforts to optimize opportunities to develop and promote effective collaborations include SURA’s sponsorship of two science community meetings, *Workshop on the Physics of Nucleons and Nuclei* and *Workshop on Future Opportunities in QCD*, both of which encouraged collaboration among the national Labs and the universities. These are discussed in 4.1.1 and 4.3.1.
- See narrative above that provides additional detail and benefits of the four new MOUs/MOAs developed in FY07.

Measure 4.1.4 Requirement: The Laboratory has corporate citizenship programs that encourage community support of the Laboratory and its programs and that draws on Laboratory competencies and meets community needs. These corporate citizenship efforts include public outreach and improved scientific literacy. This responsibility of the Laboratory is measured by metrics and peer reviews. The Laboratory also has an outreach program to the broader scientific community to increase the awareness and scientific community support of the Laboratory and its accomplishments.

Performance Level Achieved:

Performance Level	Grade	Score
JSA takes extra measures (working as appropriate in conjunction with the JSA Board’s Relations Committee) to ensure that the Laboratory has model programs in public relations, community awareness, and science education. Initiatives demonstrate a high level of quality or effectiveness that exceeds expectations or is noted as an example program at SC.	A	4.0

JSA Performance:

JLab’s Biennial Open House was held on April 21<sup>st</sup> and there were over 5,000 attendees. In addition to highlighting the latest physics research and technology developments, the event featured one-on-one contact between the public and more than 300 volunteers from the Lab’s enthusiastic scientists, students and support staff. Parts of every major area of the facility were open and visitors were able to tour one of the Lab’s experimental halls, the accelerator control center, and the FEL. The Open House provides an

opportunity to increase community awareness and appreciation of the Lab's research facilities, scientific research, educational programs, and local partners.

We also set up an agreement with Tidewater Regional Fire Academy to conduct firefighter graduations at the Lab semi-annually, strengthening existing community ties and introducing JLab to a wide spectrum of people and organizations from across the peninsula.

JLab's Science Education program continues to deliver outstanding results and is noted for providing an educational pipeline for the country's brightest students at the high school and undergraduate levels. In an agreement with the Commonwealth of Virginia's Department of Education, JLab developed and has continually managed and maintained a Standards of Learning web resource for elementary-, middle-, and high-school students to use in preparing for the annual exams. This website allows students, teachers, and parents to test their math, science, and technology knowledge against the previously used SOL test questions. The Science Education website is referenced on numerous K-12 science and math resource websites and hit several new high-use records during the 2007 testing season for a 24-hour period and for a single month. A record 59 million hits occurred during the month of May, averaging out to nearly 1.9 million pages accessed each day. The single highest-use day was May 14<sup>th</sup> with approximately 3.5 million pages accessed during a 24-hour period. During the summer we serve between 150,000 and 170,000 pages daily. The first version of JLab's Science Education Website posted during the summer of 1995 had 166 pages accessed that first month.

The Becoming Enthusiastic About Math and Science (BEAMS) program, which provides teachers with classroom activities based on JLab science and technology, continues to serve approximately 1500 students each year and teachers have reported an increased understanding of science, careers, and applications. Math and science scores on the Virginia Standards of Learning (SOL) tests have improved and students in the program are significantly more positive about math and science than their peers not attending BEAMS. In addition, JLab scientists serve as voluntary mentors for high school students spreading the influence of JLab in the local community. Three Lab staff members (Douglas Higinbotham, Hall A Physicist, Physics; Marcy Stutzman, Accelerator Physicist, Accelerator; David Mack, Hall C Physicist, Physics) received DOE's 2006 Outstanding Mentor Award. This award, presented by the Office of Workforce Development for Teachers & Scientists in the Office of Science, recognizes scientific and technical personnel whose dedication and leadership have made a significant contribution to the success of the SC Undergraduate Research Internship programs and to the development of those individuals who will soon become our future scientists.

Another program, the Science Undergraduate Laboratory Internship (SULI), gets students involved directly in the forefront of research and attracts the best students into nuclear/particle physics. Graduate students in the Ph.D. and M.S. program are supervised, nurtured, and supported throughout the whole period. Three of 16 eligible 2006 SULI students' posters were selected for publication in the Journal of Undergraduate Research and for presentation at the AAAS meeting in February. This publication rate was notably higher than other Laboratories (2 of 200 were selected from Argonne, 1 of 150 from Brookhaven, and 2 of 20 from NREL), signifying the quality of the education programs at JLab.

Additional science education programs, including JLab's Science Activities for Teachers (JSAT) initiative and the DOE ACTS (Academies Creating Teacher Scientists) program at Jefferson Lab, impact more than thirty teachers each year and places the Lab as the community's leader in teacher professional development. Lab scientists and users periodically give presentations to teachers to increase their content knowledge in current science and research; teachers who participate in these programs receive recertification points and are eligible to receive graduate credits in Physics from the University of Virginia. It is also noted that for the first time, JLab was accepted to present at the national conference

for the National Science Teachers Association (NSTA). Four teachers that participated in the DOE Academies Creating Teacher Scientists (ACTS) program at JLab gave presentations that were well received. One of those teachers, Christine Ward-Diaz, was selected as a recipient of the 2007 Presidential Award for Excellence in Mathematics and Science Teaching – the nation's highest honor for teaching mathematics or science. She attributed her success directly to her participation in the Lab's program.

JLab hosted the Virginia Regional High School Science Bowl on February 10<sup>th</sup> and the Virginia Regional Middle School Science Bowl on March 10<sup>th</sup>. A total of 24 schools registered for the High School Bowl, which included 5 participating for the first time and a total of 18 schools registered for the Middle School Bowl, twice as many compared to the previous year. These competitions are well received and attended by the public. Other items of interest to the public are the Science Series events that are held at CEBAF Center after hours. Significant free public lectures (Science Series events) that occurred during this performance reporting period include, *When Stars Attack!* – presented by Dr. Brian Fields, Associate Professor of Astronomy and Physics, University of Illinois, Urbana-Champaign; *The Science of Harry Potter* – presented by Dr. George Plitnik, Professor of Physics, Frostburg State University, Maryland; *Chesapeake Bay Impact Crater* – David Powars, hydrologist with the U. S. Geological Survey (USGS); *The Physics IQ Test* – Dr. Dick Berg, Physics Professor, University of Maryland; *Benjamin Franklin and the Future* – Dr. Fred Dylla, Executive Director/CEO American Institute of Physics; and *The Physics of Sailing* – Dr. Bryon Anderson, Professor of Physics, Kent State University.

Eight national news releases were published resulting in web and print media coverage, including announcements of a staff member qualifying for the final round of the Google Global Code Jam, an award of 10 million hours of super computing time for theory calculations, and a precise measurement of the lifetime of the neutral pion. Local press releases included announcements of the Jefferson Lab Open House, middle and high school science bowls, and spring science series. All press releases can be retrieved at <http://www.jlab.org/news/releases/2007/index.html>. Also ten new front page news articles were posted on the Jefferson Lab website homepage, highlighting the science program of the Lab. In addition, the Jefferson Lab weekly briefs and monthly e-newsletters are sent to all Jefferson Lab registered users and staff in an effort to keep all interested parties up-to-date on the scientific achievements of the Lab staff and user community. Finally, each experiment, as it is carried out, is described in lay language on a web page featured on Jefferson Lab's website home page; the page can be accessed directly at [http://www.jlab.org/exp\\_prog/experiments/currentexp.html](http://www.jlab.org/exp_prog/experiments/currentexp.html).

A news release and website front page story issued by Public Affairs called attention to the Ganni Cycle and other cryogenic improvements developed and implemented by the Jefferson Lab Cryogenics Group. This publicity caught the interest of NASA's Johnson Space Center, where engineers were working to simulate the deep freeze of space for testing large satellite components. Through Public Affairs, Johnson engineers were connected to the Cryogenics Group and as a consequence, a \$350,000 agreement may soon be reached between JLab and NASA-JSC for technology transfer between the two groups.

Outreach efforts to the broader scientific community include implementing and populating a new prominent section of the Jefferson Lab website, entitled *Research Highlights* that highlight the Lab's scientific achievements (<http://www.jlab.org/highlights/physics.html>). This section assists scientists who are searching for recent research results being published by Jefferson Lab users. To date the website has included 20 physics highlights, four accelerator highlights, and six medical imaging highlights.

Science Education Metrics for October 1, 2006 through September 30, 2007:

- 13,100 Students Served – 34,900 Student Contact Hours (11,170 students in FY06)
- 2,500 Teachers Served – 2,960 Teacher Contact Hours (1,250 teachers in FY06)

Measure 4.1.5 Requirement: JSA and its corporate owners have developed and implemented technology transfer, commercial applications and projects with other agencies and organizations to augment Laboratory efforts and to enhance utilization of Laboratory-developed and related technologies.

Performance Level Achieved:

Performance Level	Grade	Score
JSA and its corporate owners take extra measures to strengthen technology transfer activities at the Laboratory, such as providing unique opportunities for its spin-out companies to obtain outside funding from venture capitalists and other private sources; providing JSA funding for investment or commercialization assistance; or creating cross-agency programs to bundle technologies for commercialization opportunities.	A	3.8

JSA Performance:

JSA successfully negotiated a license with Linde BOC Processing Plans, LLC for JLab’s Helium Processing Cycle technology. This technology saves the Lab about \$1,000 per day in cooling costs and recently won two prestigious awards: DOE’s “2006 Best in Class Pollution Prevention and Environmental Stewardship Award” and the “White House Closing the Circle Award”.

Other Lab technologies also have been marketed, including a hollow tube lead glass collimator for x-ray image enhancement and a compact accelerator driver for coherent sources of radiation, in partnership with the University of Virginia. Negotiations are underway with several firms on another license deal for a cryogenic RF feed-through technology developed at the Lab. Continuous improvements have been made to the SURA-funded automated system (Inteum) for managing Lab invention disclosures and intellectual property. SURA staff continue to be a resource in the Lab’s technology transfer development strategy sessions and serve on the Lab’s Technology Review Committee.

SURA makes accessible to the Lab its SURAfund initiative, offering opportunities for startup companies associated with the Lab, as a licensee of Lab technologies or as a company founded by a Lab employee to seek funding to support commercialization efforts. To date, one Lab-affiliated startup company seeking to market technology related to the Lab’s cryogenics processes, has taken advantage of this opportunity. While the company was not selected by the venture capitalists due to the niche market nature of the business, the company did receive the attention, review, and advice on its business plan for marketing this technology. This SURA sponsored initiative provides unique opportunities for start-up companies to seek funding through a vigorous marketability review process by potential investors.

SURA continues its sponsorship of and involvement in numerous technology commercialization activities across the country directly promoting Jefferson Lab technologies for licensing. For example, SURA has sponsored and made presentations at meetings of the Association of University Technology Managers; the Silicon Valley Venture Capital-Angel Round Table; the Girvan Institute Tech Showcase, COVITS, etc. Jefferson Lab technology is highlighted at any events in which SURA makes a presentation or sets up a display. These events provide the forum for interactions, both formal and informal, between Lab

innovators and inventors and technology professionals that have the potential of leading to commercialization with private sector ventures.

JSA's latest cryogenic technology (patent pending) has saved Jefferson Lab over \$1M in operating costs and is now being transferred to NASA Johnson Space Center to adequately cool and test a deep space telescope. See discussion under 4.1.4.

In FY07, JSA planned organizational changes in the COO and CFO organizations to, among other things, emphasize the role of the technology transfer capabilities of JSA. In this way, JSA is implementing a role in a commercialization manager, who will interface and network with internal JLab scientists, engineers and physicists, focused on the scope and mission of the contract, who have new and innovative patentable concepts to catalog these concepts into a portfolio and use that portfolio to network with business and industry with interests in these areas with a focus on securing patents, license and royalties, to bring monies to the JLab in furtherance of the Lab's mission. Through collaboration between JSA and SURA representatives work has been accomplished to focus this effort and reorganize technology transfer to the Business Operations area and plans were developed to add the commercialization resource to the staff who with the requisite expertise will aid in the execution of the plan. These efforts resulted in a Growth Strategy white paper that articulates eight key recommendations to satisfying the goal:

- 1) Obtain Laboratory Support – this was accomplished as it is now one of the Lab Director Priorities for FY08.
- 2) Establish a new reporting structure for technology transfer – This was accomplished as Technology Transfer was mapped in FY07 to the CFO, Business Operations Manager's Organization and was executed effective October 1, 2007.
- 3) Hire a new Technology Commercialization Manager as soon as possible – Plans were developed for posting to hire this manager and will be accomplished consistent with Lab Priorities and AWP / Budget Planning Cycles.
- 4) The TRC should continue its Leadership role in technology transfer – The TRC is active and continues to work to the Lab's agenda.
- 5) Create 5-Year Goals for Technology Transfer at the Lab.
- 6) Outreach to Laboratory Scientists and Technologists – Plans to be accomplished through the commercialization manager and Technology Center Leaders would be appointed in each science and technology division.
- 7) Allocate more funds to technology transfer and institute a viable tech transfer budget Anticipated to be accomplished via Lab Priorities and AWP / Budget Planning Cycles.
- 8) Model Best Practices from other Labs and universities – Visits to Labs in these pursuits have been discussed and invitations have been extended. The JSA COO has planned a visit in November to PNNL for discussions with Battelle, in furtherance of this initiative.

#### **Opportunities for Improvement**

As noted in DOE FY07 Midyear Feedback → *The cryogenic technology innovation is impressive; a compelling case for the strengthening of technology transfer activities at the laboratory does not appear to be supported by the actions listed in the JSA self-assessment narrative. It is unclear how the SURA Fund Initiative strengthened the Labs technology transfer activities. In addition, one technology transferred does not demonstrate that extra measures were taken to strengthen the technology program.*

#### **Status:**

The collaboration that occurred above and participation from SURA representatives to support the committee and development of our technology transfer mission enhancement, as captured in the whitepaper discussed above, was significant.

**Table 10. Objective 4.1 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>4.1 Provide a Distinctive Vision for the Laboratory and an Effective Plan for Accomplishment of the Vision to Include Strong Partnerships Required to Carry Out those Plan</b>					
4.1.1 The vision addresses outstanding science questions of national priority to DOE.	A	4.0	20%	0.80	
4.1.2 5-Year Business Plan sets framework to optimize scientific output in a cost effective manner.	A-	3.5	20%	0.70	
4.1.3 Lab has formalized vital collaborations for advancing priority issues in science and technology.	A	4.0	20%	0.80	
4.1.4 Lab has corporate citizenship programs that encourage community support of Lab and its programs.	A	4.0	20%	0.80	
4.1.5 Developed/implemented tech transfer to augment efforts to enhance use of technologies.	A	3.8	20%	0.76	
<b>Objective 4.1 Total</b>					<b>3.86</b>

**Objective 4.2 Provide for Responsive and Accountable Leadership throughout the Organization**

Objective Requirement:

In measuring the performance of this Objective the DOE evaluator(s) shall consider the following:

- Leadership’s, to include Corporate Office Leadership’s, ability to instill responsibility and accountability down and through the entire organization; and
- The effectiveness and efficiency of Leadership, to include Corporate Office Leadership, in identifying and/or responding to Laboratory issues or opportunities for continuous improvement.

**Opportunities for Improvement**

As noted in DOE FY07 Midyear Feedback → *With the leadership and staffing changes occurring at the Lab, the Site Office is concerned that the Lab may not have adequate coverage in key areas to address current and future needs of the laboratory.*

**Status:**

- With the recent appointment of George Neil as Associate Director for the Free Electron Laser, Arne Freyberger as Director of Accelerator Operations, and Vashek Vylet as the Radiological Control Manager, several key position vacancies have been filled. Additionally, the Lab has developed a

detailed position control document and staffing plan that will be used for not only budget planning and control, but will also be used as the baseline for a comprehensive succession plan document.

Measure 4.2.1 Requirement: JSA has a responsive Board of Directors and corporate owners that provide timely and effective policy guidance and oversight; offers subject matter expertise; facilitates corporate reach back; and provides entrée to vital, external resources. JSA establishes an efficient organization that:

- Focuses the Laboratory Director on corporate, strategic, customer and stakeholder goals, priorities and issues.
- Empowers the Chief Scientist to provide overall direction for balanced, highest impact science.
- Empowers COO to integrate operations and business management functions-deliver more science with efficiencies.
- Optimizes matrix support functions to assure efficient deployment of resources.
- Fully integrates safety throughout the organization.
- Formalizes and documents roles and responsibilities and accountability and authorities (R2A2).

Performance Level Achieved:

Performance Level	Grade	Score
JSA Board and its corporate owners, where appropriate, take extra measures to provide responsible and accountable leadership by: formulating innovative solutions for Laboratory problems and issues; securing local, state and federal support for the missions and goals of the Laboratory; favorably impacting policies for the support of science; rallying support for science among its member universities and the academic world; and by incubating new ideas and identifying and implementing, where appropriate, innovative and alternate sources of financing for laboratory programs and activities to include state, federal and private sources.	A	3.7

JSA Performance:

Following the Lab Director’s announcement of his plans to step down, the JSA Board appointed a Director’s Search Committee to begin the search for a new director. The Committee was charged with recruiting and attracting the best qualified person to lead the Lab, taking into consideration the future outlook for nuclear physics and the Lab’s role, the long range plans of the Lab and its impact, the core competency of the Lab in superconducting radio frequency (SRF) technology and the Lab’s service to the broader DOE laboratory community. The search process is still underway to ensure that the selected leader of the Lab is an individual who will most effectively deliver on contractual commitments to the Department and on the Lab’s scientific commitments to the research community.

During this performance period, three key Lab personnel, namely the Associate Director for Accelerator, Associate Director for the Free Electron Laser, and Chief Financial Officer, left the Lab. Immediately upon notice of their pending departures, the Lab Director conferred with members of the JSA Board to strategize the filling of these vacancies. Following discussions with the Lab Director and a review of the qualifications of the candidate, the Board fully supported the Director’s plan to promote an internal staff member, the director of operations for the accelerator facility to Associate Director for Accelerator. The Board supported the Director’s plan to name the incumbent deputy manager for the FEL as the Acting Associate Director for the FEL. The Chief Financial Officer vacancy was filled within a month by a highly qualified individual from JSA owner CSC who had worked closely with the Lab representing JSA in the transition of the contract. Members of the Compensation Committee who monitored this staff

turnover believe that the steps taken by the Lab Director to fill these key positions have been effective and have enabled the operations of the Lab to continue without a lapse in leadership.

The Lab Director provides the Board a monthly report highlighting Lab accomplishments, progress, and any issues or problems that warrant Board attention. During this performance period, the Board discussed with the Lab Director several issues including: shortfall between the FY2007 budget request and final appropriations and the period during which the Lab operated under a continuing budget resolution; vacancies of key positions (discussed above); safety concern and need to change Lab culture; property management practices; infrastructure concerns; findings of review teams; etc. In discussions of Lab issues, the Board and the Lab Director considered resolutions, alternatives and contingencies. The Board provided guidance and support for resolutions and monitored progress and status through frequent and regular communication with the Lab Director.

JSA's relations program provides for the long-term and continuous relations building necessary for securing and sustaining local, state, and federal support for the Lab mission. The beneficial results of meetings with decision makers do not necessarily accrue within a given performance period, but rather occur over a period of time, sometimes within the year, most often in the out years. The JSA Relations and Outreach Committee, co-chaired by two university presidents (John Casteen, University of Virginia, and William Harvey, Hampton University) is a resource to the Board in developing a relations strategy appropriate for the Lab and consistent with the plans of the broader scientific community as endorsed by the NSAC. Members of this Committee have provided effective guidance to JSA in its advocacy of the Lab. For example, a Committee member included several Lab-specific sound bites in his meetings with President's Bush's chief of staff and with the Secretary of Energy when he had occasion to meet with these officials representing his situation. These types of interactions, in and of themselves, often do not produce immediate results, but they constitute part of a larger relations program to bring attention to the mission of the Lab and its value to the taxpayer, as do the activities discussed below.

SURA's inaugural Distinguished Friend of Science Award was presented during this performance period. The purpose of the award is not only to recognize individuals who have worked to support the SURA mission of enhancing the research capacity in the region and nation, but to bring recognition to the critically important science agenda and its public impact. The first awardee, Senator Lamar Alexander (TN), is a champion of increasing DOE's Office of Science funding as well as the primary advocate for the Gathering Storm report which led to the President's competitiveness initiative and Congressional attention to doubling the nation's investment in basic research in the next seven years. The Senator has led bipartisan efforts in recent years to restore budget cuts to the Department of Energy's Office of Science, including the effort, supported by 68 Senators, calling on appropriators during the FY2007 budget discussions to "reaffirm the centrality and importance of our basic research investments [and] insure that America remains at the forefront of scientific capability, thereby enhancing our ability to shape and improve our nation's and the world's future. The JSA Board believes that its duty to be a good corporate citizen and responsible steward of the Lab requires that its members and owners participate in public debate and advocacy that will inform and sustain policy discussion to support the advancement of science and building our nation's research capacity.

During this performance period members of the JSA Relations and Outreach Committee met with the Under Secretary of DOE to foster continued good relations between the contractor and the Department and to ensure that an effective communication channel was in place for JSA to discuss with the Under Secretary any concerns the Department may have. JSA and the Under Secretary and his staff discussed the Lab's science highlights, the Lab's future potential including the capability to conduct discovery-level science, importance of the 12-GeV upgrade project, status of actions taken by the Lab in its efforts to improve safety performance, and the impact of the continuing budget resolution. In response to

Congresswoman Jo Ann Davis' letter to the Department of Energy regarding the need for adequate funding for Jefferson Lab and the 12 GeV, the Under Secretary acknowledged the importance of the project to the future of the Lab and to nuclear physics, and stressed the importance of continued Congressional support.

Additional JSA's relations efforts during this period include: working with the Energy Sciences Coalition to support adequate funding for the Office of Science; being a signatory on a letter to the Speaker of the House urging increased FY2007 funding for the Office of Science; being a signatory on a letter to Senators Dorgan and Domenici calling for full appropriation of the FY2008 President's Budget level for the Office of Science; submitting written testimony to the House Energy and Water Subcommittee in support of the President's budget; meetings with state delegates and members of the Governor's cabinet to advocate for funding in the next biennial budget; discussions with JSA's relations firms to strategize for adequate out-year budgets for Lab programs including the FEL. Prior year efforts of the relations program resulted in \$1M Commonwealth of Virginia funding (for GDCP/GCS positions and for industry-led research that promote economic development opportunities in the state) and an additional \$.5M funding specifically for the 12-GeV upgrade during this performance period. Continuous relations efforts by JSA (and previously SURA) have resulted in over \$20M in Commonwealth of Virginia funding as well as contributed personnel and facilities (11 W&M positions assigned to the Lab, VARC building and land). The estimated value of the contributed personnel and facilities is over \$1M for FY2007.

Relations efforts on the state level continued from prior years, including visits to Richmond to educate and inform key legislators about the Lab and the impact of the 12 GeV Upgrade, presentations to the Hampton Roads Caucus and the House Higher Education Subcommittee of the Appropriations Committee, meetings with key legislators, hosting Cabinet members at the Lab to provide a better understanding of the positive effect of having a major research facility in the state. These coordinated efforts resulted in the inclusion of \$.5M specifically for the 12 GeV/Hall D effort. This additional funding is significant in that new initiatives are not usually funded in the state's off-year budgets and success can be attributed to JSA's relations program.

On the local level, Newport News Mayor Joe Frank corresponded with several members of the Virginia Congressional delegation expressing support and offering assistance to ensure that the Lab enjoys a long and dynamic future at the scientific forefront in the region and the Commonwealth of Virginia overall. He noted that the President's American Competitiveness Initiative and the associated funding for the physical sciences with it is a welcome step after years of declining budgets and asked for their support of the President's FY08 budget request.

### **Opportunities for Improvement**

As noted in DOE FY07 Midyear Feedback → *The JSA self-assessment performance narrative did not provide a compelling demonstration that performance met the performance level particularly with securing local, state and federal support for the missions and goals of the Laboratory. Greater context for the Labs accomplishments may provide a more compelling case.*

### **Status:**

- Newport News Mayor Joe Frank corresponded with several members of the Virginia Congressional Delegation expressing support and offering assistance to ensure that JLab enjoys a long and dynamic future at the scientific forefront in the region and the Commonwealth of Virginia overall. He noted that the President's American Competitiveness Initiative and the associated funding for the physical sciences with it is a welcome step after years of declining budgets and asked for their support of the President's FY08 budget request. Congresswoman Jo Ann Davis wrote a letter to the Department of Energy regarding the need for adequate funding for Jefferson Lab and the 12 GeV. JSA participated

in efforts coordinated by the Energy Sciences Coalition supporting the President’s Budget level and the American Competitiveness Initiative. JSA also provided written testimony on March 16, 2007 to the House Energy and Water Subcommittee in support of the President’s Budget and the principles of the Gathering Storm Report.

- In addition, in support of an initiative by the Virginia Secretary of Education to provide funding for the 12 GeV Upgrade and Hall D, JLab and SURA made multiple visits to Richmond to educate and inform key legislators about JLab and the impact the 12 GeV Upgrade will have on Virginia. They were invited to make presentations to the Hampton Roads Caucus and the House Higher Education Subcommittee of the Appropriations Committee and to meet with several key legislators. These coordinated efforts of the JSA Board, the corporate owners, member Universities of SURA and the Lab Director and his staff resulted in the Commonwealth of Virginia including \$500K in the final bill budget for the 12 GeV/Hall D effort, despite the fact that new initiatives are not usually funded at all in off-year budgets. JLab also hosted a visit by Secretary of Education Thomas Morris. These interactions provided an excellent opportunity to expand relationships Jefferson Lab had in Richmond.

Measure 4.2.2 Requirement: Fully implements a performance based integrated management system including: An Annual Work Plan (AWP) that is aligned with the Laboratory vision, the Five Year Business Plan, and the Work Breakdown Structure is developed; and implement JLab Insight (Applied Insight), the Maximo Work Order system, and AQIS within the first year of the JSA contract.

Performance Level Achieved:

Performance Level	Grade	Score
In addition to B+, WBS and AWP have measurable impact on operational efficiencies and are used as a tool for budgeting and responding to cost/budget scenarios. All three applications are deployed, significantly exceeding expectations on scope and schedule, with regard to the respective project plan.	A-	3.5

JSA Performance:

**WBS Implementation:** The WBS serves as the cornerstone for the Lab’s integrated performance-based management approach and is the foundation for improving the financial management system at the Lab. It serves as a map for activity definition, resource staffing, cost estimating, cost budgeting, risk management, procurement management, quality management, change control management and scheduling. The WBS directly supports critical financial management tools such as cost estimating, budgeting, variance analysis and forecasting. It provides the ability to develop plans and assign budgets at a new level of detail that provides our project managers and Lab management better insight into the cost of running the Laboratory. It also provides a vehicle for integrating and assessing cost performance across the organization to facilitate cost effectiveness. Lastly, the WBS provides for the identification of suitable management control points that are used to facilitate communication and control of scope, cost, quality, and schedule performance. FY07 is the first full year of cost collected under the new WBS which has provided valuable cost and baseline data for detailed projects and activities across the Lab. This was also essential in developing the FY08 AWP.

**AWP Development:** JLab has implemented an annual work planning (AWP) process that provides greater insight into operational costs, enables the timely identification of efficiencies and provides for full accountability for cost, schedule and performance at appropriate levels of the organization. This annual

planning process directly and efficiently relates organizational elements to mission requirements in a cost-effective manner, with well-defined scope, goals, performance standards and measures and clearly defined deliverables.

The AWP allowed Project Managers (PMs) to develop activity-based annual budgets. The plan is a requirements-based “bottoms-up” budget development effort that identifies the true resources required to complete the activities. The AWP was built into the Lab’s Annual Business Planning Process to ensure it reflects the planning assumptions and initiatives that are included in the JLab 5-Year Business Plan and the JLab Ten-Year Site Plan and that it incorporates the goals and needs of the customer and users. By understanding the cycle and feeding it with data from the WBS and AWP, the resource needs of the Lab can be better identified and communicated.

An AWP automated system was developed to provide managers with a convenient way to develop or update their individual work plans. In addition, an AWP Guidance Manual was developed and all PMs were trained on the purpose of the AWP and how to develop one for their WBS elements. On November 22, the FY07 AWP effort was kicked-off and well over half of the Work Plans were completed as training for PMs and testing of the system and process. In April 2007, the FY08 AWP commenced and over 300 Work Plans were completed for the upcoming fiscal year which facilitated the initiation of the Budget Review Board in early FY08 and start of the prioritization process. In addition, the AWP System continued to be enhanced via new reports and functionality to support the needs of the PMs and management. While a full set of benefits from this process may not be demonstrated until a full budget cycle has been completed (FY08 and beyond), initial feedback from PMs and key leadership has been positive. JLab is leading the way in establishing a strong management tool to keep the cost of doing business down. Some immediate benefits of the WBS and AWP include:

- Comprehensive list of all components (activities and deliverables) needed to run the Laboratory now available.
- Project-based budget and cost vs. organizational-based budget and cost.
- Insight into cost at more meaningful activity levels → better variance analysis and forecasting capabilities.
- Relational orientation → all levels of the Laboratory understand how their project fits into the overall mission.
- Better visibility of budget change impacts on all levels of the Lab.
- Better definition of work requirements.
- Better scheduling, budgeting and cost estimating → aligns and compliments SC budget process.

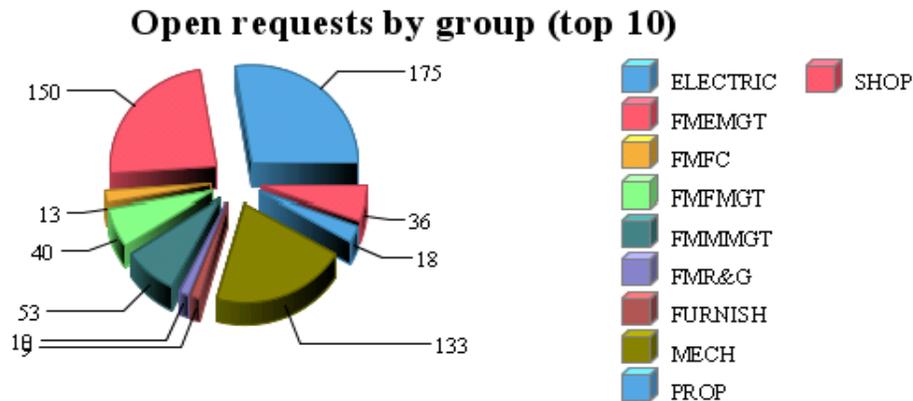
**JLab Insight Implementation:** JSA’s corporate commitment required three phases, two of which occurred during this performance period as promised.

1. Infrastructure assessments and planning → to be completed during transition.
  - CSC provided system architecture and JLab Insight was built before contract start on June 1, 2006.
2. Beta testing → at six months into the contract.
  - Started on October 1, 2006 and completed in May 2007 as scheduled.
3. Go-live → one year after contract award.
  - System went live eight months ahead of schedule on October 1, 2006 with full functionality and real time data.
  - Performance suite went live on May 31, 2007.

The TJSO was briefed in March on the project and a live demo was provided. The overall design of the Performance Tab in JLab Insight was developed and implemented as well and it includes four major categories: PEMP, Key Performance Indicators (KPIs), DOE Metrics, and Projects. The PEMP and DOE Metrics sections were fully populated. Face-to-face meetings with metric owners was initiated to define KPI charts, data sources, frequencies and stoplight thresholds and additional enhancements and functionality is planned in FY08 for all performance reporting areas. Some of the benefits of Insight to date include:

- Provides tool to measure performance, track against and benchmark DOE goals, and make quick corrections as necessary.
- Simplifies and facilitates DOE oversight.
- Provides current data on key performance goals/metrics/milestones/indicators.
- Complies with DOE order 226.1 "Implementation of DOE Oversight Policy".
- Facilitates continuous improvement through issues management, audits and assessments, and lessons learned.
- Benchmarks well against SC requirement to improve Laboratory business processes.
- CSC support available for life of contract.

**Maximo Implementation:** Converted Lab Work Request System to Maximo on May 3, 2007. An independent consultant from JFC evaluated the system and provided input for implementation. Facilities Management staff were trained to use the new Maximo software and provided valuable input for implementation. Benefits of this new system include: 1) customer, staff and users requesting work have a better means of tracking work status; 2) new ability to tie actual cost to each work order; 3) Facilities and Logistics have better means to track and report work being completed around the site.



**Contracts Requirements Management Value Analysis Workshop (CRMVA):** During this period, analysis of 81 contract directives and 29 non-contract directives were evaluated and a semi-automated web based tool was created and implemented for SMEs to perform the Requirements Analysis. Forty-six contract directives (57%) identified as candidates for removal from the contract and a letter requesting exclusion of these orders and disposition of these recommendations was submitted to DOE. In addition, 620 CRDs from all directives have been reviewed of which 227 are recommended for exclusion (37%). Quantification of Value Improvements, Savings, or Cost Avoidances will be delayed and deferred to FY08 or as funding is available. This project was presented to the National Laboratory Improvement Council (NLIC) members at their request because of other new Lab contracts having to do similar analysis.

The Executive Summary Report lists the numbers for the Contract Requirements Management Value Analysis Project as follows:

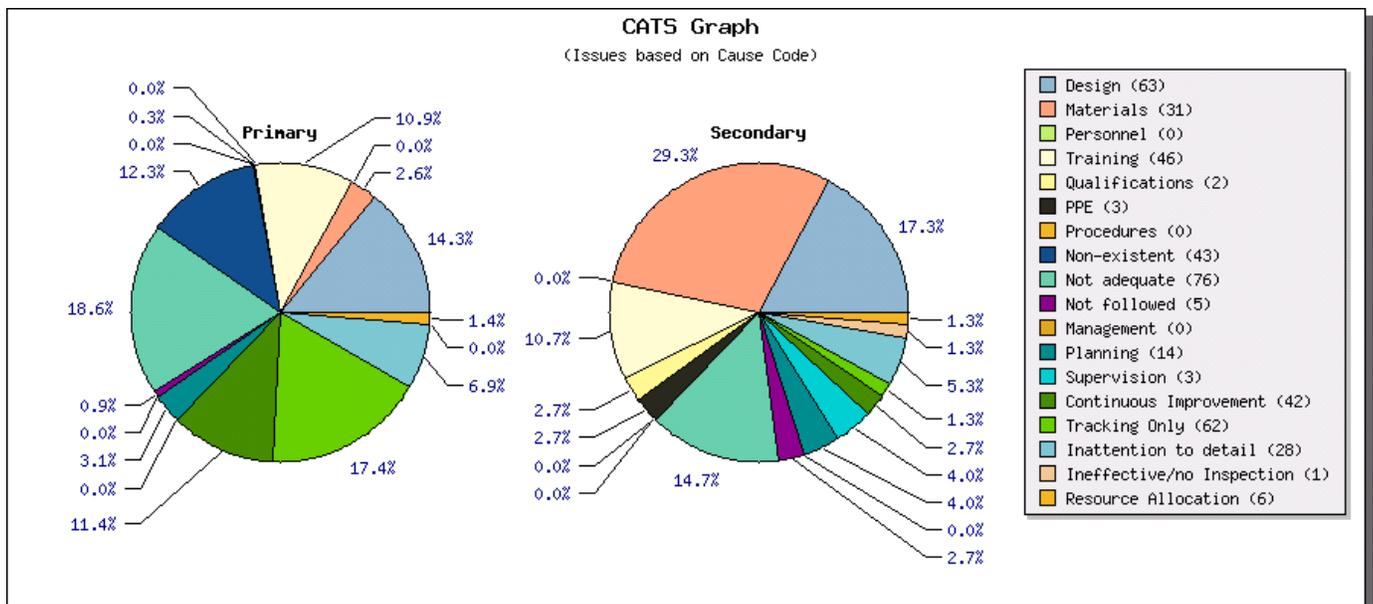
- 35 of 81 Contract Directives, or 43% of those which were originally in Appendix E, Section J, List B are recommended to remain in whole or part → 21 Directives concurred for total inclusion, 14 CRDs or Pseudo CRDs for partial inclusion.
- 46 of 81 Directives recommend for exclusion, or 57% of the total number of the original set of Contract Directives.

The estimated potential cost avoidances include \$11M for the first year cost avoidance and \$53M for the contract life cost avoidance. Approximately \$2.65M per year, not adjusted for escalation or NPV.

**AQIS Implementation:** Automated Quality Information System (AQIS) was integrated with the Corrective Action Tracking System (CATS) on May 31, 2007. AQIS features were developed into existing JLab CATS and Insight. Orientation sessions were conducted for new features that include AQIS improvements allowing greater flexibility in working with corrective and preventive actions through CATS:

- Enhanced Tracking and Sorting
- Improved Functionality for Drill Down & Analysis
- Ability to Trend by Cause Codes
- Improved Process for Closure and Extension Request Processing
- Automated E-mail Notification Features
- Creating Specialized Reports

The system transition was seamless to customer and users.



### Opportunities for Improvement

As noted in FY2006 S&T recommendations → *After some real experience with the new integrated management software, the Laboratory should report on the implementation and impact at the next S&T review.*

**Status:**

- This recommendation was marked as completed and closed in the final FY2007 S&T Report. In addition, the report stated that the annual work planning process has been implemented in a staged fashion which appears to be flexible and reasonable; but, it has not yet been used in resource prioritization or performance evaluation, where the process will be put to the test.

As noted in FY07 DOE Midyear Feedback → *The JSA self-assessment performance narrative did not provide a compelling demonstration that performance met the performance level particularly with the WBS and AWP having a measurable impact on operational efficiencies at this time. Although the WBS and the AWP are in place, the impact of these efforts was not clear in the narrative. The Insight, Maximo and the AQIS initiatives are in development and nearly ready for implementation. It appears that it is too early to take credit for these accomplishments until some positive results are identified*

**Status:**

- Insight, Maximo and AQIS have all been fully implemented with tangible benefits as reported above.
- The WBS and AWP applications are long-term solutions to the Lab’s ever increasing need to keep costs down. Implementation of these at the Lab was a significant effort that was completed during this performance period while minimizing impact to ongoing operations and other priorities. The WBS and AWP will be key for the Lab to develop a cost of doing business baseline by December 2008 per DOE’s request. In addition, it will facilitate easy tracking and review by DOE and Lab management to ensure the cost of doing business does not increase. This is because the Lab took the initiative in FY07 to include both direct and indirect activities in the AWP process. JLab is the first Lab in the SC complex to implement project-based management for all activities.

**Table 11. Objective 4.2 Performance Rating Development**

<b>ELEMENT</b>	<b>Letter Grade</b>	<b>Numerical Score</b>	<b>Objective Weight</b>	<b>Total Points</b>	<b>Total Points</b>
<b>4.2 Provide for Responsive and Accountable Leadership throughout the Organization</b>					
4.2.1 JSA has a responsive Board of Directors and corporate owners that provide timely and effective policy guidance and oversight.	A	3.7	50%	1.85	
4.2.2 Fully implement an Annual Work Plan (AWP) that is aligned with the Laboratory vision; the Five Year Business Plan; and develop the Work Breakdown Structure.	A-	3.5	50%	1.75	
<b>Objective 4.2 Total</b>					<b>3.60</b>

**Objective 4.3 Provide Efficient and Effective Corporate Office Support as Appropriate**

Objective Requirement:

In measuring the performance of this Objective the DOE evaluator(s) shall consider the following:

- Corporate Office involvement in and support of business and other infrastructure process and procedure improvements;

- The willingness to enter into and effectiveness of joint appointments when appropriate; and
- Where appropriate, the willingness to develop and work with the Department in implementing innovative financing agreements and/or provide private investments into the Laboratory.

Measure 4.3.1 Requirement: The corporate owners offer reach back to their own corporate expertise and that of outside, nationally recognized experts serving on the Board of Directors subcommittees in areas such as scientific leadership, project management, IT organization, risk assessment, and a variety of business disciplines to address emerging problems and for a process of continuous improvement.

Corporate commitments include a \$500K per year Initiatives Fund to support initiatives and activities that promote the science and technology of Jefferson Lab in ways complementing and enhancing its basic and applied research programs, particularly activities that leverage commitments by others and that support the Laboratory’s extended user community. Examples of specific initiatives and activities include: scientific outreach programs (e.g. graduate fellowship, post doctoral fellowship, faculty sabbatical and research leave support, thesis prizes, poster contests, Director’s discretionary fund, and tech transfer activities.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Corporate owners and JSA will implement a program for the use of the Initiatives Fund in FY2007, and provide appropriate resources/expertise to initiate improvement in several high leverage areas.	A-	3.6

JSA Performance:

During the performance period, Initiatives Fund support was provided for programs, initiatives, and activities that promote the science and technology of the Lab and support the efforts of the extended user community. In addition to evaluating new proposals, the JSA Programs Committee reaffirmed the continuance of certain programs that preceded the contract award, such as the Fellowship program, thesis award, poster contest, etc. and in some cases increased the amount of support based on valid justification. The JSA Initiatives Fund was committed for the following programs and activities.

- JSA/JLab Graduate Fellowship Program. The Programs Committee approved the continuation of this program which was established in 1989. Awards are made based on a competitive evaluation of the academic qualifications, references, plans of study, and research relevance and potential to the Lab’s experimental, theoretical, or FEL programs. This program encourages graduate students to undertake research at the Lab. Furthermore, the program establishes pipelines into the nation’s universities, increasing research capabilities and opportunities for the nation’s next generation of scientists. Funding includes one-half of an academic year research assistant stipend, to be matched by one-half from the awardee’s home institution, plus a supplemental stipend and additional travel support. During this performance period, seven graduate fellowship awards were made. Since inception, over 130 awards have been made to 18 different universities. The experience of these graduate students who are immersed into the Lab’s research program not only are beneficial in the support for the students in completing their degree aspirations, but also bring to the Lab the connection with young scientists and potential contributions to nuclear physics by providing for advanced training in the theoretical and experimental research programs, including nuclear and related particle physics, accelerator physics, and associated scientific and engineering fields.

- JSA/JLab Sabbatical Support Program. The Programs Committee approved the continuation of this program which was established in 1997. This program provides for living expense support for faculty members who relocate to the area to undertake research at the Lab as part of their sabbatical leave. Awards are made based on the potential contributions of the applicants to the Lab’s research program. Since inception, fifteen awards have been made to faculty members from ten different universities. During the current performance period, the Initiatives Fund supported sabbatical support for four faculty members. These faculty members were from The George Washington University, Mississippi State University, Massachusetts Institute of Technology, and Indiana University. Support consists of up to 12 months of living expenses for awardees while they interact with Lab researchers in their programs and experiments. This program enhances research opportunities for university faculty, strengthening the teaching capabilities of universities in nuclear physics. The program also attracts “new blood” to the research programs of the Lab and has proven to be a very cost effective addition to the Lab’s research capabilities.
- Director’s Discretionary Fund. The Programs Committee approved the continuation of the Director’s Discretionary Fund. This Fund is designated to support user activities, safety incentive programs, community and corporate citizen initiatives, miscellaneous reviews and workshop costs, service awards, and other employee morale activities. This Fund is essential to the Lab to enable ancillary activities that cannot be supported by contract funds, but factor into the quality and overall effectiveness of the primary activity for which funds are used. For example, a significant portion of the Director’s Discretionary Fund supports costs over and above contract reimbursed expenses associated with reviews, seminars, workshops, lectures, collaborations, dignitary visits, training classes, etc. at the Lab to enable effective and time efficient reviews and engaging outreach activities that appeal to a wide audience. Yet another portion of the Fund supports employee welfare and morale activities (condolences, retirements, service awards, group accomplishments, staff appreciation, etc.). During this performance period, the Director’s Discretionary Fund supported some of the costs associated with Dupont Safety Leadership Training – a key element in the Lab’s efforts to strengthen managers’ engagement with employees towards safe behavior practices.
- User Group Activities. Activities of the Jefferson Lab User Group supported by the Initiatives Fund include: thesis prizes (established in 1999), poster awards (established in 2005), student registrations at User Group meetings, User Group relations activities, student tour guides, post doctoral prizes. The satisfaction of the user community with the Lab is very important for a user facility. The impact of this category of Initiatives Fund support on the Lab is the positive enhancement of the experience of the User Group which represents the broader science community.
- Recruitment Costs. Following the announcement of the upcoming departure of the Lab Director, JSA formed a Search Committee charged with recruiting and attracting the best qualified person to lead the Lab as the next Director, taking into consideration the future outlook for nuclear physics and the Lab’s role, the Lab’s long range plans of Lab and its impact, the Lab’s core competency of Lab in superconducting radio frequency (SRF) technology and the Lab’s service to the broader DOE Laboratory community. A portion of the Initiatives Fund was used in this performance period to support certain recruitment costs. The impact of this support to the Lab is to ensure that the selected leader of the Lab, as it is embodied in the Director position, represents the very best efforts of the Search Committee during its deliberations, as the search process seeks to identify an individual who will most effectively deliver on contractual commitments to the Department and on the Lab’s scientific commitments to the research community.

- Other support from the Initiatives Fund includes: nuclear physics workshops (2007 National Nuclear Physics Summer School at Florida State University and Workshop on Exclusive Reactions at High Momentum Transfer at Jefferson Lab); patent awards to Lab employees; membership for the Lab in the Hampton Roads Partnership; American Physical Society Thesis prize. The workshops covered major themes in nuclear physics research and provide researchers with a broad perspective in current nuclear physics research. Support for the Hampton Roads Partnership contributes to the relations building between the Lab and the local community. Because the membership includes the mayors of the major cities in Hampton Roads, as well as presidents of several local Lab-connected universities (e.g., William & Mary, Hampton University, Old Dominion University), the Director has access to community leaders who consider the Lab a key institution in the local economy. The impact of this relationship is the long-term nurturing and solidifying of the Lab's reputation as a good corporate citizen. The support for the American Physical Society Dissertation Award in Nuclear Physics is supported every three years, with Universities Research Association and Brookhaven Science Associates supporting the intervening years. This support contributes indirectly to the Lab through its support of the field of nuclear physics and rising researchers. Fourteen patent awards were given to 27 Lab employees. These financial incentives encourage Lab employees to engage in the arduous process of seeking patents for their inventions based on the Lab's technologies. The indirect impact of these awards to the Lab is the support of the contractual requirement to pursue and conduct technology transfer activities that provide a benefit to the industrial competitiveness of the U.S.

In addition to the Initiatives Fund, other JSA contributions are addressed below:

- Sponsorship of two science community meetings. SURA sponsored two science community meetings at the JSA principal office location in Washington, DC: *Workshop on the Physics of Nucleons and Nuclei* (see <http://www.sura.org/events/physworkshop101606.html>) and *Workshop on Future Opportunities in QCD*, (see <http://www.sura.org/events/QCDWorkshop.html>). Meetings such as these encourage collaboration among the national Labs and the universities so as to maximize the collective contribution of the Lab system to DOE and the nation. See discussion under 3.1 and 4.1.1.
- Residence Facility. The 42-room Residence Facility, owned, managed and operated by SURA, provides on-site accommodations for Lab researchers, guests, collaborators, and vendors with a staff of four FTE's and additional seasonal staff and outsourced support to meet peak demands. SURA maintains a refurbishing and facilities maintenance program to ensure high quality service and accommodations. SURA's objective is to manage this operation on a break-even basis. In order to maintain an affordable and competitive rate schedule, SURA has historically, and again in this performance period, subsidized the operations. The Residence Facility is the preferred choice of many Lab visitors, both short- and long-term. The results of the FY2007 guest survey show a 90% guest satisfaction, with two-thirds of responses rating the Facility in a dozen different factors as *Excellent*. It is quite obvious that Lab users consider the location and services of the Facility to be part of their entire Lab experience and the impact of this contribution to the Lab rests with the appeal of the Lab as a user facility that can accommodate 24/7 operations.
- Relations support. SURA provides relations support to manage a relations and outreach program that supports science in general and the Lab and its related activities in particular. Two firms are engaged to work with corporate staff and members of the JSA Relations and Outreach Committee to advocate for adequate funding to support a vibrant Lab program. SURA is an active member of the Energy Science Coalition (ESC), the Task Force for the Future of American Innovation and the Alliance for Science and Technology Research in America (ASTRA). Each of these coalitions – made up of industry, academic and association partners – are advocates for increasing the federal investment in

the physical sciences, including DOE's Office of Science. While the ESC is geared specifically to advocate for the Office of Science, the other two organizations aim for broader public understanding and Congressional support of the sciences and the importance of basic physical sciences funding.

With independent studies and private surveys, SURA has participated in efforts to arm policymakers and opinion leaders with the rationale for greater support of science as a means of ensuring our nation's continued preeminence. Pursuit of, support for, and dissemination of such reports as *Rising Above the Gathering Storm* (National Academies, 2005) has been most helpful to this end. The resulting legislation will authorize a doubling of physical science research spending, including the budget of the Office of Science, over the next seven years. The America Competes Act, signed by President Bush this summer, was a result of these coalition efforts, which were instrumental in advancing this bipartisan legislation through Congress.

- Land for Hall D. During this performance period, SURA and DOE completed the deed transfer for the land needed for the 12-GeV project. The seven-acre lot, valued at \$750K, is part of a larger plot of land SURA acquired in the 1980's when it first competed for the Lab contract. In addition to this land transfer, SURA also has granted to the Lab a temporary easement of an additional seven acres of land adjacent to the transferred lot for construction access and stockpiling in connection with the construction of Hall D. In addition to financial savings, these contributions, and the timeliness with which they were made, impact the successful schedule of this \$300M construction project.
- JSA subleases a building, the VARC, and surrounding land at no cost to the DOE for use by Lab staff. The VARC houses several administrative functions as well as the Lab's education and outreach group. It provides much needed office and meeting space for Lab staff and educational and outreach activities. Estimated annual value of this contributed facility and land is \$475K.
- Since the mid-1980's, the Commonwealth of Virginia, through the College of William and Mary, has contributed a dozen positions to the Lab (originally 17.5 positions in 1985). These positions are primarily administrative in nature and they represent supplemental support for key administrative Lab functions (finance, information technology services, procurement, facilities management, etc.) from non-DOE funds. The securing and maintaining of these positions as a contribution to the Lab workforce results from JSA's (and historically, SURA's) overall relations program. Estimated value of contributed personnel is \$700K.
- In support of the Lab's technology transfer and commercialization activities, SURA funds the annual licensing fee for the Inteum database for managing Lab invention disclosures and intellectual property. SURA also funds the assessments of any technologies approved by the Lab Technology Review Committee by the University of Virginia Patent Foundation.
- Support for review of the Lab property management system. SURA staff and consultants assisted Lab staff with the restructuring of the property management program, including the provision of a property vulnerability assessment by an independent third party to identify the effectiveness of implemented processes and recommendations for updated procedures with more stringent controls.
- SURA provides support for the financial transactions related to workshops and conferences held at the Lab, including the deposit of collected registration fees and payment of invoices for meeting expenditures. Conferences held during this performance period for which SURA provided this fiscal support included: HEPIX 2006, Workshop on PC's & Particle Accelerator Controls 2006, SESAPS 2006, Conference on Accelerator & Large Experimental Physics Control Systems, DOE Travel

Managers meeting, DOE Contractor Attorneys Association meeting, FEL Users meeting, vendor meetings and shows.

- SURA continues to provide the expertise of its Board Trustees when requested by the Lab. During this performance period, the Chair of the SURA Information Technology Committee, David Lambert, Georgetown University Vice President for Information Services and CIO, served as a member of the IT Independent Review Committee. See discussion under 6.4.6,

**Skillport:** CSC’s Advanced Technology Division, on behalf of JSA and its proposal commitment, negotiated a license and purchase order to support 400+ seats in Skillport a year, which they have committed to fund annually up to \$30,000. A copy of the license agreement and purchase order have been provided to the CFO and Business Manager and Internal Audit for verification that this commitment was satisfied. Further the Human Resources’ Training Department is the designated Coordinator on the purchase order and has coordinate the use of seats as required to institute three classes of approximately 30 students per class for project management related classes utilizing the Skillport computer based training suite, made available though the CSC proposal commitments.

CSC also supported/funded 3<sup>rd</sup> party reviews of the JLab property management and emergency management systems during this period. Recommendations are currently being implemented.

**Opportunities for Improvement**

As noted in DOE FY07 Midyear Feedback → *The JSA self-assessment performance narrative did not provide a compelling demonstration that performance met the performance level. Appears too early to take credit for CSC/JSA LLC interactions with Skillport learning tools since results were not identified*

**Status:**

Results for Skillport are evident in the fact that JLab employees are now taking courses for free on work or home computers, thereby eliminating cost of travel, other fees typically associated with training, and reducing time away from work. Cost savings will be tracked in FY08 as the program continues to ramp up. There is also a value in the project management training these employees are receiving to help make their daily operations more efficient and to become PM certified at JLab.

Measure 4.3.2 Requirement: The JSA Board will facilitate close connections of key staff to academe and assist the Laboratory in taking steps to strengthen ties to the user community. To this end, the owners will work with the Laboratory Director to arrange for university appointments for key staff – including Governor’s CEBAF Distinguished Professorships (GDPC) and Scientists (GCS) – and facilitate joint and bridge appointments between universities and the Laboratory. The JSA Board’s Programs Committee will allocate and manage the annual \$500K Initiatives Fund established by the JSA owners, including especially scientific outreach programs (e.g. graduate fellowship, post doctoral fellowship, faculty sabbatical and research leave support, thesis prizes, poster contests, MSI initiatives).

Performance Level Achieved:

Performance Level	Grade	Score
Majority of Laboratory scientific leaders (Laboratory Director, Chief Scientist, AD Experimental Nuclear Physics, AD Accelerator) hold GDPC or GCS assignments; most have a university affiliation; and the appropriate Board committee approves the allocations of corporate commitment funds to support TJNAF based on an annual approved budget and long-term vision to achieve maximum benefits.	A-	3.5

JSA Performance:

The Laboratory Director, Chief Scientist, and Associate Director for Experimental Nuclear Physics hold the Governor’s Distinguished CEBAF Professorship (GDCP). In addition, two senior Lab scientists hold Governor’s CEBAF Scientist (GCS) appointments. The GDCP/GCS honors were first made in the 1980’s as part of the contributions of the Commonwealth of Virginia and a showing of its support to the Lab. Funds enable the Lab to attract and retain distinguished scientists to the Lab. The presidents of five Virginia universities, acting on the endorsement of the host university grant the appointment of GDCP and GCS to nominees. Each distinguished professor/scientist is free to discuss with his host university the specific arrangements of his association. Current GDCP/GCS appointees are associated with the College of William and Mary (A. Thomas), the University of Virginia (C. Leemann, L. Cardman, C. Rode), and Virginia Tech (P. Kneisel). The continuation of this program and its related funding is the direct result of the JSA relations program. The impact on the Lab is the availability of additional, non-DOE funding, to ensure the recruitment and retention of a top quality leadership team and top scientists.

Measure 4.3.3 Requirement: When appropriate opportunities arise and are agreed to by DOE, JSA and its corporate owners will pursue creative financing options and implement those that make prudent business sense and that are approved by the DOE.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Explore innovative financing agreements and/or options that demonstrate productive outcomes of benefit to DOE. Implement those that make solid business sense and are agreed to by DOE.	B+	3.4

JSA Performance:

JLab established contact with the City Manager and Director, Planning and Development, of the City of Newport News to discuss opportunities for alternative financing for additional facilities at the Lab. Through planning efforts to modernize the Lab over the next 10 years, we have identified several utility upgrade projects that we plan to pursue as alternative funded projects with local/municipal utility companies.

Through the JSA owner accounts, JSA provided bridge funding to enable procurements for the 12-GeV project to continue on schedule when the receipt of the Commonwealth of Virginia funding did not align with the procurement schedule. While the funding was recovered by year-end, the actions of the JSA Board through its Finance and Audit Committee to allow for this resolution was beneficial in keeping the 12-GeV project on schedule.

**Table 12. Objective 4.3 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>4.3 Provide Efficient and Effective Corporate Office Support as Appropriate</b>					
4.3.1 Corporate owners offer reach back to their own corporate expertise and that of outside, nationally recognized experts serving on the Board of Directors subcommittees.	A-	3.6	40%	1.44	
4.3.2 JSA Board will facilitate close connections of key staff to academe and assist the Laboratory in taking steps to strengthen ties to the user community.	A-	3.5	30%	1.05	
4.3.3 JSA and its corporate owners will pursue creative financing options and implement those that make prudent business sense and that are approved by the DOE.	B+	3.4	30%	1.02	
<b>Objective 4.3 Total</b>					<b>3.51</b>

**Table 13. Goal 4.0 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>4.0 Provide Sound and Competent Leadership and Stewardship of the Laboratory</b>					
4.1 Provide a Distinctive Vision for the Laboratory and an Effective Plan for Accomplishment of the Vision to Include Strong Partnerships Required to Carry Out those Plan	A	3.86	35%	1.35	
4.2 Provide for Responsive and Accountable Leadership throughout the Organization	A-	3.60	35%	1.26	
4.3 Provide Efficient and Effective Corporate Support	A-	3.51	30%	1.05	
<b>Performance Goal 4.0 Total</b>					<b>3.66</b>

**Table 14. Goal 4.0 Final Letter Grade**

<b>Total Score</b>	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
<b>Final Grade</b>	A+	A	A-	B+	B	B-	C+	C	C-	D	F

**Goal 5 Sustain Excellence and Enhance Effectiveness of Integrated Safety, Health, and Environmental Protection**

Goal Requirement:

The Contractor shall sustain excellence and enhance effectiveness of integrated safety, health, and environmental protection. (The goal shall measure the Contractor’s overall success in preventing worker injury and illness; implement ISM down through and across the organization; and provide effective and efficient waste management, minimization, and pollution prevention.)

FY2007 S&T Review findings and comments:

- The Laboratory clearly expressed its commitment to a goal of zero accidents and injuries. The total recordable case (TRC) rate and days away, restricted or transferred (DART) rate are both below the SC goal of 0.65 and 0.25 respectively for FY07 which places JLab among the top performing SC Labs.

**Opportunities for Improvement**

As noted in DOE FY07 Midyear Feedback → 1. *The timeliness of event reporting within the Laboratory and to the Site Office requires management and staff attention. Timeliness will help the Lab’s case management program and support timely notification of SC management of significant ES&H events. For example, there are some instances of delays in worker reporting to the ES&H group (e.g. 1-8-07 subcontractor hand injury).* 2. *The Site Office’s recent observations of subcontractor HVAC work on the VARC roof identified fundamental problems in fall protection awareness and planning. Similar concerns were previously identified in the August 2006 DOE Surveillance covering the same subject. Full compliance is warranted for high risk/high consequence activities, with a corresponding level of Laboratory oversight.*

**Status:**

- JLab has improved timeliness in reporting events which, in the case of injuries has improved our case management efforts since April 2007. For example, rollup door subcontractor (April 2007) and the subcontractor guard (September 2007).
- Working with the primary subcontractor involved JLab reevaluated fall protection requirements for HVAC systems with proximity to edge of building roofs or work platforms. Additional controls have been put in place including: access to some HVAC system locations is restricted; fall protection barriers have been installed on platforms in the Test Lab; and barriers have been installed on the ESR building roof. In addition, fall protection has been a point of focus for reviewing subcontractor work.

**Objective 5.1 Provide a Work Environment that Protects Workers and the Environment**

Measure 5.1.1 Requirement: The Contractor’s progress in achieving and maintaining “best-in-class” ES&H program performance as measured by the day away, restricted or transferred (DART) case rate. This rate includes: All JSA/Jefferson Laboratory staff, nuclear physics users, and JSA subcontractors, staff on official travel, and personnel paid under joint arrangements.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
DART Rate less than 0.25 and implement Behavior Based Safety program in areas beyond Engineering. Establish and implement a written causal analysis program in FY07.	A-	3.7

NOTE: Measure scores for DART rates within the Performance Levels are assigned by Linear Interpolation, using the immediate bounding upper and lower criteria.

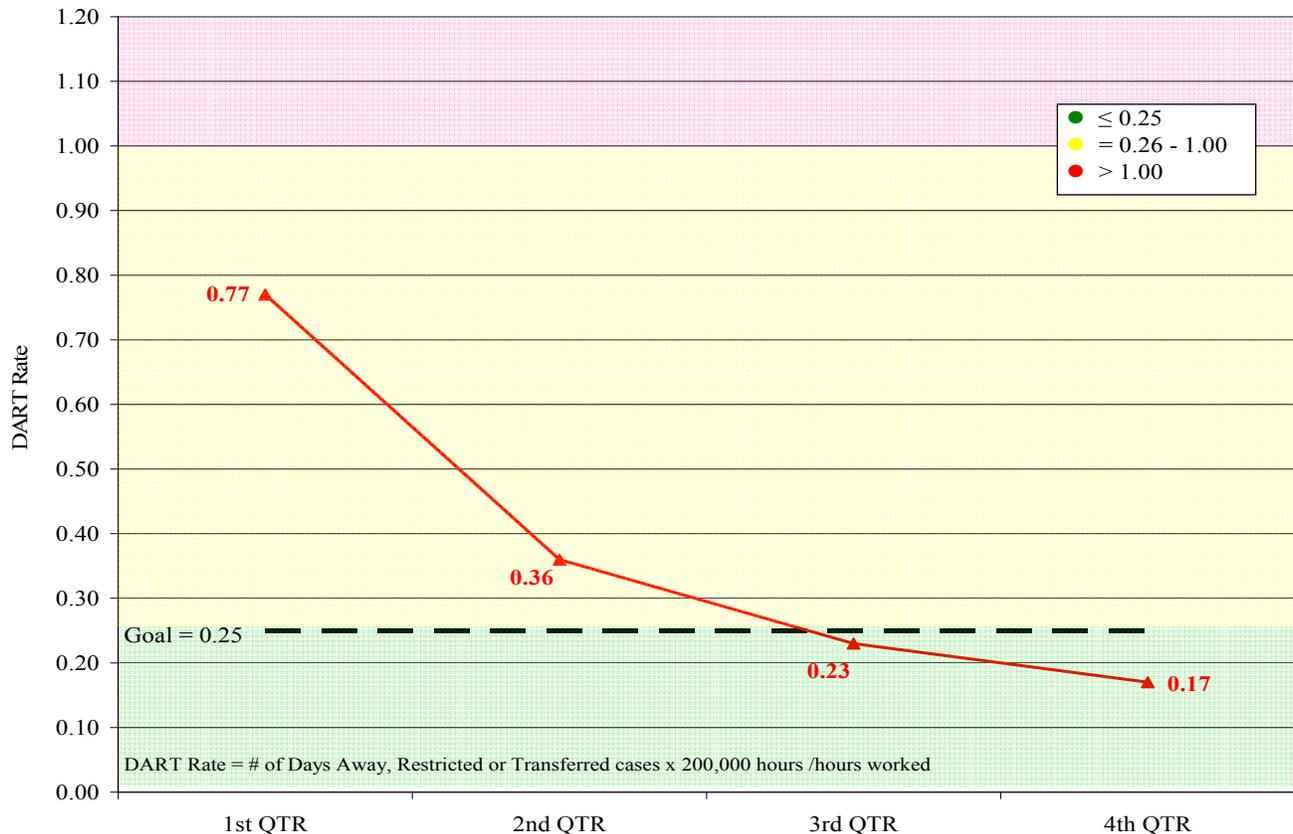
For performance level up to 3.4 the DART rate includes DART cases and hours worked for Laboratory staff and JSA subcontractors with 11 or more employees. For performance level of 3.5 and higher the DART rate includes DART cases and hours worked for Laboratory staff, users, and subcontractors. This includes hours worked from JSA service and construction subcontractors having fewer than 11 on-site employees. This excludes DART cases involving subcontractor employees whose work is limited to transient activities and direction/oversight is not provided by DOE or JSA (e.g. copy machine repair, express mail delivery, telephone installation/repair, vending machine service).

JSA Performance:

Improving safety performance at the Lab remains a top priority and is demonstrated by the achievement of 330 days (1,150,000 hours) worked without a DART injury. The DART rate for FY07 was 0.17, which was well under the goal of 0.25, and demonstrates a continuous improvement trend throughout the period. The DART rate including staff, users, and subcontractors was 0.27 as of September 30, 2007. This rate of 0.27 is the result of two DART injuries. JLab maintains that this is exceptionally high safety performance. JLab is expected to be just one of two or three Office of Science laboratories that meet the goals set forth for DART (or TRC). Listed below are examples of Behavior Based Safety programs in areas beyond Engineering that have been established and implemented in FY07 and confirmation that a written causal analysis program has been established and implemented in FY07.

- Trained over 130 supervisors and managers in Battelle/Dupont developed safety leadership observation training that included all divisions at the Lab. The Lab developed a data logging application that went live August 2007 with initial improvements incorporated by September 30, 2007. As of September 30, 2007 there were 231 observations in the system.
- The DuPont STOP (Safety Training and Observation Program) expanded beyond the Engineering division to Accelerator Division Operations Department with an additional 12 people trained. Early in 2007 JLab learned that DuPont stopped marketing and selling DuPont STOP for Employees materials. As a result JLab has focused on the Safety Leadership training and implementation discussed above.

- The revised Lab ES&H Manual Chapter 5200, Incident/Notable Event/Injury Investigation and Causal Analysis, became effective in July 2007. This revised ES&H Manual Chapter requires that designated events receive a causal analysis; this event causal analysis is conducted by using a graded approach. To ensure consistency in approach a Quality Assurance professional from the QA/CI organization assists and/or advises on each causal analysis conducted. In addition, Chapter 5200 suggests that line management use one of the 20 Lab staff members who is trained in event investigation techniques, as resources to their line management investigation. In FY07 all causal analyses were lead by trained personnel.



JLab was recognized as a 2006 National Safety Council (NSC) Industry Leader award winner. This award recognizes the top member participants in the 2006 Occupational Excellence Achievement Award program and signifies best performance (lowest total incidence rating) based on lost workday cases. The Lab is one of 168 organizations nationwide honored with the 2006 NSC Industry Leader Award.

A Corrective Action Plan was submitted in response to the TJSO Management Assessment of TJNAF ESH&Q Oversight of ISMS on June 29<sup>th</sup>. Each corrective action was entered into the AQIS-CATS with responsibilities and due dates clearly indicated in the plan. An identification hyperlink for each action was included in the corrective action description. There were a total of 28 corrective actions. As of September 30, 2007, 24 actions have been completed and closed. The following actions will be completed by December 31, 2008:

- MOA-2006-114-06
- MOA-2006-117-18

- MOA-2006-114-20
- MOA-2006-114-26

Engineering has significantly improved their safety performance in the last year and a half.

### **Opportunities for Improvement**

As noted in the FY06 DOE Performance Evaluation Report as an FY06 weakness → 1. *During the Lock-Out/Tag-Out and Fall Protection Surveillances in August 2006, DOE identified multiple instances of subcontractors performing work inconsistent with routine safety practices. Some of the observations and findings identified were also identified in JLab's Management Self Assessment conducted in March 2006. Interim corrective actions should have been in place considering the amount of time between these two efforts.* 2. *On October 24<sup>th</sup>, a "near miss" occurred when toolboxes being lifted by a crane dropped 6 – 8 inches to the floor. There were no injuries, but injury potential did exist. JLab reported the event to the DOE occurrence reporting system (ORPS) as a Significance Category (SC) 4 occurrence.* 3. *On December 1, an FEL worker was inadvertently missed during a laser lab sweep for personnel prior to laser operations. Control room operators terminated operations when they noted the worker's presence after about one minute of laser light being directed into the laser lab. There was no exposure and no injury to the worker*

**Status -** JSA corrective actions for this area have included:

- 1. An experienced electrical engineer started in October 2006 in the new position of Lab Electrical Safety Engineer. This individual is serving on the Lab Electrical Safety Committee and is coordinating a number of activities that address the DOE Lockout/Tagout review concerns. The actions implementing these initiatives are in the CATS system. In addition, a second quarter FY07 Lab subcontractor fall protection initiative has used subcontractor worker inputs to address the DOE fall protection concerns. This approach of soliciting worker feedback and aggressively developing fall protection action plans is an example of using Integrated Safety Management (ISM). This actual ISM use not only is a safety compliance vehicle but also resulted in worker "buyin" to working safely. The fall protection action plans are in the CATS system. The Lab SOTR safety awareness training program was completed.
- 2. The results of this investigation and the causal analysis team's findings were used as an internal lesson learned. Event information was provided lessons learned to all JLab certified crane operators. Immediate actions were put in place such as supervisor's specific approval to conduct a lift. Facilities Management is in the process of developing commercially equivalent Hoisting and Rigging guidance and training for Lab-wide use to augment current procedures and qualifications.
- 3. JLab reported the event to the ORPS system as an SC 4 occurrence. The JLab Laser Safety Officer conducted an event briefing for other Lab laser system supervisors to discuss lessons learned from this "near-miss" event. Several immediate compensatory measures were put in place until engineered controls can be installed. In addition, the FEL Division Safety Officer hosted an SC-wide lessons learned video conference on this event to share the information more directly with other Labs that may have similar situations. The FEL installed the engineered controls during the summer shutdown.

As noted in DOE FY07 Midyear and 3<sup>rd</sup> Quarter Feedback: → 1). *The Human Factors training established by the Accelerator Division in October 06 is considered notable, as is the recent DuPont Leadership Training being provided to Lab management. Limiting the details on the Oct. 24 dropped toolbox as falling 6"-8" is a bit misleading without also noting the toolbox unit stool nearly 6 feet tall and toppled completely over on its side. Injury from the tool box falling had potentially significant consequences* 2). *For future reference, please include the JLab specific TRC and DART performance*

figures in addition to the SC based numbers. There was no mention of the rather significant finger injury sustained by a small business service subcontractor during the rating period. The absence of such information doesn't provide the balanced perspective we have been encouraging.

**Status:**

- 1. JLab took appropriate action on the toolbox event and treated it as a serious event. This event was widely distributed by QACI and posted on the ESH&Q Lessons Learned web location. In addition, it drove improved training and the procurement of motorized material lifts that will be installed in the Test Lab in FY08.
- 2. The TRC and DART performance figures for JSA Staff, Nuclear Physics Users + All Subcontractors are 0.67 and 0.27 respectively, just 0.05 above the SC goals. JLab followed up aggressively on the finger injury as well and kept the Site Office well informed. Since this injury, JLab logged nearly a million work hours without a lost time.

The following is a listing of recordable injuries that occurred at JLab in FY07:

- 11/3/06: A subcontractor security guard sprained her left ankle when she fell off the sidewalk while doing security rounds around CEBAF Center. This injury is a DART case with six days with work restrictions and two lost workdays. (DOE SC-reportable)
- 1/8/07: A subcontractor worker suffered a right hand contusion while disassembling Test Lab storage shelving. This TRC injury did not have any lost or restricted days.
- 4/19/07: A subcontractor suffered a fracture to his left finger while repairing a roll-up door to the South Access Bldg. This DART injury had lost and restricted workdays.
- 4/24/07: An Argonne National Laboratory (ANL) physics user suffered a left ankle fracture injury at the accelerator site boundary as he traversed a vehicle barrier. This TRC injury did not have any lost or restricted days and is recorded with ANL.
- 9/19/07: Early in the morning a subcontractor security guard sprained his right wrist when he fell while doing security rounds in Building 70 (Accelerator Exit Stairway #5). The guard received medical treatment for his TRC injury but did not require work restrictions or any lost workdays. (DOE-SC reportable)

**FY07 Challenges:**

Staying injury-free during upcoming extended summer accelerator shutdown.

**Status:** The task list for the extended scheduled accelerator shutdown (SAD) exceeded 325 tasks. These tasks, spanning over three months, range from minor maintenance to the installation and testing of site wide installations such as the sump discharge piping system. The SAD was preceded by a pre-shutdown safety briefing consisting of lessons learned from the previous SAD and key safety focus issues. These tasks represent intense, focused work effort and **were performed without any injuries, first aid events, or events of environmental consequence**. Draft lessons learned from this SAD have already been developed by the Operability Manager / SAD Work Coordinator and distributed for review by the line managers and supervisors who were instrumental in the hazard analysis, work planning, and the conduct of the work.

Measure 5.1.2 Requirement: The Contractor’s progress in achieving and maintaining “best-in-class” ES&H program performance as measured by the total reportable case rate (TRCR). This rate includes: All JSA/Jefferson Laboratory staff, nuclear physics users, contractors, official travel, and personnel paid under joint arrangements.

Performance Level Achieved:

Performance Level	Grade	Score
TRCR less than 0.65 and implement Behavior Based Safety program in areas beyond Engineering. Establish and implement a written causal analysis program in FY07.	A-	3.7

NOTE: Measure scores for TRC rates within the Performance Levels are assigned by Linear Interpolation, using the immediate bounding upper and lower criteria.

For performance level up to 3.4 the TRC rate includes recordable injury cases and hours worked for Laboratory staff and subcontractors with 11 or more employees. For performance level of 3.5 and higher the TRC rate includes recordable injury cases and hours worked for Laboratory staff, users, and subcontractors. This includes hours worked from service and construction subcontractors having fewer than 11 on-site employees. This excludes recordable injury cases involving subcontractor employees whose work is limited to transient activities and direction/oversight is not provided by DOE or JSA (e.g. copy machine repair, express mail delivery, telephone installation/repair, vending machine service).

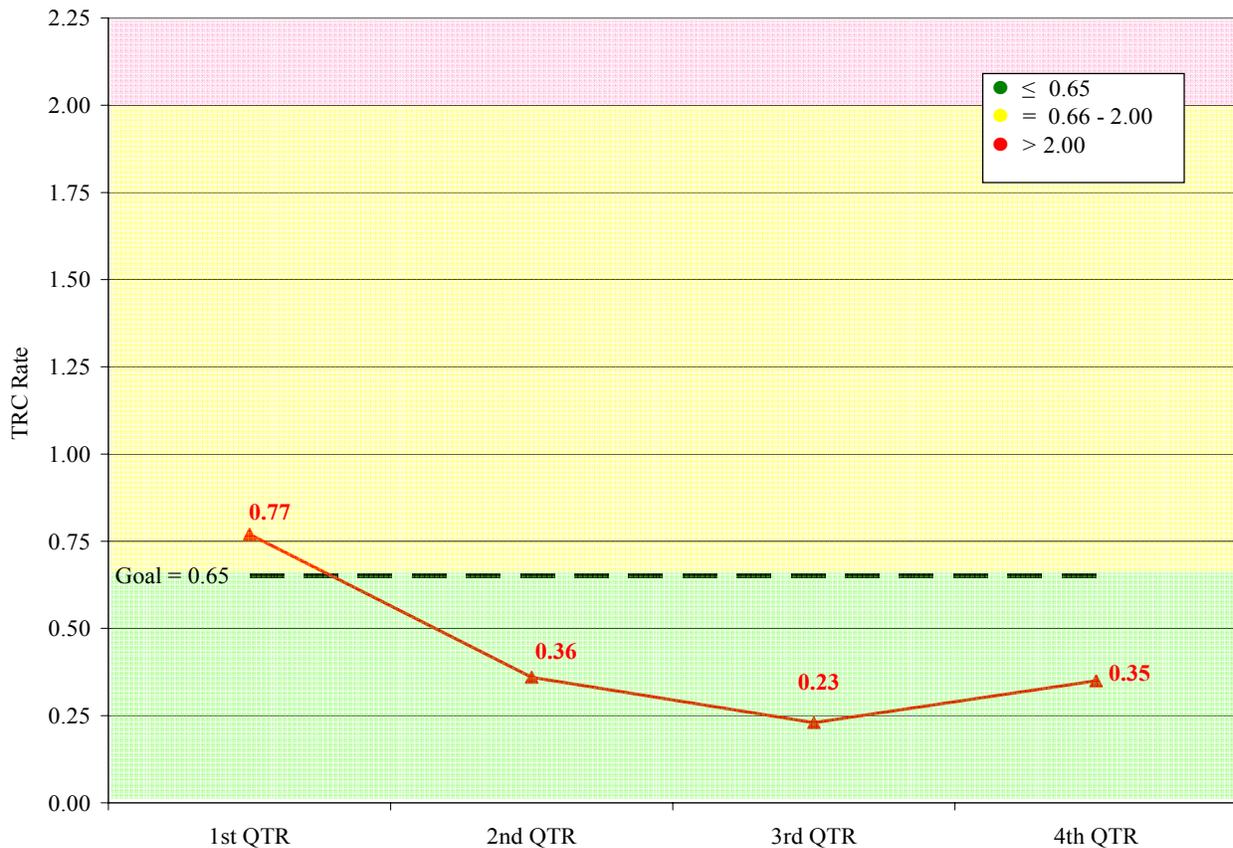
JSA Performance:

The TRC rate for this reporting period is 0.35, which is well below the goal of 0.65. JLab’s FY07 TRC and DART rates place us in the top three safety performers of the 10 SC Laboratories.

On January 8<sup>th</sup>, a subcontractor worker (for a firm with <11 workers onsite) injured his hand reorganizing shelves in the Test Lab. The injury was classified as a TRC. He had received a safety briefing by the SOTR, including requirements for PPE. A causal analysis and lessons learned was issued on that same date. In addition, ESH&Q, Procurement and HR have taken great strides during this period to enhance the subcontractor and temporary labor process so that any worker coming on site will be provided the same orientation and training as permanent employees and to enhance oversight of subcontractor work.

JSA has been continuing its focus on safe behaviors in high-risk groups to reduce potential for injury through, for example, continued implementation of the DuPont Safety Training Observation Program (STOP). STOP training was completed for all TJNAF Engineering workers and supervision. The result has been **no recordable injuries for this group during FY07**, a remarkable improvement in safety performance. For example, in FY05 Engineering staff accounted for three of the four recordable injuries. STOP refresher training was initiated for selected worker groups as well. **Over 100 personnel** were trained in DuPont Safety Leadership during FY07. An implementation steering group, led by the COO, was formed and approximately 135 work observations were logged in the centralized database specifically designed for this purpose.

JSA implemented a substantial CATS system upgrade in January. This CATS upgrade improves the existing causal analysis program and event trending capability. Cause code fields were added, this enhancement allows for additional trending and analysis capabilities.



ESH&Q staff participated in a November 15, 2006 Corporate Operating Experience day long videoconference. This Office Health, Safety & Security (HS) sponsored videoconference provided DOE Order 210.2, Corporate Operating Experience implementation guidance on. A cryogenic safety lesson learned for potential bolometer (a type of R&D thermocouple used at the JLab FEL and other national Laboratories) was provided to the Office of Health, Safety and Security’s Office of Analysis for consideration as a DOE-wide lesson learned. The lesson learned was distributed DOE-wide in December 2006. TJNAF is also involved with DOE Society for Effective Lessons Learned Sharing (SELLS) activities for DOE Order 210.2 implementation including participation on the newly formed SELLS Metrics Committee.

Over the course of FY 07 JLab published thirteen notable event reports to aid with staff awareness and availability of lessons learned. These reports are available at: [http://www.jlab.org/div\\_dept/dir\\_off/oa/notable/index.html](http://www.jlab.org/div_dept/dir_off/oa/notable/index.html)

The H&S group established a link to all documented Industrial Hygiene procedures on Docushare for easier access by Lab personnel.

Submitted and received approval of Accelerator Safety Envelop and initiated actions to improve alignment with Accelerator Safety Order. JLab exercised its Senior Safety Advisory Committee (SSAC) to conduct a thorough review of JLab’s implementation of the new Accelerator Safety order. As a result JLab identified opportunities for improvement for the Final Safety Assessment Document and Unreviewed Safety Issue (USI) identification and processing. The revision to the FSAD has been

projectized and started, and will be completed in FY08. JLab issued required reading surrounding the FSAD to raise staff awareness on the accelerator safety envelope and controls in place.

A lesson learned on oil-filled electrical switches (manufactured by G & W Electrical Co.) was submitted to the HSS Office of Analysis for consideration as a DOE-wide lesson learned. Two G & W 15kv oil-filled switches are currently in use at TJNAF. These switches have had a history of explosions and fires at other facilities. The lesson learned was distributed DOE-wide on July 11, 2007.

Measure 5.1.3 Requirement: 100% of all jobs for which the projected collective Total Effective Dose Equivalent (TEDE) exceeds 100 mrem per Job Specific RWP are reviewed (pre and post job) by a radiological engineer for ALARA considerations. 90% of jobs for which a Job Specific RWP is generated where the collective TEDE does not exceed 100 mrem are reviewed (pre and post task) by a radiological engineer for ALARA considerations.

Performance Level Achieved:

Performance Level	Grade	Score
50% of all radiological work permits (RWP) generated in FY07 are audited independently for accuracy. Assist local, state and federal entities in radiological advisory role or assistance/augmentation. Participate in radiological safety benchmark activity with Laboratory of similar size and function.	A	4.0

JSA Performance:

100% RWPs (whether exceeding 100 mrem or not) had pre-job ALARA review by radiological engineer, and were audited upon closure during this period. There were 12 RWPs executed in FY07. All were reviewed and found to be accurate with tasks described clearly and in sufficient detail, and signed by workers/participants. Four of 12 required dose-tracking. Comparison of the projected vs actual doses indicates that a) estimates were mostly conservative, and b) in all cases there was a good understanding and assessment of radiation hazard at the planning stage.

JLab RadCon Manager participated in the SLAC RadCon Peer Review December 12<sup>th</sup> – 14<sup>th</sup> and the NS SAVANNAH emergency drill on December 19<sup>th</sup>. The SLAC review included benchmarking and radiological advisory role. A SLAC representative also later participated on the JLab RadCon peer review.

The ESH&Q AD was recognized for providing an independent review of the LATA/Parallax, Portsmouth’s “lost radioactive source” investigation. LATA/Parallax is a Department of Energy M&O EM contractor. This participation included briefing the M&O contractor management, local DOE field office, and DOE HQ-EM3 on the results of this support effort.

The Lab responded to QA concerns through its primary sample analysis subcontractor and worked with them to secure a more reliable second tier radioanalytical subcontractor.

RadCon participated as a mentor for the Lab's subcontractor radiological analytical laboratory, Universal Labs of Hampton, VA. Universal Labs is currently evaluating participation in the DOE's Consolidated Audit Program (DOECAP) laboratory accreditation program.

Radiation Control Sealed Source Accountability was completed on February 14, 2007. The semiannual accountability was accomplished with a 100% compliance result.

The following events, indicating a less than adequate control of radioactive material, occurred in FY07:

- April 2007: A beam line segment was relocated to improperly posted area in experimental hal
- June 2007: Activated magnet coil was discovered at Bluecrab storage facility
- September 2007: Electronic components were moved from experimental end station to transportainer without radiation survey. An activated beam viewer, removed from beamline in 2004, was found in the same transportainer.

As a result of this series of events the Lab Director led a September 21, 2007 a radiological work stand-down for all radiation workers to increase awareness on the proper control of radioactive material. These events did not result in exposure to the public or unmonitored exposure to the workers. This stand-down emphasized radiological work planning, Radiation Control Group involvement, and included an associated required reading document. Requirements for the stand-down included a required read and sign document. Both the document and videotaped presentation was provided on the web for those that could not attend. Based on discussions with JLab personnel following the presentations, awareness had greatly improved as a result of the standdown. In addition, JLab surveyed the lab campus for “extent of condition” and found no other uncontrolled radioactive material. An ORPS report and an updated NTS report were submitted.

**Opportunity for Improvement**

As noted in DOE FY07 Midyear and 3<sup>rd</sup> Quarter Feedback → 1. *The JSA self-assessment narrative did not provide a compelling case for the performance level. For example, identify how many RWPs were reviewed, and cite examples of lessons learned that were generated from these post work reviews.* 2. *There is no mention of radiologically activated equipment being identified at Blue Crab storage facility. While the NTS report was issued in July, the discovery itself occurred during this quarterly period*

**Status:**

- 1. See above discussion.
- 2. The lab addressed this in a comprehensive manner. See above discussion.

Measure 5.1.4 Requirement: Conduct Radiological Control Program Peer Review.

Performance Level Achieved:

Performance Level	Grade	Score
Conduct RadCon Program Peer Review during FY07. Within 20 days of receipt of the final report, any review findings and observations will be evaluated by JSA for implementation. Within 30 days, findings, observations, and resolutions will be put in a tracking system, assigned a responsible person for corrective action, and identify a suspense date for resolution.	A	3.9

JSA Performance:

JLab’s RadCon Peer Review was conducted on September 5-7<sup>th</sup>. SLAC, Brookhaven, and Fermilab staff participated and presented their preliminary assessment in a close-out briefing on September 7<sup>th</sup>. Immediate action has been taken to address critical issues: improve posting, ensure consistency in use of

radiological signage, update area survey maps and improve control of radioactive material and improve radiological housekeeping in the experimental areas. A final corrective action plan will be developed and put in CATS upon receipt of the final peer review report, which is expected by November 15<sup>th</sup>. The Radiological Control Manager has been in frequent contact with the peer review team leader to ensure our understanding of issues and concerns.

DOELAP representatives were at JLab March 14<sup>th</sup> – 15<sup>th</sup> to conduct the onsite portion of the external dosimetry program re-accreditation review. Several recommendations for improvement were identified; no deficiencies were found and JLab received a two year DOELAP accreditation certificate for maintaining the Lab's dosimetry program in the manner in which DOELAP performance testing and site assessment were based. The successful maintenance of this accreditation is a vital component of the Lab's Safety program. Initial dosimetry testing by JLab's dosimeter vendor used an incorrect algorithm to calculate dose from the test badges. Jlab worked with that vendor to revise dose evaluation procedures to incorporate the correct algorithm. Subsequent test results were satisfactory. At no time was the incorrect algorithm used to calculate or record personnel dose.

### **Opportunities for Improvement**

As noted in DOE FY07 Midyear → 1. *To present a balanced assessment, the narrative should have included a limited discussion on the problems identified in December 2006 on the initial round of DOELAP dosimetry testing.* 2. *The Lab's submission of the Corrective Action Plan in response to the DOELAP review allowed essentially two business days to review and submit to the DOELAP PEPA before the 45 day deadline. If the Site Office had comments or issues with this product, it is questionable if the suspense date would have been met. Performance ratings that "meet or exceed exception" must include submission of deliverables to TJSO that factor in a reasonable amount of time for TJSO review.* 3. *The Site Office remains concerned that the current RadCon staffing shortage may compromise RadCon support to operations as well as the planning and execution of the Peer Review slated for this summer.*

### **Status:**

- 1. Initial dosimetry testing used an incorrect algorithm to calculate dose. Jlab worked with that vendor to revise dose evaluation procedures to incorporate the correct algorithm. Subsequent test results were satisfactory
- 2. Unanticipated departure of the Radiological Control Manager resulted in shifting personnel to cover all the programmatic requirements and delayed JLab's submittal of the corrective action plan. JLab has since hired a Radiological Control Manager and three technicians to bolster the radiological control program. JLab will factor time in for future submittals to allow TJSO adequate review time.
- 3. As noted in item 2 above the RadCon staffing has increased by nearly 30 % and support to operations is adequate, and the RadCon peer review was indeed conducted in FY07.

As noted in DOE 3<sup>rd</sup> Quarter Feedback → *The Lab has not conveyed confidence that the peer review will be completed as expected, and within the FY. There is no evidence shared yet that a CRAD based review plan is being/has been developed.*

### **Status:**

- JLab put an extensive amount of energy in searching for and selecting a nationally recognized expert to replace the previous RadCon Manager (RCM). The previous RadCon manager departed and the new RadCon Manager was selected, all in the 3rd quarter. The new Rad Con manager started on July 23<sup>rd</sup> and during the gap between departure and hire, the ESH&Q Deputy AD made peer review team contacts to get a team commitment ahead of the new RCMs arrival. The AD, ESH&Q verbally told

the site office staff that we intend to conduct the peer review even as we deal with the challenges of organizational change, bringing on new technicians, turnover duties, etc. Furthermore, it was important for the new RCM to get on board and get comfortable with the team members (which has now happened) and with the review plan approach (which has now happened). The lines of inquiry are based on DOE’s own program review guidance found on DOE’s HSS 10CFR835 website. As a result of these efforts, the review was conducted as planned during this period.

**Table 15. Objective 5.1 Performance Rating Development**

<b>ELEMENT</b>	<b>Letter Grade</b>	<b>Numerical Score</b>	<b>Objective Weight</b>	<b>Total Points</b>	<b>Total Points</b>
<b>5.1 Provide Work Environment that Protects Workers and the Environment</b>					
5.1.1 Progress in achieving/maintaining “best-in-class” ES&H program performance as measured by DART.	A-	3.7	30%	1.11	
5.1.2 Progress in achieving/maintaining “best-in-class” ES&H program performance as measured by TRCR.	A-	3.7	30%	1.11	
5.1.3 100% of all jobs in which TEDE exceeds 100 mrem are reviewed for ALARA considerations.	A	4.0	15%	0.60	
5.1.4 Conduct radiological control program peer review.	A	3.9	25%	0.98	
<b>Objective 5.1 Total</b>					<b>3.80</b>

**Objective 5.2 Provide Efficient and Effective Implementation of Integrated Safety, Health and Environment Management**

Objective Requirement:

In measuring the performance of this objective the DOE evaluator(s) shall consider the following:

- The maintenance and appropriate utilization of hazard identification, prevention, and control processes/activities; and
- An open reporting culture is maintained at the Laboratory while appropriately responding to ESH&Q incidents/emergencies
- Identification of root causes to ES&H non-compliances and implementation of corrective actions
- Extent of the Laboratory’s participation in working with other SC Laboratories or other entities/organizations outside SC in both giving and receiving external safety program audits as to advance staff skills and facilitate the sharing of lessons learned.

Measure 5.2.1 Requirement: Number of Management Self Assessments (MSAs) conducted and reviewed and accepted by ESH&Q Division. The number of Independent Assessments (IAs) completed. Number of work observations on average per week.

Performance Level Achieved:

Performance Level	Grade	Score
<p>MSAs and IAs Completed - 100% of number of MSAs conducted and reviewed and accepted by ESH&amp;Q Division during the 4<sup>th</sup> quarter of FY07 with a minimum of 30% of all groups within major divisions performing MSAs (Accelerator, FEL, Physics, Engineering, Facilities Management)) (e.g. 30% of Accelerator Division groups will perform MSAs). To ramp up to this performance, 10% of groups by the end of the first quarter, 20% of groups by the end of the 2<sup>nd</sup> quarter, and 30% of groups by the end of the 3<sup>rd</sup> quarter (and continue at 30% through the 4<sup>th</sup> quarter). IAs Completed = 100% - of number scheduled are completed. Completed means IAs are conducted and draft reports are written. Conduct three work observations on average per week during the scheduled accelerator down (SAD) and at least one work observation per week on average for each major division (Accelerator, FEL, Physics, and Facilities. Document that these observations were conducted in docushare or equivalent.</p>	B+	3.4

JSA Performance:

During FY 2007, seven Management Self Assessments (MSA) were completed. These assessments involved personnel from six divisions and the Directorate. A brief description of each assessment appears below. Of the seven MSA's 2 were scheduled for the Fiscal Year, and 4 were unscheduled. Of the 2 scheduled MSA's JSA documented greater than 50% group participation in each one. This exceeded the PEMP goal of 30% by over 20% as of the 4<sup>th</sup> quarter.

An MSA of the procurement process within the Divisions with respect to ESH&Q Manual requirements was performed. Outcomes indicated that the processes in each Division comply with ESH&Q requirements. No opportunities for improvement were noted.

An MSA covering calibration of measurement and test equipment (M&TE) was performed. It should be noted that there was no lab wide calibration requirement document at the time this assessment was performed. Outcomes varied by Division and organization within a division. The results of the assessment indicate there is a need for a lab wide calibration procedure to provide guidance for calibration, handling and storage of M&TE. This procedure has been developed and is in the final review process. Some organizations were noted as having very good local systems for calibration in place.

The QA/CI department performed an MSA of ESH&Q ISMS Oversight. Additional personnel from ESH&Q Division were interviewed. Results of the MSA indicate that ESH&Q Division is in compliance with the ISMS Program Description requirements.

Based on the DOE report on SLAC compliance to their ISMS program, JLab performed an MSA on JLab compliance to the same criteria. Results indicated that JLab is performing acceptably against the same criteria used at SLAC. The team identified the Safety Observation System currently in the process of implementation as a noteworthy practice. Improvement opportunities were noted and most coincide with results from the ISMS IA.

An MSA of Environmental aspects at JLab was performed. This assessment involved personnel from all JLab divisions. Implementation of improvements from previous initiatives and assessments resulted in no opportunities for improvement being noted.

Facilities performed a Property and Vehicle Balanced Scorecard MSA. The assessment found JLab in compliance to the plan.

QA/CI performed an Unreviewed Safety Issue Historical MSA which included personnel from Physics and Accelerator. The purpose was to review work done on the accelerator against the requirements in the draft Unreviewed Safety Issue Procedure (noted as an opportunity for improvement in the ISMS (part 1) IA. Safe operation and maintenance of the accelerator/Physics Halls within the ASE resulted in no safety issues with past work performed being found.

During FY 2007, six Independent Assessments (IA) were completed. These assessments involved personnel from six divisions and the Directorate. A brief description of each assessment appears below. An IA of the Jefferson Lab Integrated Safety Management System (provided by the Senior Safety Advisory Committee, SSAC) was performed. Twenty eight opportunities for improvement were found resulting in improvements to the ISMS PD, identification of needed procedures and improved awareness by JLab personnel of the PD. (Note: this assessment is filed in DocuShare in the FY 2006 Assessment file. This is an FY 2007 assessment and should be refilled.)

Two IAs were performed to assess compliance to various subparts (B, F and G) of 10 CFR 835. Participation by RadCon management and personnel included interviews and tours. These assessments indicated that RadCon is in compliance with the subparts assessed. Noted as a positive practice is the RadCon process for training personnel on procedure revisions and documenting the results.

An IA of JLab Accelerator Safety Order Implementation was performed by the SSAC. Outcomes from this assessment have resulted in planned improvements to the Final Safety Assessment Document and staff awareness, and the Unreviewed Safety Issue process. As discussed earlier, JLab is making improvements in these documents and processes.

(NOTE: this assessment replaced the ISMS (part 2) IA scheduled for the fourth quarter)

A Personal Property Management Program IA was performed. Noted practices included the fact that the Property Management Policy and Practices document is well written, and was delivered to TJSO ahead of schedule and the "Free Stock" program should be considered a best practice. Observations and recommendations provide minor opportunities for improvement in the process.

An additional IA was performed to evaluate compliance to 10 CFR 851 with respect to design and fabrication of pressure vessels. Specifically, the FEL SF6 tank design (technically not a pressure vessel due to working pressure) and fabrication were assessed by an expert in ASME Boiler and Pressure Vessel Code. Results indicated that the JLab process for pressure system design and fabrication meets 10 CFR 851 requirements. This IA was unscheduled and was performed to take advantage of the opportunity presented by the SF6 tank project.

More than two work observations per week on average were conducted for each major division (Accelerator, FEL, Physics, Engineering, and Facilities Management) during this period prior to SAD. During SAD, approximately 3 work observations per week were performed. A Labwide electronic work observation database was initiated in July 2007 with participation by all Lab divisions by September 30. Database beta testing was conducted during the fourth quarter FY2007. The Lab's work observation program continued to contribute to the continued development of a labwide safety culture. Evidence of this safety culture is that no JLab staff members had an FY07 recordable injury.

The electronic work observation database was extensively utilized by Physics and Engineering Divisions during the fourth quarter SAD period. Both divisions met the SAD period requirement of an average of

three weekly work observations as documented in the electronic work observation database. Physics and Engineering Divisions are the two Lab divisions that actually experience considerable SAD workload impacts. The SAD period has a limited impact on Accelerator Division activities in the Test Lab typically are mostly independent of the SAD Facilities and FEL Divisions met the average of two work observations recorded weekly during the fourth quarter. While work observations at the start of FY07 were documented in a combination of paper, Excel spreadsheet or other means across divisions, at the end of FY07 there was one common database for documenting these observations.

The safety warden training was revamped by a multi disciplinary team, and new training was provided to the lab safety wardens. Area inspections are ongoing by safety wardens with the assistance of safety professionals.

Accelerator Division assigned a full-time employee as the Division Safety Officer and created an Assistant position during this fiscal year.

### **Opportunities for Improvement**

DOE Midyear Feedback:

*1. The Lab is unable to document the participation of the Physics Division in meeting this goal, as only walkthrough schedules are being maintained by this group, and no details on work tasks reviewed or corresponding observations exist. The Facilities Management Division has ample DuPont STOP observation records to satisfy this metric, but these are not being maintained in DocuShare or equivalent system that allows transparency to the Site Office. 2. It is DOE's expectations that monitoring during Scheduled Accelerator Down (SAD) periods will be accounted for in the quarterly and final PEMP self assessments to satisfy the additional oversight observations (3X/week avg) during SADs. 3. The Lab's Corrective Action Plan issued in response to the 2005 SC Energized Electrical Review included labeling electrical panels to identify the approach boundaries and PPE for work inside. While this commitment was above and beyond the NFPA 70E requirements, it was nevertheless a corrective action commitment. The suspense date for completing this initiative continues to be delayed.*

### **Status:**

- 1. The lab has put in place a common work observation process including documentation of the observations. See above discussions.
- 2. Two divisions did not meet the stated quota by about eleven documented observations each across the entire fiscal year. This was a lack of documentation, not the actual lack of conducting the observations. Our safety performance this year, including an injury free SAD indicate proper attention to the conduct of work.
- 3. JLab has put significant effort into upgrading the electrical safety program, including the addition of an electrical safety engineer to lead the program. The electrical safety engineer has been actively engaged in reviewing field work, will deliver a Electrical AHJ Policy document by mid-November 2007, and is developing an inspection program and procedure for evaluating non-NRTL equipment equivalence. The EAHJ has conducted over 70 Work Observations/Inspections, has taught nine LOTO classes, and has been consulted over 20 times on electrical work.

DOE 3<sup>rd</sup> Quarter Feedback:

*1. Sufficient evidence has not been provided to demonstrate that the FEL and Physics have met the Measure, as records are not being maintained, or aspects evaluated don't demonstrate oversight of work in-progress as much as they are reviews of work spaces or pending tasks. 2. MSA and IA documents available on the Lab's ESH&Q website are 2006 efforts; therefore, there is no evidence to support the*

score claimed for this measure. The track record for the completion of MSA and IA for the FY thus far (against the schedule) should be provided.

**Status:**

- 1. The Safety Leadership Training presented the lab with an opportunity to consolidate work review programs and records. Previously, different organizations used different processes to conduct and document work observations. The process was somewhat non-uniform and the task of retrieving observations data was difficult. As of October 1, 2007, all line managers, supervisors, and senior managers are conducting work observations using a common computer-based tool to record information. More importantly, managers, supervisors, and senior managers are conducting work observations in a more uniform manner. This will make the analysis of the results and the selection of associated metrics easier and more meaningful.
- 2. FY07 information was inadvertently filed in FY06 folder, but is and has been available. The detailed schedule vs. completed MSAs and IAs is available by QACI.

FY06 Weakness: As noted in the FY06 DOE Performance Evaluation Report, the Blind Penetration/Dig Permit program was not timely incorporated into the EH&S Manual despite prompting by the Site Office. The refinement of the program by Facilities Management was impelled by lessons learned internally and externally and should have been instituted Lab-wide in a timely manner.

**Status:** In the first quarter, JSA completed and obtained approval for revisions to Chapter 3320 of the EH&S Manual to reflect the addition of the blind penetration/dig permit program, effective December 20, 2006. In addition, the Director’s Safety Council now conducts a monthly review of overdue CATS actions.

*It was also noted that there was a failure to issue event reports in a timely manner prohibiting the Lab from effectively sharing lessons learned. This was in reference to an investigation initiated by Facilities Management and the Accelerator Division following an incident on July 10, 2006 and the report was not formally issued until December.*

**Status:** As part of our causal analysis improvement, QA/CI assists line organizations with event investigation reports and associated causal analysis. This includes expediting the final report through the management review process. This assistance from QA/CI, coupled with management emphasis on reporting and investigating events, has resulted in prompt management notification of injuries, events, and near misses. Events and investigations results are also communicated to staff via a number of means including weekly electronic briefs, all staff e-mails, and on Applied Insight.

Measure 5.2.2 Requirement: Maintain an open reporting culture through an established employee concerns program, infusing management expectations in performance appraisals, conducting Director’s Safety Council and Worker Safety Committees, providing training, and rewarding performance.

Performance Level Achieved:

Performance Level	Grade	Score
Chief Scientist and COO to hold quarterly round table with randomly selected cross-section of staff to solicit feedback. Demonstrate use of positive recognition of good safety performance.	A	3.8

JSA Performance:

The Chief Scientist and Chief Operating Officer held at least two roundtable meetings each per quarter during the FY to solicit feedback. Examples include meetings with the FEL staff, workers on the Worker Safety Committee, Hall leaders, etc. In those meetings, the SC and COO provided positive reinforcement for current safety performance and encouraged continued safety awareness. They also answered general programmatic questions and solicited feedback on operational safety issues.

Multiple safety incentives and awards were utilized this period to include at least ten safety incentive awards of appreciation that were awarded by the COO. These monetary awards to staff members recognized their efforts to proactively improve safety at the Lab. Over 150 other impromptu safety recognition activities occurred by handing out safety cups, lanyards, jotters to staff to reinforce observed safe behavior.

The Worker Safety Committee held nine meetings during FY07; most including participation from the Associate Director for ESH&Q and/or the Chief Operating Officer. Committee topics included reviewing expanded Safety Warden training and potential Safety Warden recognition measures. Additional topics included suggestions for sidewalk improvements between ARC and VARC and traffic safety improvements around the counting house.

Lab managers were briefed on the Lab's safety strategy in December including accident trends, six strategy elements, and ISM. A follow-up presentation of trends and feedback was presented as part of the pre-SAD safety briefing in June, and to the Director's Safety Council. All safety subcommittees reported out at the Director's Safety Council at least once during the FY.

In FY07, an interdisciplinary team reviewed Safety Warden Training. The result was a number of changes to the training designed to improve/enhance Safety Warden effectiveness and bring the training up-to-date with respect to the WHSPP and other important issues. The training also introduced a number of web-based tools that provide a common interface for Safety Warden information and logging tools for area inspections. The Lab-wide safety warden training was conducted February 27<sup>th</sup> – 28<sup>th</sup>

JSA/TJSO conducted six safety focus meetings during this FY. Discussions include subcontractor oversight activities, various corrective action plans, and updates on assessment activities, and accelerator safety order improvement efforts. The meetings have been an important tool to keep both the lab and site office senior leadership abreast of various activities in the ESH&Q realm.

**Opportunities for Improvement**

## DOE Midyear Feedback:

*See comments on timeliness of reporting in 5.1.1. The information sharing during the FEL videoconference session was notable. It is DOE's expectation that a comprehensive Lessons Learned report on the FEL failed sweep incident will be submitted to the DOE website.*

**Status:** On December 1, 2006, an FEL control room operator discovered a subcontractor in the FEL laser lab post-sweep. This incident was reported as a SC-4 ORPS "near miss" event and Jefferson Lab was commended on the follow-up actions. Lessons learned from the December FEL sweep event were shared with Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), Fermi National Accelerator Laboratory (FNAL), Lawrence Berkeley National Laboratory (LBNL), and site office staff. Jefferson Lab and TJSO staff coordinated a January 25<sup>th</sup> laser safety benchmarking video conference. This lesson learned on an FEL inadequate sweep "near miss" was submitted to the HSS Office of Analysis for consideration as a DOE-wide lesson learned. The FEL sweep lesson learned was distributed

DOE-wide on June 15. The lesson learned was also provided to SC and is posted on the SC laser safety webpage. JLab has proactively provided input to the DOE-wide lessons learned system as demonstrated by the submittal, and DOEs use of two other TJNAF generated lessons learned; one involving bolometer safety and the other involving G&W switches.

Measure 5.2.3 Requirement: Contractor provided Worker Protection Program (WPP) submittal to TJSO by February 9, 2007 as required by 10CFR851.

Performance Level Achieved:

Performance Level	Grade	Score
Contractor provided WPP submittal to TJSO by February 9, 2007, as required by 10CFR851.	B+	3.4

JSA Performance:

JSA conducted a 10CFR851 gap analysis in preparation of the Worker Safety and Health Protection Program Plan (WSHPP). The Worker Health and Safety Plan and Gap Analysis (90%) for 10CFR851 were submitted to TJSO on December 21, 2006. In addition to JSA, the document was reviewed by the TJSO, ORO, the ESH manager at the Strategic Petroleum Reserve Operation and Perot Systems. The JSA approved WSHPP was provided to the TJSO on February 9<sup>th</sup> along with the completed gap analysis. The WSHPP was implemented May 25<sup>th</sup>.

ESH&Q staff attended the October 2006 EFCOG PAAA workshop where 10CFR851 interpretations and implementation were emphasized. ESH&Q staff participated in monthly 10CFR851 videoconferences to stay abreast of DOEs approach to some outstanding implementation issues, particularly surrounding pressure system safety. JLab submitted a Non-Compliance Tracking System (NTS) report for the pressure safety requirements of 10CFR851 that included an action plan to come in to full compliance. All actions to date have been completed as scheduled. The JLab Pressure Systems Committee, chaired by the Engineering Manager, has been instrumental in the progress made in improving the pressure systems program at JLab

DOE Midyear Feedback:

*The development and completion of the WSHPP was very well executed! This is supported by the timely submission of progressive draft documents for review, and the relatively low number of comments generated during these reviews*

DOE 3<sup>rd</sup> Quarter Feedback:

*Now that the plan has been submitted, presenting the progress to close the NTS action items would be prudent. → TJSO has been kept well informed of progress and all actions associated with this NTS report are in CATS as well.*

**Table 16. Objective 5.2 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>5.2 Provide Efficient and Effective Implementation of Integrated Safety, Health and Environment Management</b>					
5.2.1 100% of MSAs and IAs conducted, completed, reviewed, and accepted by ESH&Q Division.	B+	3.4	50%	1.70	
5.2.2 Maintain an open reporting culture through an established employee concerns program.	A	3.8	20%	0.76	
5.2.3 Contractor provided Worker Protection Program (WPP) submittal to TJSO by February 9, 2007 as required by 10CFR851.	B+	3.4	30%	1.02	
<b>Objective 5.2 Total</b>					3.48

**Objective 5.3 Provide Efficient and Effective Waste Management, Minimization, and Pollution Prevention**

Measure 5.3.1: Number of environmental incidents resulting in administrative or technical permit violations and that could have resulted from improper EMS implementation: 1 administrative, 0 technical permit violations. Apply causal analysis principals to environmental incidents if one occurs in this period. Note: Administrative and technical violations are those issued by the regulatory agency.

Performance Level Achieved:

Performance Level	Grade	Score
0 administrative, 0 technical permit violations, submit one pollution prevention award or environmental recognition application to a local, state or federal agency for environmental stewardship. Make progress toward meeting oil recycling goal in FY07. Implement one TIP in FY07.	A	4.0

JSA Performance:

In addition to meeting the B performance level criteria, the Lab also accomplished the A level criteria including: apply causal analysis principals to environmental incidents if one occurs in this period; and submit one DEQ/EPA award or recognition application for environmental stewardship.

During FY07, there were no environmental incidents that resulted in administrative or technical permit violations. However, there were three minor environmental incidents: a release of hot water from the heating system in the ARC building; a neutralization rinsewater sump overflow at Building 31; and a paint spill on Lawrence Drive. These minor incidents did not trigger any regulatory reporting

requirements and causal analysis principles were applied to each.

An ORPS report was submitted for the Hampton Roads Sanitation District (HRSD) Notice of Violation (NOV) that was received on December 1<sup>st</sup> as a result of the September 29<sup>th</sup> Test Lab release of untested cooling tower water to the Area D HRSD sampling point. Note - This minor NOV occurred during FY06 and was as result of a one time discharge that produced a low pH reading of 4.4 (permit requires discharges to be pH of 5.0 or higher). The low pH resulted from discharging water that included cooling tower water treatment chemicals in combination with a cooling tower system malfunction. Facilities Management conducted a causal analysis to prevent future problems. Corrective actions as a result of this event's causal analysis identified that pH sampling shall be conducted to ensure discharge is within permit limits whenever any special waste material or effluent release is discharged to the sanitary sewer or to the surface. This procedural change was implemented in October 2006. In addition, caustic treatment is now used in the cooling water so this failure can not be repeated.

SC recognized Jefferson Lab with one of four SC 2006 "Best in Class" pollution Prevention (P2) awards for cryogenic refrigeration improvements that reduces the utility requirements of a number of Lab facilities by as much as forty-five percent. This process, termed the "Ganni Cycle" is responsible for cost savings of \$1,000 per day in the Lab's Central Helium Liquifier. Furthermore, the Office of the Federal Environmental Executive (OFEE) awarded JLab a 2007 White House Closing the Circle (CTC) Award for this pollution prevention effort. The CTC Awards recognize outstanding achievements of Federal facilities and staff for efforts that resulted in significant contributions to environmental stewardship.

JLab made progress on the TIP (Target Implementation Plan) that includes the oil recycling goal of minimizing lubricating oil use and maximizing recycling of used oil. FY07 progress included reviewing quantities of oil recycled over past years and the start of recording quantities and departments turning in used oil. In addition, the Lab implemented an additional TIP in FY07 which was improvement to minimize chances of spills by eliminating the manual transfer of activated water from accelerator tunnel sumps. In a collaborative effort by Facilities & Logistics and the Radiation Control Department all accelerator sump contents are now plumbed to a central HRSD collection point via almost a mile of piping.

The ESH&Q Division (specifically Linda Even) was recognized for providing vital assistance to the TJSO in developing and finalizing the revised Environmental Assessment (EA) and associated approvals required under the National Environmental Protection Act (NEPA). As a result, the Site Office was able to meet the Department's NEPA commitments, allowing the 12 GeV Upgrade Project and associated facility upgrades to move forward in a timely manner.

JLab received an annual HRSD environmental permit compliance review on March 14<sup>th</sup> and no regulatory violations were noted.

In September 2007 the lab submitted an application to qualify as a participating member of the Virginia Environmental Excellence Program (VEEP). The VEEP, coordinated by the Department of Environmental Quality, encourages superior performance through environmental management systems and pollution prevention, and invites participation from organizations that impact the environment.

Actions to elevate two Environmental Scorecard elements from "C" to "D" were accomplished. The Lab made significant improvements to the two Scorecard elements of Environmental Training and Contracts. The Grade Change Documentation includes:

- Environmental Training – an update to SAF127A, Staff EMS awareness, was accomplished and a special EMS awareness program was prepared for provision to the nuclear physics users,

SAF127u, that had not received an EMS briefing earlier.

- Contracts – information in construction subcontracts includes restricting chemical purchases and reporting, as applicable, on quantities of items purchased that have recycled material content.

### Opportunities for Improvement

DOE Midyear Feedback:

*While not specifically itemized in this metric, information should be furnished on EMS actions and scorecard progress.*

#### Status:

As well as the improvements identified in Environmental Training and Contracts above, other scorecard elements received appropriate attention. Two items of note included that:

- The Lab reviewed its environmental aspects under an MSA, which was lead by ESH&Q, in FY07. This will enable the Lab to elevate to a D for that category.

The Lab maintained its D rating in another category by performing a Management Review documenting the EMS actions that had been accomplished, or were underway, under the EMS program in FY07. These included showing CATS completion performance, discussing the MSA Environmental Aspects Review results, and identifying recommendations to improve the EMS in the coming year.

DOE 3<sup>rd</sup> Quarter Feedback:

*A review of the Notable Event report generated from the acid neutralization building spill/overflow event 5-11-07 yields limited evidence that a thoughtful causal analysis review was conducted. If it was determined that sensors were procured and installed that were not suitable for the environment these sensor were to be used, probing the explanation of why those conditions existed and imposing corresponding mitigation steps would have been appropriate. The ultimate objective of performing a causal analysis review is to go beyond the immediate event and location as to intervene before the next mishap occurs for which common precursor conditions exist.*

**Status:** The causal analysis was performed by a trained staff member, and assisted by and accepted by QACI. The causal analysis, employing a graded approach, used Safety Systems Development Center technique. The procurement of an unsuitable sensor was a personnel error. A neutralization system upgrade has been planned as noted in the report, which includes a new control system to improve reliability. Proper probes and sensors are now installed in the system.

**FY06 Weakness:** *As noted in the FY06 DOE Performance Evaluation Report, sampling conducted in-house should have identified transient high phosphorus concentrations before they were identified by the HRSD.*

**Status:** The high phosphorus (P) concentrations are a byproduct of the Test Lab Acid Neutralization System (a system that creates a significant annual hazardous waste disposal saving). High occasional P concentrations had been previously noted by Lab staff. Controls, including periodic sampling for various HRSD parameters, were put into place. This action was only a moderate priority as P was not an HRSD permit parameter. Area supervision was already giving this matter appropriate attention. No other parameters of regulatory concern were identified during the previous sampling. Monthly P sampling started in late 2006, which is an appropriate P monitoring frequency, and is monitored by JLab personnel to note any trends. Again, P is not a permit compliance parameter.

**DOE 3<sup>rd</sup> Quarter Feedback:**

*For the first time in the Lab’s history, there were ground water results reported to the State regulator in this quarter above the limits of quantification for tritium. While there remains some discussion and uncertainty as to whether these numbers are real or artifact, the evaluation of this condition alone warrants mention by the Lab as an interim challenge.*

**Status:** The ground water analytical results for the 2nd quarter indicated that monitoring well GW-20 tritium values were “detectable” but below permit action levels. Detectable values are any readings above the Minimum Detection Level (MDL). This is the first time that a monitoring well has shown apparent tritium activity clearly above the MDL. Upon knowledge of the event, JSA informed TJSO of Lab actions surrounding the ongoing investigation into the results and kept the TJSO updated on further actions. Follow-up sampling was performed at the well, and none of the additional samples taken indicated positive results.

**Further actions:** The results from the follow up evaluation at GW-20 demonstrated that the tritium values at the noted monitoring well were reported correctly but that the Lab has reason to believe that the results were a false positive. This is based on the presence of other unusual water quality parameters at this well. This well has historically high values for parameters such as total dissolved solids and total suspended solids, and demonstrates a poor purge/recovery response. In addition, samples from the well sometimes display an oily sheen. These unusual factors could indicate the presence of organics, which could potentially cause false positive results for tritium. Further follow-up evaluation of the well has indicated high iron content. This condition puts the well at risk for certain biological agents which may also interfere with tritium analysis, if present. The Lab has hired a hydrogeologist to make corrective recommendations that could include replacing the well. JSA will continue to discuss all plans and recommendations with the TJSO.

**Table 17. Objective 5.3 Performance Rating Development**

<b>ELEMENT</b>	<b>Letter Grade</b>	<b>Numerical Score</b>	<b>Objective Weight</b>	<b>Total Points</b>	<b>Total Points</b>
<b>5.3 Provide Efficient and Effective Waste Management, Minimization, and Pollution Prevention</b>					
5.3.1 # of environmental incidents resulting in admin or technical permit violations and EMS Action Plan implementation.	A	4.0	100%	4.00	
<b>Objective 5.3 Total</b>					<b>4.00</b>

**Table 18. Goal 5.0 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>5.0 Sustain Excellence and Enhance Effectiveness of Integrated Safety, Health, and Environmental Protection</b>					
5.1 Provide a Work Environment that Protects Workers and the Environment	A-	3.80	45%	1.71	
5.2 Provide Efficient and Effective Implementation of Integrated Safety, Health and Environment Management	A-	3.48	45%	1.57	
5.3 Provide Efficient and Effective Waste Management, Minimization, and Pollution Prevention	A	4.00	10%	0.40	
<b>Performance Goal 5.0 Total</b>					<b>3.68</b>

**Table 19. Goal 5.0 Final Letter Grade**

Total Score	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
Final Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F

**Goal 6.0 Deliver Efficient, Effective, and Responsive Business Systems and Resources that Enable the Successful Achievement of the Laboratory Mission(s)**

Goal Requirement:

The Contractor sustains and enhances core business systems that provide efficient and effective support to Laboratory programs and its mission(s).

**Objective 6.1 Provide an Efficient, Effective, and Responsive Financial Management System(s)**

Measure 6.1.1 Requirement: Effectively track costs against budgets to ensure cost performance.

Performance Level Achieved:

Performance Level	Grade	Score
In addition to meeting expectations (B+), adhoc reports requested by the customer are responded to in a timely manner. Cost variance is less than or equal to 5% for organizational budgets and G&A and fringe pools. Monthly reports are used to increase employee and management awareness of financial management goals, expectations, and performance. Reports are utilized by managers to provide/exercise financial management control of Laboratory operations, direct and indirect costs, and to perform variance analysis.	A-	3.7

JSA Performance:

Targets were established to manage at continuing resolution levels while minimizing the impact to performance. At the end of FY07, JSA managed the \$126.7M budget with a cost variance less than 5% for organizational budgets. The G&A and fringe pool targets have remained fixed since October and the year end variance was less than 1%. Daily variance analysis was performed at the WBS level and is available on the web to all budget staff and Lab management. Performing daily variance analysis allows the Budget Office to control cost and commitment overruns. No cost or commitments exceeded funding for the control level provided in the monthly DOE financial plan. Carryover afforded payroll protection for continuing resolution delay for initial 30 days as well. In addition, monthly estimates at completion are provided to Lab management for review and analysis to ensure that they are kept apprised of financial management goals, expectations, and the overall financial performance of the Lab. Each Division has a budget analyst assigned to oversee the daily review of actual costs versus budget and to provide the Division head a monthly financial report. Managers at various levels of the Lab also have access to numerous web reports that are updated daily providing the latest data on budgets, actual costs, commitments, and pending costs. During the funds control review last year, the ORO reviewers were impressed that the Lab managers were able to see daily activity on their projects and organizations. Lab management is apprised of any direct or indirect cost variances that need to be addressed. In addition, the Budget Office provides the Site Office Manager monthly graphs with actual vs. budget and plans for our major program funding.

The CFO accounting and budget offices provided all requested and required reports to DOE and deadlines were met on all submittals. These official and adhoc reports are accurate, timely, and complete and are in accordance with the requirements for key activities/deliverables specified in the FY07 PEMP. This includes responses to DOE requests regarding Continuing Resolution funding that were provided on October 5<sup>th</sup>, November 2<sup>nd</sup> and 15<sup>th</sup>, December 8<sup>th</sup> and 11<sup>th</sup>. A funding impact response was also sent to Ray Orbach as requested in a timely manner. Examples of additional ad hoc reports that were responded to during this fiscal year include:

- IT information data call (October – Office of Science)
- AIP and Capital spending plans (December – Office of Science)
- TJNAF Facility Upgrades and Instrumentation Projects (February – Office of Science)
- TJNAF FY06 WFO BA for Lab Business Plan Submission (February – Office of Science)
- Defined Benefit Pension and Post Retirement Benefit Data (February – ORO)
- HEWD Ad Hoc Requesting FY06 Headcount and FY06 Cost for State, Local and Tribal Units of Government (February – Congressional Request Received from ORO)
- FY06 through FY08 Overhead Comparison (March – DOE Site Office Manager)
- FY2009 OMB Exhibit 300 (June – ORO)
- Revised Call for FY 2008 Reimbursable Work Obligational Authority Estimates - Other Defense Activities (September – ORO)
- FY07 Projected Uncosted Balance Report (September – ORO)
- FY08 Mandatory Funding Report (September – ORO)
- Financial Management Attestation in June 2007
- Deferred Maintenance Reporting Requirements for Personal Property for FY 07 as requested by the Site Manager on September 6, 2007
- The FY 2007 Management Representation Letter to the ORO Site Manager, dated September 27, 2007, as requested by the TJSO Site Manager on August 9, 2007.

LABWIDE B&R STATUS THROUGH SEPTEMBER 2007

	BUDGET	TOTAL COSTS	OPEN COMMITS	TOTAL SPENDING + PROJECTED SPENDING	REMAINING BUDGET	% OF BUDGET SPENT
12 GeV Construction (39KB)	\$6,648,786	\$5,538,637	\$595,280	\$6,133,917	\$514,869	92.3%
Plant Acquisition & Construction (39KG)	\$43,695	\$19,989	\$0	\$19,989	\$23,706	45.7%
FEL (40)	\$8,000,660	\$6,072,232	\$928,482	\$7,000,714	\$999,946	87.5%
WFO (60)	\$578,201	\$496,188	\$3,920	\$500,107	\$78,094	86.5%
CRADA (65)	\$241,952	\$95,810	\$6,000	\$101,810	\$140,142	42.1%
S&S (FS10)	\$1,371,814	\$1,144,151	\$187,214	\$1,331,366	\$40,448	97.1%
Indirect	\$26,701,467	\$23,499,661	\$1,498,039	\$24,997,699	\$1,703,768	93.6%
High Energy Physics (KA)	\$1,925,687	\$1,307,426	\$131,016	\$1,438,442	\$487,245	74.7%
Nuclear Physics (KB)	\$73,587,813	\$62,697,978	\$5,939,770	\$68,637,749	\$4,950,064	93.3%
inventory & spares	\$6,395,000	\$6,205,063	\$8,786	\$6,213,849	\$181,151	97.2%
Science Laboratories Infrastructure (KG)	\$102,649	\$67,849	\$7,747	\$75,596	\$27,053	73.6%
Advanced Scientific Computing Research (KJ)	\$120,951	\$34,558	\$2,915	\$37,473	\$83,478	31.0%
Workforce Development for Teachers & Scientists (KL)	\$372,721	\$278,927	\$0	\$278,927	\$93,794	74.8%
Biological & Environmental Research (KP)	\$496,868	\$299,333	\$92,423	\$391,756	\$105,112	78.8%
SNS (YN)	\$113,347	\$41,678	\$0	\$41,678	\$71,669	36.8%
<b>TOTAL</b>	<b>\$126,701,611</b>	<b>\$107,799,480</b>	<b>\$9,401,592</b>	<b>\$117,201,072</b>	<b>\$9,500,539</b>	<b>92.5%</b>

**Opportunities for Improvement**

DOE Midyear Feedback:

*The JSA self-assessment narrative did not provide a compelling case for the grade assigned. For example, table provided shows organizational budgets with variances greater than 5%. While there was progress with implementing the FY07 AWP cycle, it was stopped to begin work on FY08 AWP.*

**Status:** Through the daily variance analysis, the budget office is able to control cost and commitment overruns and we have not had any cost and commitments that have exceeded funding for the control level provided to us in our monthly DOE financial plan. The small variances in direct and indirect costs combined with the fact that we did not exceed any funding types, demonstrates the Lab’s efforts to maximize the use of available funds to the benefit of the Lab. In addition, the FY07 AWP cycle actually transformed into the FY08 AWP cycle and was extremely valuable from a Project Manager training standpoint. It was considered more effective to roll it forward and continue it through completion in FY08 and it resulted in full completion of the FY08 AWP Work Plans.

Measure 6.1.2 Requirement: Demonstrate an effective financial management system through accurate, timely and complete financial reports to DOE, external reviews, internal and external audits, and self-assessments.

Performance Level Achieved:

Performance Level	Grade	Score
<p>JSA Board of Directors Finance Committee develops overarching guidance for the audit plan. Utilize expertise from SURA Universities’ accounting and finance departments and/or CSC expertise to perform one review. Accurate, timely and complete financial reports are provided to DOE in accordance with Departmental requirements for key activities/deliverable including accelerated financial statement reporting and other financial data calls. No material/major findings as defined in DOE Order 413.1A Attachment 2 and no unallowable cost findings for internal/external audit reviews. There are no repeat audit findings identified in any external reviews where contractor had received notification of the finding and had reasonable opportunity to implement corrective actions. Demonstrates improvement to financial system through self-assessment process which takes into account recommendations from internal and external reviews as well as self-identified improvements.</p>	A-	3.5

JSA Performance:

JLab’s funding was constrained during this period due to a continuing resolution. The FY07 budget was not released until February 2007 and during the interim, the Lab received only 1/12th of its FY06 funding per month for FY07 operating expenses through March 2007. Not only was this a difficult year in terms of budget execution, it was also the most difficult year in terms of preparations for the annual budget submission and the annual Kovar Budget Briefing held in Germantown. Without a FY2007 budget or FY2008 target budget, it was extremely challenging for the Lab to prepare a budget submission for FY2009 through FY2013. Despite these challenges, we were able to prepare and submit the FY2009 budget materials on time and were successful in putting together the materials requested for the NP Annual Budget Briefing on March 1st. Dennis Kovar commented that the presentation was the best he had seen from JLab and probably the best he had seen from any Lab. He also noted that the Lab had done an excellent job on the budget spreadsheets. JLab now has in place a budget process and model for future use and to continue exceeding expectations in this area.

An IG audit was conducted in the CFO office March 3<sup>rd</sup> and an IG cost audit was conducted March 15<sup>th</sup>. In preparation for the Financial Management System Baseline Review, JSA conducted a Management Self Assessment. A CRAD was developed using the criteria provided by the review team and as documented in O 413.1A. The Self assessment ran for a period of a month in advance of the review and involved resources from business disciplines across JSA. The teams meet weekly and provide status on their internal reviews and updates, their CRAD sheets or other supporting documentation to ensure that systems were adequate. In so doing, JSA determined that policies and procedures were an area, while extensively documents, could be improved and streamlined for enhanced operations. The ORO Financial Management System Baseline Review Team later comments on this determination and reiterated the JSA MSA internal determination in their out briefing.

Subsequently, the Financial Management System Baseline Review was held June 11<sup>th</sup> – 15<sup>th</sup> and successfully completed. Noteworthy findings included the competency of staff and controls; no material weaknesses were identified; no repeat audit findings were identified; closed out past funds control action; opportunity in two areas to improve documentation.

JLab has been coordinating with the JSA Board of Directors Finance Committee to develop Overarching

Audit Plan guidance. In addition to SURA efforts to coordinate with the JSA Member regarding internal audit requirements the CFO and Business Manager independently coordinated with the CSC ATD member of the company to ensure that internal audit plans were reviewed by the members, comments provided were incorporated and that plans were approved accordingly. The JSA CFO and Business Operation Manager, worked directly with the CSC ATD, CFO to ensure that this coordination was effective.

**Opportunities for Improvement**

DOE Midyear Feedback:

*The JSA self-assessment narrative did not provide a compelling case for the performance level assigned. The narrative does not address the requirements of the meets expectations performance level, i.e. JSA Board of Directors Finance Committee develops overarching guidance for audit plan.*

**Status:** In determining the grade assigned we should consider the performance criteria that TJSO/DOE agreed to in the PEMP. The JSA Board of Directors Finance Committee develops overarching guidance for the audit plan is part of the measure articulated in the plan. To follow-up on this statement, we should advise that the Committee is active. It is working matters with JSA Internal Audit the Members as it is chartered. JSA Internal Audit has developed and recently provided its Preliminary FY08 Jefferson Lab Internal Audit Plan to the JSA Finance and Audit Committee COO, CFO, and others in direction relation to this requirement for the JSA Board of Directors Finance Committee to comment and ensure overarching guidance for audit planning is achieved. The Plan is to be the outcome of a critical risk assessment process driven by careful consideration of JSA and JLab operations, business risks and opportunities. Focus areas of the plan include Property Management, Fraud Prevention and Awareness, Contract Requirements Management, Transaction Testing FY2008, and Follow-up Reviews FY2007.

Measure 6.1.3 Requirement: Financial attestations accurately reflect the status of internal controls and are provided in a timely manner.

Performance Level Achieved:

Performance Level	Grade	Score
In addition to meeting the requirements for B+, meet all requirements for OMB Circular A-123 Appendix A within DOE timelines identified.	A-	3.5

JSA Performance:

Internal controls over financial reporting, including safeguarding of assets and compliance with applicable laws and regulations, were evaluated and tested utilizing the guidance provided by the DOE OMB A-123 Project Management Team. Based on the results of the Internal Control Evaluation submitted August 17<sup>th</sup>, a Final Assurance Statement was submitted to the TJSO indicating that the Lab’s internal controls over financial reporting worked effectively, with no material weaknesses identified in the design or operation of the specific controls over financial reporting evaluated. The FY07 scope consisted of all remaining High Risk Activities, as well as Medium and Low Risk Activities as defined in the A-123 Assessment and Reporting Tool (AART). The assurance statement included consideration of entity controls, which help ensure accurate and timely financial reporting, and consideration of the results of previous tests of controls.

In addition to the Final Assurance Statement, the following deliverables were also submitted as scheduled: the Report on Review of Prior Year High-Risk Activities – 11/22/06, the Updated Site Implementation Plan – 12/1/06, the 1st Quarterly A-123 Report – 12/29/06, the 2<sup>nd</sup> Quarterly A-123 Report – 3/30/07, the 3<sup>rd</sup> Quarterly A-123 Report – 6/29/07, Complete Testing – 7/13/07, and the Preliminary Assurance Statement on Adequacy of Internal Controls Over Financial Reporting – 7/13/07. Feedback on the Financial System Baseline Assessment and the review on the A-123 reviews were positive in both instances.

The ORO Financial Assessment Division provided initial inputs at the Financial Management System Baseline Review out briefing that concluded that JSA FMS was adequate to record events accurately and to provide complete, timely, reliable, and consistent financial information within each of the major event cycles. JSA was in compliance with DOE guidance and contractual requirements in the majority of the event cycles.

Internal controls were adequate to properly record financial related activities and to protect assets from theft and misuse. JSA has incorporated appropriate levels of approval for financial data, purchasing, and recording entries. Organizational and systematic controls were in place, as well as segregation of duties to safeguard financial data.

The review team noted several notable accomplishments, citing JSA has implemented several new systems for improving the legacy FMS since its contract award. The new systems are a project-based Work Breakdown Structure, an Automated Annual Work Plan, Maximo Work Order System (requisition system), InSight Information Interface (on-line financial dashboard reporting system), and an Automated Quality Information System. These systems add levels of details for recording financial data and improving control over expenditure of funds.

There were observations noted providing room for improvement in formalizing policies and procedures. The Review also pointed out the need for an automated funds control feature in our systems. This feature, in coordination with our IT department was implemented prior to the conclusion of the Baseline review. The Review Team also recommended action toward implementing systemic improvements to maximize the use of the electronic funds transfers, capitalize assets.

The Oak Ridge Office (ORO) completed its review of the Jefferson Science Associates, LLC (JSA) fiscal year (FY) 2007 compliance with the Office of Management and Budget Circular A-123, Appendix A requirements. ORO took no exception to the results of our internal control assessment. They noted improvements in the documentation of control process narratives. This was an area cited as needing improvement in the FY 2006 review

However, ORO's review indicated JSA's consistency and format of documentation of test plans was not completely consistent with Departmental of Energy Chief Financial Officer Quick Start Guide 4 – Testing guidelines. Their review indicated JSA assumed a summary test plan description contained in its A-123 Assessment and Reporting Tool (AART) was sufficient, and the universe, sample size, and acceptable error threshold for tests where sampling was performed was not always documented including disclosure that sampling may not be appropriate due to the nature of controls being tested. Deficiencies noted were discussed with Mr. Tom Reed ORO Financial Services Center to understand and will work toward ensuring that future submissions will be substantially consistent with the Chief Financial Officer Quick Start Guide 4 – Testing.

JSA also provided a timely response to the Office of Financial Policy confirming that the Lab will be in full compliance with DOE's Departmental Property Accounting Policies in FY08.

**Table 20. Objective 6.1 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>6.1 Provide an Efficient, Effective, and Responsive Financial Management System</b>					
6.1.1 Effectively track costs against budgets to ensure cost performance.	A-	3.7	35%	1.30	
6.1.2 Demonstrate effective financial management system through accurate, timely and complete financial reports.	A-	3.5	35%	1.23	
6.1.3 Financial attestations accurately reflect status of internal controls and are provided in a timely manner.	A-	3.5	30%	1.05	
<b>Objective 6.1 Total</b>					<b>3.58</b>

**Objective 6.2 Provide an Efficient, Effective, and Responsive Acquisition and Property Management System(s)**

Measure 6.2.1 Requirement: Demonstrate efficacy of the acquisition system through outstanding results on annual performance measures (Procurement Balanced Scorecard) that cover critical aspects of the procurement process.

Additional credit for exceptional performance in areas outside the balanced scorecard purview may be given (i.e., system enhancements, improvements in procedures and practices, implementation of new programs, etc.)

Performance Level Achieved:

Performance Level	Grade	Score
Achieve Procurement Balanced Scorecard Total Score $\geq$ 92 (“Outstanding”)	A-	3.5

JSA Performance:

The efficacy of the acquisition system was assessed in accordance with the Lab’s FY07 Procurement Balanced Scorecard Plan dated October 20, 2006 which utilizes DOE’s FY07 Core Performance Measures as the basis of the assessment. The targets are based on National Targets issued by DOE’s Office of Procurement Assistance Management where available or they were negotiated with the TJSO. Although the final report will not be issued until November 15, 2007, as indicated in the summary below interim scorecard results of 94 out of 100 points indicate that Procurement is on track for receiving an “Outstanding” rating in business operations.

<b>Summary of FY 2007 Planned BSC Objectives and Measures</b>		
OBJECTIVES	PTS	JSA PERFORMANCE
CP-1 Customer Satisfaction	25.0	25.0
IP-1 Effective Internal Controls	18.0	14.0
IP-2 Effective Supplier Management	3.0	3.0
IP-3 Effective Competition	2.5	2.5
IP-4 Effective Utilization of Alternate Procurement Approaches	7.5	7.5
IP-5 Acquisition Process	9.0	9.0
IP-6 Corporate Citizenship	15.0	15.0
LG-1 Employee Satisfaction with Work Environment	5.0	4.0
LG-2 Employee Alignment with Mission & Lab Culture	10.0	10.0
FP-1 Optimum Cost Efficiency of Purchasing Operations	5.0	4.0
<b>TOTAL</b>	<b>100.00</b>	<b>94.0</b>

<b>92 to 100 Points</b>	<b>Outstanding</b>
<b>82 to 91 Points</b>	<b>Excellent</b>
<b>72 to 81 Points</b>	<b>Good</b>
<b>62 to 71 Points</b>	<b>Fair</b>
<b>52 to 61 Points</b>	<b>Poor</b>
<b>&lt;52 Points</b>	<b>Fail</b>

Several new processes were implemented during this performance reporting period. JLab’s Business Services is participating in a program initiated by ORNL that involves selling excess items on eBay. The FED BID OPS is a streamlined procurement process to electronically procure goods and services via reverse auctioning. This process greatly enhances the Lab’s ability to contract with small business concerns as well as to promote competition. Projected cost savings is \$60,000 annually.

A new process to purchase temporary contract labor that provides front end coordination and review by HR was implemented. This process reduces Lab costs by ensuring proposed salary ranges are reasonable and consistent with comparable JLab staff and aids management implementation of Lab’s staffing plan.

The Maximo requisition system was enhanced and now allows Hall Leaders to quickly identify status of their active purchase requisitions. It also enables all Lab staff to track the status of open purchase requisitions, including approval status, through award of the resulting purchase order/subcontract.

JLab received DOE approval of the Lab’s new Acquisition Policy Manual (APM) and provided an access link to the APM on the Lab’s website. In addition, a Procurement Operations Manual (procedures manual) was established that separates Procurement Policy from Procedures and is organized based on the Federal Acquisition Regulations (FAR) sections to facilitate location and interpretation of key procurement issues and processes. A further advantage is that Procurement can more readily update procedures without having to send the policy to DOE for review.

Procurement has been working very closely with the 12 GeV Project Team to ensure Project readiness for CD2 expected in December. Procurement recently completed and submitted a Master Acquisition Plan to DOE for review and approval that will be used as the key planning tool to process major procurements for the Project.

Procurement established liaison responsibility/assignments with Experimental Hall leaders to assist procurement planning and execution of procurement requirements. This has helped to improve communication between the Hall Leaders and the project, particularly to expedite and facilitate more complex procurement requirements. Also, we streamlined the procurement approval process for ADP hardware by implementing on-line approval/coordination with the CIO. This speeds the acquisition of computer hardware as Procurement personnel no longer have to suspense procurements waiting for CIO approval.

Upgraded the webstock system (Ecommerce) to speed the vendor catalog download process by the buyer. The new process down loads catalogs within a 2 hour time frame, whereas the old process took from one to five days. In addition, made other improvement that allows Procurement to readily identify delinquent orders that need to be expedited with the vendor.

Measure 6.2.2 Requirement: Effectiveness of JSA’s Small Business Program Outreach- Small Business Program Goal Achievement.

Additional credit for exceptional performance in areas outside the balanced scorecard purview may be given (i.e., system enhancements, improvements in procedures and practices, implementation of new programs, etc.)

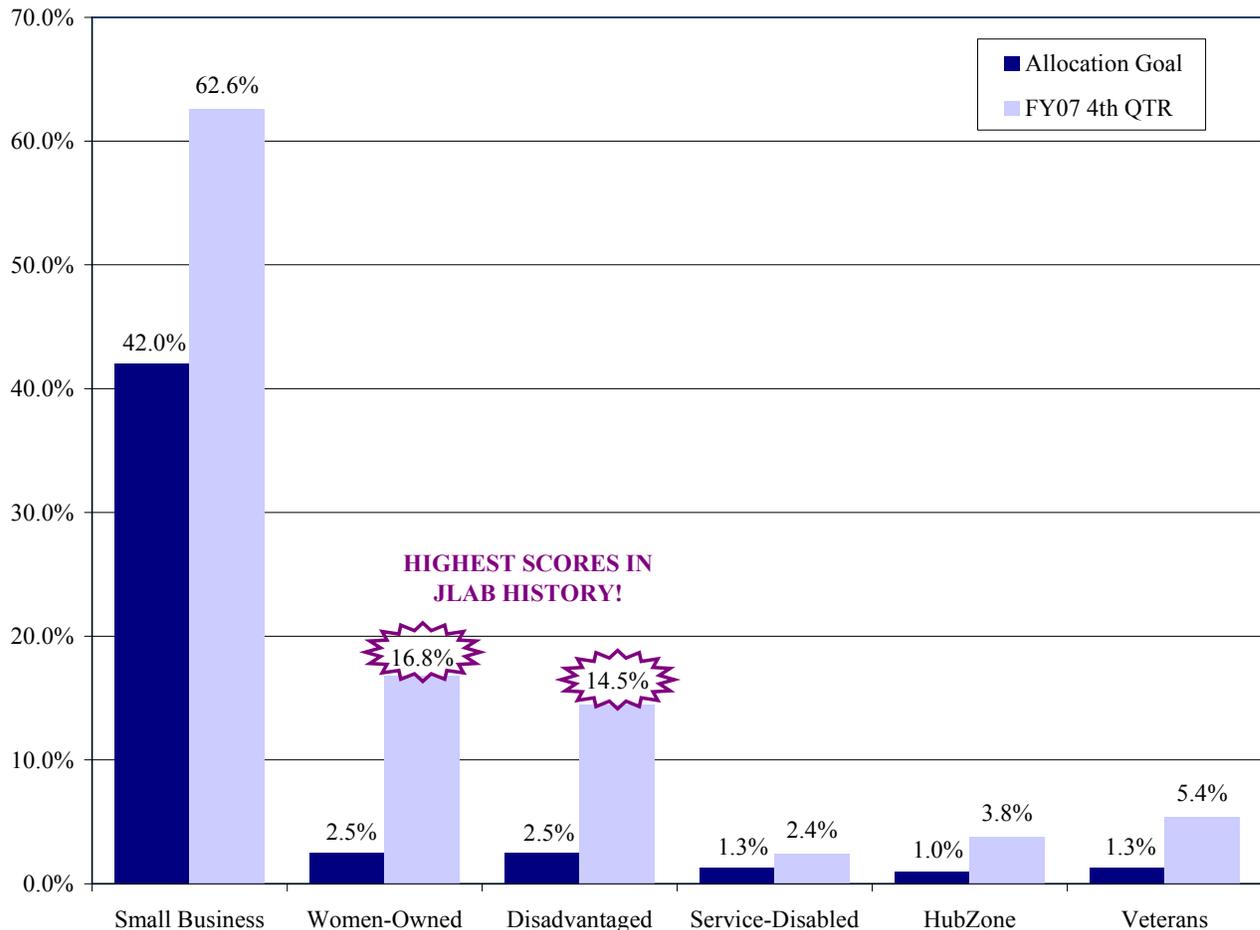
Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Exceed all Small Business Goals established in JSA’s Annual Small Business Plan and have two Protégé Mentor agreements in place by 09/30/07.	A+	4.2

JSA Performance:

The Small Business Department continues to have excellent results, exceeding all FY07 goals. Note that in the FY2008 Small Business Subcontracting Plan submitted August 17<sup>th</sup>, the Lab has increased, in some cases doubling, all goals as compared to our FY2007 goals.

Three companies were identified as viable candidates for the Mentor Protégé program and two were selected to participate, exceeding the A+ performance level requirement. Mentor Protégé agreements were signed with JLWS Enterprises, Inc. (Office Supplies/Remanufactured Toner Cartridges) and TechnoGeneral Services Company (Quality Assurance, Management & Environmental Consulting Services). Official approval was received from DOE Headquarters (Office of Economic Impact and Diversity) effective February 2, 2007. Progress reports submitted August 3<sup>rd</sup> and August 10<sup>th</sup> indicate that the program is very successful and the companies are eager to learn about the mission of the Laboratory as well as future needs of DOE to be in a position to offer valuable services throughout the DOE family. In addition, JLWS Enterprises, Inc was awarded a contract to operate the Laboratory’s technical stockroom which was formerly accomplished in-house. On September 17<sup>th</sup>, JLWS officially took over the operation of the technical stock room.



JSA's Small Business Manager, along with both Mentor Protégés, attended the Virginia Minority Supplier Development Council (VMSDC) trade fair and the DOE Small Business Conference and Trade Fair in Washington, D.C. JSA had a corporate booth at the DOE Trade Fair occupied by the Small Business Manager, and both Mentor Protégés. Marketing of both Mentor Protégés to other Laboratory contractors was extensively accomplished during this conference with several key leads for both. In addition, JSA received the VMSDC "Chairman's Challenge Award" for JSA's Small Business Program Manager's work on their Executive Board of Directors.

JSA's Small Business Advocacy Team, established to recognize the Lab's outstanding small business companies, presented our annual Outstanding Small Business Award to JR Precision Machine Service in March 2007. J. R. Precision provides services for Fabrication Planning in Accelerator Engineering, the Machine Shop, and the Physics Division Target Group and has been extremely important to the end result of many of the targets installed in JLab's three end stations.

JSA hosted an e-commerce vendor fair on September 13<sup>th</sup> for Lab employees to get better acquainted with what is available on the e-commerce system. Small business partnering was highlighted during this vendor fair where approximately 19 vendors displayed their goods and services.

Measure 6.2.3 Requirement: Demonstrate efficacy of the property management system through outstanding results on annual performance measures that cover critical aspects of JLab’s personal property management.

Additional credit for exceptional performance in areas outside the balanced scorecard purview may be given (i.e., system enhancements, improvements in procedures and practices, implementation of new programs, etc.)

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Annual Property Balanced Composite Score is less than 96 points but greater than or equal to 93 points.	B+	3.4

JSA Performance:

JLab’s Annual Property Balanced Composite Score is 99.14%.

Facilities Management (Property Management) conducted a third party external vulnerability assessment which resulted in the Lab’s Property Management Program being substantially revised with procedures put in place to include more stringent controls. Several problems in reference to the use and protection of government property had been noted and the revisions were designed to strengthen internal controls and increase management involvement in and visibility of the system operation.

During the second quarter performance reporting period, all JLab property custodians were required to complete an annual validation of all sensitive items and any equipment valued at \$5000 (or greater) assigned to them and “Guidelines for Better Property Management” were issued to all staff.

The “independent of the Personnel Property Program’ generated 19 action items most are administrative in nature all have been logged into CATS for tracking. Vulnerability assessment was conducted by Gregg Protective Services in December 2006 as detailed in letter to DOE date 11 Sep 2007. Noted in letter to DOE (1) both inbound and out bound vehicles will be inspected as a deterrent to theft and pilferage of government property (2) new policy is being put in place prohibiting transportation of tools and equipment in personnel vehicles (3) internal audit conducted by JSA of Scrap metal/recyclable materials. The policy for implementing items 1 and 2 is awaiting final approval from the Leadership Council. Item 3 was completed and higher dollar pilferable scrap metals are being stored in locked areas.

New policies and practices that have been put in place to strengthen management and control of government property include:

1. Commodity managers assigned to review and approve purchase of various types of material and property most notable TOOLS
2. All custodians required to annually validate assigned property
3. Security guard activity has been modified to increase “security presence” to act as deterrent
4. Annual security awareness briefing was updated to reinforce employee property protection and reporting responsibilities
5. Informed staff of new JLab Fraud, Waste and Abuse reporting telephone number
6. Marking new tools as processed by S&R

Jefferson Lab is participating in a program advocated by ORO that involves disposal of excess DOE material by selling surplus government and Lab property on EBAY. JLab completed its first eBay auction ending the week of March 19<sup>th</sup>. Twenty-seven used bicycles were sold and all proceeds were applied against the cost of running the property program. This was completed with the assistance of the Oak Ridge Property Office under a Basis Ordering Agreement established by Savannah River for DOE. Total sales for FY07 were \$1,980. The current process is quite cumbersome. JLab is working to bring this function in house in FY08.

In response to the Department of Energy's mandated program to eliminate Unneeded Material and Chemicals at various DOE facilities by the year 2011, the Lab collected commodities that do not have a planned use within the next 12 months and made them available for use elsewhere on the site. The material was placed in Free Stock and checked prior to purchasing additional material. To date, \$14,000 has been reissued from what we have entered into the database.

Other accomplishments in property management during this period include:

- Property pending excess EADS/FEDS/SALES acquisition value: \$2,050,690
- Helios (\$29M) screened through EADS/FEDS (was not picked up). The two Linac units, associated waveguides and control/power racks requested by LSU's Center for Microstructures and Devices. Beam line ion pumps transferred to Jefferson Lab FEL. Helios will be cannibalized for parts and disposed at public sale or scrap as directed by DOE.
- Completed transfers to other agencies: \$339,679
- Reutilized property in-house \$151,096
- Scrap ADPE - 29,067lbs (36 pallets)
- Scrap Metal - 68,720 lbs
- Completed 18 reporting requirements as scheduled
- Thirteen property related All Staff Memo's, On Target Articles or Weekly Highlight Notices published during FY 07.

New technical stockroom changes will significantly reduce the cost of maintaining a just-in-case inventory while at the same time guaranteeing rapid turn-around of material requests. The goal is to draw down the "un-expensed" inventory and move to 100% commercial supply chain. The combination of proper work planning, E-commerce procurement, expedited material deliveries and the move to a consigned inventory should result in improved supply chain management and responsiveness. In September 2007, a subcontract was awarded to JLWS to manage the technical stockroom. To date, the majority of their business has been through e-commerce. The existing technical stockroom will close in FY08.

### **Opportunities for Improvement**

*FY06 Weakness: As a result of the contract transition, and the implementation of a new DOE Property Management Program under DOE Order 580.1, the Laboratory's Property Management System has been substantially revised. The revised system is currently being reviewed for approval and is thus in a state of flux. A number of problems in the proper use and protection of government property have been noted over the course of the past 12 to 18 months. The revisions made to the Property Management System are designed to strengthen internal controls and increase management involvement in and visibility of the system operation. The Site Office anticipates that organizational changes by the new M&O Contractor, coupled with the revisions to the Property Management System, will improve accountability within the system and assure compliance with the DOE Personal Property Program requirements.*

**Status:** 1) The revised JSA Property Policy and Procedures were provided to the TJSO in late September 2006. JSA has been following the revised procedure's guidance since that time. 2) TJSO comments on the revised JSA property document were received in December 2006 and JSA staff has been discussing proposed changes with TJSO staff. The revised JSA Property Policies and Procedures have not to date been approved. Note - this activity is determined to be a continuous improvement activity. 3) Frequent all staff communications have improved awareness of property requirements. 4) A CRAD approach was developed for a Property Management Independent Assessment (IA). 5) A Property Management IA was scheduled and completed in late FY07 and all 19 items were logged into CATS, 9 of these items have already been completed.

**Table 21. Objective 6.2 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>6.2 Provide an Efficient, and Responsive Acquisition and Property Management System</b>					
6.2.1 Demo efficacy of acquisition system by outstanding results on annual Procurement Balanced Scorecard.	A-	3.5	45%	1.58	
6.2.2 Effectiveness of JSA's Small Business Program Outreach/Goal Achievement.	A+	4.2	15%	0.63	
6.2.3 Demonstrate efficacy of property management system through outstanding results on annual performance measures.	B+	3.9	40%	1.56	
<b>Objective 6.2 Total</b>					<b>3.77</b>

**Objective 6.3 Provide an Efficient, Effective & Responsive Human Resources Management System**

Measure 6.3.1 Requirement: Balanced Score Card Results Based on the Following:

A. Measure 1-Diversity- Protected Class Representation: Representation of protected classes (PC) within each EEO-1 category at the end of the fiscal year compared to the beginning of the fiscal year (adjusted for voluntary separations).

Scoring:

$$\text{PC Assessment Factor} = \frac{\% \text{ of PC to total workforce at the end of FY within each EEO-1 category}}{\% \text{ of PC to total workforce at the beginning of FY within each EEO-1 category}}$$

where:

- Total Workforce = Total number of regular and term employees (excludes casuals, temps, and students)
- EEO-1 Category = Occupational job categories as defined by EEOC (N=10)
- Protected Classes (PC) = Women and minorities as defined by EEOC (N = 20): 2PC \* 10 EEO-1 CATEGORIES

Note: EEO-1 categories where Utilization percentages meet or exceed 80% of availability percentages are determined to be fully in compliance with this metric.

B. Measure 2- Benefits - Premium Increases vs. the Market: Three-year rolling average of annual increases in medical insurance premium cost relative to market.

Scoring: Difference in the Laboratory’s percent increase in medical insurance premium compared to the market trend percent increase in medical insurance premiums averaged over three years.

C. Measure 3- Compensation - Alignment with the Market: Achieve compensation positions aligned with market practices to reflect the Laboratory’s mid-market compensation philosophy.

Scoring:

$$\text{Compensation Factor} = \frac{\sum (\text{weighted average salary within each classification})}{\sum (\text{weighted salary range midpoint* within each classification})}$$

\*Assumes salary range midpoints reflect mid-market position

D. Measure 4- Retention of Talent- Attrition rate of Top Performers.

Scoring: Percentage of top performers (employees who receive the top two performance ratings) who voluntarily separate from the Laboratory

Note: Excludes involuntary terminations due to funding issues, restructuring or contractor turnover. Excludes voluntary terminations due to retirement, or participation in a voluntary separation program or early retirement program.

E. Measure 5- Internal Business Practices- Annual Review of Policies/Procedures.

Scoring: Number of policies/processes reviewed for Fiscal Year 2007.

F. Measure 6 – Timely reporting to DOE

Reports:

Report of Contractor Expenditures for Employee Supplementary Compensation (3/15)

Report of Compensation Parts I & II (4/15, 10/15)

Contractor Salary – Wage Increase Expenditure Report (11/15)

Annual Affirmative Action Plan (1/31)

Baseline Employment Data (1/15, 7/15)

Report of Contractor Employment (1/15, 4/15, 7/15, 10/15)

Postretirement Benefits Other than Pensions (June, exact date varies)

Any Additional Reporting Required by DOE

Scoring: Reports submitted by due date.

Note: Jefferson Laboratory may be given additional credit for exceptional performance in areas outside the balanced scorecard purview (i.e., system enhancements, improvements in procedures practices, implementation of new programs).

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
In addition to meeting the requirements for B+, 6 of 6 BSC Measures Meet Target	A-	3.5

JSA Performance:

During this period, the Human Resources team has worked to meet all contractual requirements set forth. Below is a summary of the progress made.

- A. Diversity – There is a continued focus with regards to the recruitment process and internal growth and development of staff that the Lab is represented through a diverse workforce to meet the scientific mission. JSA met the diversity goals by obtaining a diverse representation in 17 of the 20 categories which equals 85%.
- B. Benefits – JSA’s score of the three year rolling average of annual increases in medical insurance premium cost relative to Market is -5.2%. This score represents below market increases over the last three years and exceeds the target goal of 2%.
- C. Compensation – alignment with the Market. JSA achieved a score of 97% which is within the target of plus or minus 3%. JSA has responsibly managed its compensation program under tight budgetary constraints. HR partnered with management to address equity and market issues with limited available funds.
- D. Retention of Talent – There is a continued focus to address exit issues in order to retain top talent. JSA’s attrition for the top two performance ratings for this period has been 4.5%. The goal for the year is 7%.
- E. Internal Business Practices – The HR team reviewed the following policies and procedures for the Lab:
  - Performance Review Process: The Lab has completed a thorough review of the performance review process and has developed a new form and ratings with input from employee and management focus groups. The new form was presented to all employees and managers in July and August. HR also conducted performance review training with all managers. Enhancements to this process and the new automated system were well received by Lab management. Process improvements have led to a more efficient use of time for both management and employees and has allowed for greater employee-manager interaction with less administrative burdens.
  - Matrixed Staffing Process: To address the dynamic needs of the Lab with regards to employee staffing, HR has partnered with management and employees to gather feedback on the best path forward. The result is a Matrixed Staffing Process that will allow for staffing flexibility and leveraging scarce resources to be spread over a variety of critical projects.
  - General Labor Codes (GLC): HR partnered with Lab management and the Project Management Office to modify the 3<sup>rd</sup> & 4<sup>th</sup> digits of General Labor Code (GLC). The revised codes will provide management more detailed information on labor effort and the skills mix at the Lab. The result was an improved management capability to efficiently identify and leverage critical skill sets.
  - New Employee Orientation: HR is in the process of redesigning its New Employee Orientation (NEO). Among the proposed enhancements:

- A more comprehensive presentation on the culture of the Lab. This will provide new employees with information to facilitate their integration into the Lab and accelerate productivity.
- An additional orientation module for foreign nationals to assist with acculturation. HR will recruit a staff member from the same country to assist with language barriers. Periodic updates will be conducted by HR to support the transition to the Lab.
  
- Holiday Policy: Appendix A has been modified to revise the policy on floating holidays for nonexempt employees. This change has enabled more flexibility for nonexempt employees to take advantage of this benefit while balancing business demands.
  
- HR Policies Reviewed: HR reviewed and modified 13 policies to improve clarity and assure consistency with Appendix A of the Contract.
  
- HR Procedures Manual: HR prepared for the Comprehensive Financial Management System Review and in the process, updated the procedures manual to reflect current internal practices.
  
- Recruitment Rating Instrument: Through a management focus group it was determined the rating instrument should be modified to allow for more ease of use and consistency in interpretation. A guide was developed based on feedback to assist managers in the recruitment process. The supplemental material provides clear, consistent direction to the management during the hiring process making it more proficient.
  
- Staffing: HR has partnered with management to establish a baseline staffing level for the organization that will assist with future staffing needs and succession planning.
  
- F. Timely Reporting to DOE: - The following reports were due and submitted as scheduled to DOE:
  - Contractor Salary – Wage Increase Expenditure Report (Submitted 11/15/06)
  - Compensation Plan and Workforce Plan (Accepted 11/29/06)
  - Report of Contractor Employment (Submitted 10/13/06, 1/13/07, 4/13/07 & 7/3/07)
  - Baseline Employment Data (Submitted 1/9/07 & 7/3/07)
  - Diversity Plan (Submitted 2/23/07)
  - Report of Contractor Expenditures for Employee Supplementary Compensation (Submitted 3/15/07)
  - Report on Compensation (Parts I & II) (Submitted 10/13/06 & 4/13/07)
  - Appendix A Negotiations (Finalized 10/5/06)
  - Postretirement Benefits Other Than Pension (PBR) (Submitted 6/14/07)

During FY07, the Human Resources Team has met all the contractual requirements set forth. With respect to retention of talent, JLab has exceeded this measure through solid partnership with management and seeking to understand the root cause when employees leave the organization. Additionally, the HR department has reviewed and revised 13 policies as well as numerous internal business practices that have enabled more efficient services to the employee population. The HR team will continue to look for opportunities to improve upon our service levels to the organization and believes a solid foundation has been put in place to meet future challenges.

In March 2007, Rhonda Barbosa, HR Manager, visited the ORO facility to meet with the HR Consultants that advise and support Appendix A of the contract as a way to build relationships between JLab and

ORO. HR engaged in initiatives during FY07 that had a positive impact on the Lab's performance and resulted in superior service delivery and better scoring on the metrics through:

- Improved performance management
- More efficient and effective selection of candidates for job openings
- More effective integration of new employees into the Lab

HR will continue to seek opportunities for enhancing its support of the mission of the Lab.

In an effort to ensure the safety and care of the workforce, the Sentara Employment Assistance Program (EAP) link was posted on JLab Insight and communications were sent out in response to several tragic events directly affecting Lab staff during this period.

Benefits Value Study Corrective Action Plan – Through agreement with DOE, JSA is working with the vendor to provide a new benefits value study. When results are received JSA will forward to DOE for review and discussion.

Employee Service Awards – During FY 07, HR convened an employee panel to solicit feedback on how employee recognition could be improved. Based on input, HR revamped the Service Award Ceremonies which led to a more personalized experience, increased participation and overall positive feedback.

**Table 22. Objective 6.3 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>6.3 Provide an Efficient, Effective, and Responsive Human Resources Management System</b>					
6.3.1 Balanced Scorecard Results based on diversity/benefits/comp/ retention/ business process/timely reporting.	A-	3.5	100%	3.50	
<b>Objective 6.3 Total</b>					<b>3.50</b>

**Objective 6.4 Provide Efficient, Effective, and Responsive Management Systems for Internal Audit and Oversight; Quality; Information Management; and Other Administrative Support Services as Appropriate**

Measure 6.4.1 Requirement: Oversight Through Internal Audit - Internal audits completed in accordance with annual audit plan.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Complete all audits in accordance with annual audit plan and provide at least one advisory service engagement. (Notes 1, 2, 3) <i>1 – Includes audit plan changes and/or substitutes.</i> <i>2 – Due to the nature of internal audits completion dates may not coincide with the organization's fiscal year end. For Performance Level purposes, all current year audits (excluding Transaction Testing) are targeted for a report release date no later than 90 days after the close of the fiscal year, unless extenuating circumstances can be established. The Transaction Testing audit for Performance Level purposes is targeted for a report release date no later than 180 days after the close of the fiscal year, unless extenuating circumstances can be established.</i> <i>3 – Percentage of completion will be utilized where practical including requests for other than annual reporting, e.g., mid-year.</i>	A-	3.6

JSA Performance:

JSA's Internal Audit Peer Review was successfully completed in November 2006 and the Lab received an overall satisfactory rating, including one noteworthy practice and no findings of noncompliance. The review committee found many positive aspects about the IA activity at the Lab and noted a best practice in the implementation of an IA website which provides information about JLab IA activity. The committee also noted that the Lab's IA activity conformed to the Institute of Internal Auditor's *Standards for the Professional Practice of Internal Auditing (Standards)*.

The EHS&Q Systems Integration Audit scheduled for the 1st quarter was delayed because of an unplanned special management request for audit on scrap metals/recyclable materials controls. The audit was completed on January 26, 2007.

The Performance Based Integrated Management Systems Audit scheduled for the 2nd quarter was delayed due to the unplanned special management request for audit services in Quarter 1 and an additional unplanned audit services request in Quarter 2. With the resignation of JLab's CFO, JSA Internal Audit was assigned Interim Project Leader for the A-123 Project in Quarter 2. The A-123 2nd Quarterly Status Report was prepared and issued on schedule by JSA Internal Audit on March 30, 2007. The Performance Based Integrated Management Systems Audit was completed on April 25, 2007.

In response to DOE's request, JSA's preliminary FY08 Audit Plan was submitted to HQ on May 30<sup>th</sup>, thirty-one days ahead of schedule. The Lab received DOE approval on July 13<sup>th</sup>.

Measure 6.4.2 Requirement: Oversight Through Internal Audit - Consistent with Professional Auditing Standards and DOE contract requirements receive an overall satisfactory rating from an external peer review by qualified persons from other DOE contractor internal audit organizations every five years.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Receive an overall satisfactory rating from external peer review with at least one noteworthy practice.	A-	3.6

JSA Performance:

JSA successfully received an overall satisfactory from an external peer review, including one noteworthy practice and no findings of noncompliance. The report date was November 30<sup>th</sup>. The Peer Review Team noted a best practice in the area of information technology where JSA Internal Audit has implemented a comprehensive web site as a resource to JLab staff and management.

Measure 6.4.3 Requirement: Monitor/Maintain a Quality Improvement Plan

Performance Level Achieved:

Performance Level	Grade	Score
Implement 85% of the JSA FY07 Quality Improvement Plan initiatives and objectives by 09/30/07 which may include all or specific elements from the QAIP Plan: quality improvement objectives and measures, process improvement/efficiency methodology (including Value Methodology), AQIS implementation, work activity and process quality enhancement, issues management and closure quality, procurement quality, work closeout quality objectives and methodology, and documentation and recordkeeping supporting the quality program objectives. If not already in place, submit a QA Plan for TJSO approval by December 31, 2006.	B+	3.1

JSA Performance:

The Quality Assurance Plan was submitted on January 12<sup>th</sup> and was approved by DOE on April 5, 2007. QAP Gaps and Actions to close Gaps have been identified and a preliminary plan and schedule for implementing these actions was submitted on February 28<sup>th</sup>. It is noted that funding constraints due to Continuing Resolution have put the Lab several months behind schedule due to hiring delays for critical resources having a significant impact on timely implementation of the actions. A more detailed plan submitted in June has also been approved and is now in effect Lab-wide. The plan was developed using ISO 9001-2000, “Quality Management System – Requirements” and associated DOE QA guidance and provides a framework for continuous improvement in all areas of JLab Work, including research, business, and infrastructure activities. While behind schedule, significant progress was made in this area during FY07:

- Of 18 QIP Tasks and Activities, 16 were completed (89%) and 2 remained open and in process. However, those two items were well on their way to completion. A draft Issues Management procedure was complete and forward for review by leadership. However, additional comments to automate approvals was directed. Therefore, procedure changes had to be incorporated and CATS programs changed. The other incomplete item involved updating the ESH Manual with CATS and Issues Management changes. Those changes were identified prior to close of the fiscal year and incorporated during early Oct. FY08. Therefore, JSA believes partial credit should be allocated for these two items for an A-. Based on the 16 completed tasks, the percent complete for the FY07 tasks was 89%, 4%> than the required 85% for a B+. [As such, JSA believes this performance warrants justification for the A- score.](#)
- QAP was completed and approved. By mutual agreement, it was delivered later than scheduled to allow for independent 3<sup>rd</sup> party reviews,
- QAP Gap Procedures Scheduled for FY07 = As a result of the QAP gap analysis, 11 procedures were committed to be complete during the fiscal year. 11 procedure drafts were complete on or about as scheduled. As of the end of the fiscal year, none had been approved due to challenges

with the JSA review and approval process and the fact these new procedures are unfamiliar to the lab at large. Management and leadership expressed concern as to the impacts these procedures might have and requested an impact statement be prepared so there is an understanding of what might impact organizational performance. It is anticipated these procedures will be approved within early FY08.

- QA/CI Projects, Tasks, Activities Scheduled for FY07 = Approximately 190+ tasks, activities, and projects were completed during the year. This included assessment activities, ESH Manual changes, the Requirements Management Value Analysis project, hiring of additional personnel, 10 CFR 851 compliance procedures and NTS items, etc.
- Although the QAP gap procedures were not 100% approved by the end of the fiscal year, and that this element was not directly tied to the PEMP, ~~a grade of A~~ is justification ed is based on the following:
  - o Exceeded progress on the QIP above the B+ PEMP measure (89% vs 85%)
  - o Completed the QAP on schedule
  - o Exceeded the number of MSA's and IA's scheduled for the year
  - o Accomplished a larger amount of work with less resources and staff than originally planned and proposed for the contract
  - o Proactively responded to shifting priorities to make adjustments to meet 10 CFR 851 implementation goals
  - o Completed additional enhancements and improvements to the CATS system beyond adding the AQIS features, (eg. Completion date and approval date, standardized reporting for DSC and management).

The FY07 Integrated Assessment Schedule for JSA and DOE assessments, audits and surveillances was submitted to the TJSO.

JLab is a member of an EFCOG working group. JLAB-JSA VE program activities are in compliance with DOE O 413.2 Project Management for Acquisition of Capital Assets and P 413.2 Value Engineering. The annual DOE Value Engineering Reports were submitted to DOE EFCOG Chairperson.

As noted in Goal 4, the Automated Quality Information System (AQIS) was integrated with Corrective Action Tracking System (CATS) on May 31<sup>st</sup> resulting in much improved trending and analysis capabilities and greater flexibility in working with corrective and preventive actions:

- Enhanced Tracking and Sorting
- Improved Functionality for Drill Down & Analysis
- Ability to Conduct Real-time Trend Analysis by Cause Codes
- Improved Process for Closure and Extension Request Processing
- Automated E-mail Notification Features
- Creating Specialized Reports

The effort to establish a sustainable quality assurance program has been hindered by the budget constraints of FY06 and FY07. As a result JLab filled two critical QA positions in FY07 much later than would have otherwise been filled. A QA specialist (Bob Doane) was hired in the first quarter of FY07 and a document specialist/technical writer (Mary Jo Bailey, an internal transfer) was hired in September. Both of these delays had an impact on the ability to make full progress on the QIP.

**Opportunities for Improvement**

DOE Midyear Feedback:

*The Lab’s QAP and QIP submission during the second quarter was a different version than previously presented to the Site Office. The Lab should ensure there is a means to institute configuration control on such transmissions.*

**Status:** JLab has established configuration control through the QA/CI manager. The controlled versions of the QAP and QIP are on the web at: [http://www.jlab.org/div\\_dept/dir\\_off/oa/quality.html](http://www.jlab.org/div_dept/dir_off/oa/quality.html). Any changes to these documents are discussed with JSO ahead of posting the latest controlled version.

DOE 3<sup>rd</sup> Quarter Feedback:

*The QAP action plan posted on the Lab’s QA page would be more beneficial if a column were added to track status of the respective items.*

**Status:** The QAP action plan now includes status columns as of the 3<sup>rd</sup> quarter of FY07.

**FY06 Weakness:** *As noted in the FY06 DOE Performance Evaluation Report, the TJSO requested an overview on the Quality Improvement Plan prior to its submission, but the presentation was delayed several months and was submitted on September 31<sup>st</sup>.*

**Status:** All FY07 PEMP quality-related measures are now tracked and monthly status meetings are held with TJSO regarding QIP progress and schedule updates.

**Measure 6.4.4 Requirement:** Achieve FY07 milestones related to the May 16, 2006 letter “JSA Acceptance of SURA ESH&Q Documents” as documented in the plan submitted in accordance with referenced letter\*.

\* This includes milestones to review, revise and implement the following:

- I. Accelerator Operations Authorization, Radiation Protection Program Plan, ISMS Program Description
- II. Key ESH&Q documents such as EH&S Manual, EMS Plan, QA Manual, work documents, SOPs, TOPs, OSPs
- III. New JSA contract standards and requirements vs. Work Smart Standards

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Achieve 50-99% of the FY07 milestones related to the May 16, 2006 letter “JSA Acceptance of SURA ESH&Q Documents” as documented in the plan submitted in accordance with referenced letter as scheduled.	B+	3.4

JSA Performance:

The following is a status of the FY07 milestones related to the May 16, 2006 letter “JSA Acceptance of SURA ESH&Q Documents”:

**I. Accelerator operations authorization, radiation protection program plan, isms program description:**

- Accelerator operations authorization: Submitted and approved. JLab recognized that the entire

area of accelerator operations authorization and the associated implementation of the DOE Accelerator Safety Order (ASO) were areas that need significant management attention and resources. The JLab Senior Safety Advisory Committee (comprised of Perot senior staff) conducted an extensive assessment in late FY07. Major revision of the Lab Safety Assessment Document is a major commitment from this SSAC review. Also extensive JLab FY07 activity was directed to the drafting and incorporation of stakeholder comments, into a final draft Unreviewed Safety Issues procedure, this USI procedure is a major ASO requirement.

- Radiation protection program plan: Submitted and approved
- ISMS program description: Submitted and approved.

## **II. Key ESH&Q documents such as:**

- EH&S manual: A High Performance Work Team Process was initiated to review and streamline the ESH&Q Manual including restructuring the content guide and streamlining the processes to review, update, and approve any changes. Progress was delayed due to Continuing Resolution and the inability to fill a technical writer position. That position was filled on September 1, 2007 and substantial progress will be made in FY08. Activities in FY07 were prioritized and EH&S manual revisions were limited to higher risk activities such as electrical safety, emergency management, Lock,/tag/try, etc., to come in to compliance with 10CFR851 and to incorporate feedback.
- EMS Plan: Revised and approved.
- QA Manual: Revised and approved.
- Work documents will not be completely updated until implementation of the Contract Management Value Analysis results and Appendix E of the contract is modified to include the applicable requirements.
- Work Documents: continuing
- SOPS (Standard Operating Procedures): continuing
- TOSP (Temporary Operational Safety Procedures): continuing
- OSP (Operational Safety Procedure) continuing

## **III. New JSA contract standards and requirements vs. Work smart standards:**

- Extensive JLab activity in support of this measure took place in FY07. The Contract Requirements Management Value Analysis activity began in October 2006 and was completed in June 2007 as scheduled. The JSA recommendations were submitted to JSO in July 2007. JSA has not yet received the final disposition of all recommendations from JSO. At the end of FY07, meetings were being held between TJSO and JLab staff to consider DOE SME responses on a number of DOE directives.

SUMMARY: Due to the extensive activity and accomplishments on the areas noted in May 16, 2006 letter “JSA Acceptance of SURA ESH&Q Documents”, JLab determined that a score of 80% is appropriate for 6.4.4 in FY07.

Measure 6.4.5 Requirement: Deliver an integrated efficient and effective Information Technology Architecture that supports the mission of the Laboratory and benchmarks favorably with respect with other DOE Laboratories, research universities and commercial industry best practices.

Performance Level Achieved:

Performance Level	Grade	Score
Set up an IT Steering Committee including charter and with participation from key Laboratory stakeholders, users, outside experts from SURA universities and CSC, and TJSO. The Committee will participate in the establishment of IT Architecture vision and policy recommendations and will consider Laboratory-wide IT performance, including prioritization of work, linkage to the Laboratory’s mission, and progress on all IT related contract metrics. IT Steering Committee is operational by October 1, 2006 and recommendations from the Committee result in meaningful recommendations for improving projects supported by the IT Architecture by March 1, 2007.	B+	3.4

JSA Performance:

The IT Steering Committee was set up in August 2006 and includes CSC corporate participation and membership, DOE membership, and SURA university membership. The committee has met roughly every other month FY07, plus portions of the committee met multiple times in preparation for the IT External Review in September. The committee members reviewed Lab IT activities including the cyber security enhancement plan and its progress. Members of the committee have provided the data for the IT FY09 OMB Exhibit 53 budget data call and this information was presented to the full committee in its April meeting. The committee members, particularly those making presentations, prepared the JLab IT Architecture document that was used for the IT External Review in September 2007. The actual architecture resulted from work of the committee that integrated the Lab’s mission including the strategic plan.

IT External Review was held September 18<sup>th</sup> – 19<sup>th</sup>. (See section 6.4.6 for discussion of results.)

Jefferson Lab's newly upgraded network connection is capable of transferring data at a rate of up to 10 Gigabits per second (gbps), putting JLab firmly on the leading edge with its ability to provide high-speed data transfers to computers offsite. The initial data rate is 1 gbps per second and was upgraded to several gbps at mid year as the high speed firewall solution was deployed. The upgrade also supports the future bandwidth requirements of the experimental program, the lattice QCD computing initiative, the planned 12 GeV Upgrade and a number of other projects at Jefferson Lab.

Beginning February 5<sup>th</sup>, the Computer Center Help Desk expanded its hours to enhance support to the Lab. It is now available 8:00am – 4:30pm. The staff and users have provided numerous comments on how this resource has been of benefit to them.

Measure 6.4.6 Requirement: The Laboratory’s Information Technology favorably benchmarks with other DOE Laboratories, research universities and commercial industry best practices.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Establish annual review of IT with Advanced Board of Outside Expertise from SURA Universities, CSC and other DOE Laboratories. By February 1, 2007, provide a charter and identify the membership for the board. Perform the first annual IT review by mid-Summer of 2007. The review will be an external assessment and include benchmarking IT activities and performance. Have no more than two major findings from the review.	B+	3.4

JSA Performance:

The IT Independent External Review committee was set up at the end of January 2007 along with its charter. The members are CSC, Roy Hinrichs, Senior Director, Applied Technologies Division; DOE Lab, J. Pace VanDevender, Emeritus CIO, CTO and VP of Science, Technology and Partnerships, Sandia National Laboratories; and SURA, David Lambert, Vice President for Information Services and Chief Information Officer. The Independent External Review committee met September 18 – 19, 2007 and made a number of comments including the following:

- *You are doing an amazing amount of very good work with surprisingly few people.*
- *You are strongly enabling the excellent science we saw at JLAB.*
- *It is clear that the IT unit heads have a clear vision of the technical projects, programs and activities that comprise their future goal set and have been successful at developing and executing annual plans.*

While there were no major findings, there were several recommendations for areas for improvement including the following:

- *You can make changes over the next few years to add more value--without losing your collaborative culture or your clear focus on enabling science.*
  - o *More formal planning from strategy to projects*
  - o *More formal process culture—like the accelerator culture.*
  - o *More published policies and procedures with derivative metrics.*
  - o *Benchmark against your world-class peer group.*

IT Steering Committee’s FY08 tasks include working with results of the IT Independent External Review.

**Table 23. Objective 6.4 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>6.4 Provide Efficient/Effective/ Responsive Management Systems for Internal Audit, Quality, Info Management, and Other Admin Support</b>					
6.4.1 Oversight through Internal Audit. Audits are completed in accordance with annual audit plan.	A-	3.6	15%	0.54	
6.4.2 Receive satisfactory rating from external peer review by persons from other DOE orgs every 5 years.	A-	3.6	20%	0.72	
6.4.3 Monitor/Maintain a Quality Improvement Plan.	B+	3.1	20%	0.62	
6.4.4 Achieve FY07 milestones related to the May 16, 2006 letter “JSA Acceptance of SURA ESH&Q Documents” as documented in the plan submitted in accordance with referenced letter	B+	3.4	10%	0.34	
6.4.5 Deliver an integrated Information Technology Architecture that supports the mission of the Lab.	B+	3.4	20%	0.68	
6.4.6 Information Technology favorably benchmarks with other DOE Laboratories, research universities and commercial industry best practices.	B+	3.4	15%	0.51	
<b>Objective 6.4 Total</b>					<b>3.41</b>

**Objective 6.5 Demonstrate Effective Transfer of Technology and Commercialization of Intellectual Assets**

Objective Requirement: The effectiveness of Technology Transfer activities at Jefferson Lab can be measured by three specific measures listed below. Note: Jefferson Lab may be given additional credit (points) for exceptional performance in areas outside the performance measures (i.e., system enhancements, improvements in procedures practices, implementation of new program, etc.).

Measure 6.5.1 Requirement: The proper stewardship of intellectual assets and Laboratory owned or originated technology as measured by Invention Disclosures and Patent Applications. Intellectual Property Stewardship as indicated by the annual number of Invention Disclosures and/or Patents awarded.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Number of Invention Disclosures Greater than or Equal to 9 and Number of Patents Awarded Greater than or Equal to 4	A+	4.2

JSA Performance:

Indicating A+ performance levels, 21 Invention Disclosures and five Patents have been awarded during FY07, exceeding the annual goal of nine and four respectively.

Thirteen awards were presented to twenty-six recipients at the annual Patent Award Ceremony held February 13<sup>th</sup> representing patents received since the previous award ceremony over two years ago.

A memo was issued to all staff with pertinent information and tips on how to maximize the return on intellectual property assets at JLab. In addition, a new online invention disclosure form is improving the efficiency of disclosing inventions at JLab.

Measure 6.5.2 Requirement: The market impacts created/generated as a result of technology transfer and deployment activities as measured by licenses and/or options agreements executed.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Greater than or equal to 2 licenses awarded or greater than or equal to 2 option agreements executed.	B	3.0

JSA Performance:

JSA successfully negotiated a 10-year license agreement with Linde BOC Processing Plants, LLC on April 25, 2007 for JLab's Helium Processing Cycle technology. In addition, other facilities are utilizing this technology by implementing as many of these processes as are feasible to reduce their cryogenic electricity requirements. The processes have been submitted to the U. S. Patent Office for review and a patent is pending. JSA has been negotiating a potential license that was to be finalized by the end of FY07, but four other companies requested the same technology and in order to provide each of them with an opportunity to compete for the technology we extended the time line for execution of the Agreement or Agreements. We anticipate that license to be finalized in early FY08.

In addition, Dillon Technologies, Inc., a small business that received one of the Lab's first licenses for Scintemammography, has continued to grow as evidenced by the rate at which their camera is selling (approximately one per week).

Also, pertinent information and tips on how to maximize the return on intellectual property assets at JLab have been posted on Insight and were forwarded in an all-staff notification.

Measure 6.5.3 Requirement: Contributions to the transfer of Laboratory originated knowledge and technology as measured by customer assessments. Points will be awarded based on the customer’s overall adjectival rating of the system.

Performance Level Achieved:

Performance Level	Grade	Score
Annual Customer Rating *	A-	3.7

\*Annual Customer Assessment Rating will be on a 0 – 4.0 range to correlate with the Measure Score

JSA Performance:

JSA received a 4.5 out of 5.0 score on the FY06 customer survey issued in early FY07, with feedback from eight technology transfer customers. For the FY07 customer survey, the Lab implemented a new process that allowed customers to provide feedback online in efforts to increase the number of surveys received. JSA received a 4.6 out of 5.0 score on the FY07 customer survey with feedback from 10 technology transfer customers.

JSA provided nine Letters of Support and currently has 33 active CRADAs, WFOs and other agreements with various private sector companies, government agencies and other organizations for a total of approximately \$2.4M. Some examples of these exciting research projects are:

- JSA, under several CRADAs, is partnering with a small business company, Muons, Inc., to explore sophisticated designs for a muon particle collider for high energy physics research.
- Under a WFO with NASA Johnson Space Center, JSA is providing guidance on cooling the satellite slated to replace the Hubble telescope.
- JSA, under a CRADA, is working with Easter Virginia Medical School to expand EVMS capability to image small biological samples at EVMS for variety of medical projects.

**Table 24. Objective 6.5 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>6.5 Demonstrate Effective Transfer of Technology and Commercialization of Intellectual Assets</b>					
6.5.1 Intellectual Property Stewardship as indicated by annual number of Invention Disclosure/Patents awarded.	A+	4.2	40%	1.68	
6.5.2 The market impacts created/generated as a result of technology transfer and deployment activities.	B	3.0	40%	1.2	
6.5.3 Contributions to transfer of Lab originated knowledge/technology as measured by customer assessments.	A-	3.7	20%	0.74	
<b>Objective 6.5 Total</b>					<b>3.62</b>

**Table 25. Goal 6.0 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>6.0 Deliver Efficient, Effective, and Responsive Business Systems and Resources that Enable the Successful Achievement of the Laboratory Mission(s)</b>					
6.1 Provide an Efficient, Effective, and Responsive Financial Management System(s)	A-	3.58	25%	0.90	
6.2 Provide an Efficient, Effective, and Responsive Acquisition and Property Management System(s)	A-	3.77	25%	0.94	
6.3 Provide an Efficient, Effective, and Responsive Human Resources Management System	A-	3.50	20%	0.70	
6.4 Provide Efficient, Effective, and Responsive Mgt Systems for Internal Audit/Oversight; Quality; Info Mgt; and Other Admin Support Services	B+	3.41	15%	0.51	
6.5 Demonstrate Effective Transfer of Technology and Commercialization of Intellectual Assets	A-	3.62	15%	0.54	
<b>Performance Goal 6.0 Total</b>					<b>3.59</b>

**Table 26. Goal 6.0 Final Letter Grade**

Total Score	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
Final Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F

**Goal 7.0 Sustain Excellence in Operating, Maintaining, and Renewing the Facility and Infrastructure Portfolio to Meet Laboratory Needs**

Goal Requirement:

The Contractor provides appropriate planning for, construction and management of Laboratory facilities and infrastructures required to efficiently and effectively carry out current and future S&T programs.

**Objective 7.1 Manage Facilities and Infrastructure in an Efficient and Effective Manner that Optimizes Usage and Minimizes Life Cycle Costs**

Measure 7.1.1 Requirement: Asset Condition Index (ACI):

ACI = 1 minus the Facility Condition Index (FCI). FCI is the ratio of Deferred Maintenance to Replacement Plant Value. The FCI is derived from data in FIMS.

Performance Level Achieved:

Performance Level	Grade	Score
Greater or equal to 95%.	B+	3.1

JSA Performance:

The asset condition index is calculated annually in FIMS. ACI was met for mission critical but not for mission dependent due to the trailers being in poor condition.

ACI as shown in FIMS = 0.96; the goal is >0.95. The mission dependent ACI is driven by the Real Property Trailers at the Lab. 100% of the RPV for Real Property Trailers is considered as DM, which is 96% of the Mission Dependent Deferred Maintenance. This dramatically drags down the overall score.

Asset Condition Index:

- Mission Critical 0.96
- Mission Dependent (Less Trailers) 0.98
- Overall (less trailers) 0.96

JLab is mitigating the risk of the trailer condition by replacement with new facilities. All real property trailers have been identified for replacement through the construction of the Technical and Engineering Facility (new building and renovation of the Test Lab) and additions to CEBAF Center (Wings D and E). The development of approval documents for the Technology and Engineering Development Facility is currently being worked on. Construction is currently anticipated to start in FY10 and be complete in FY13 when the trailers will be demolished.

**Opportunities for Improvement**

DOE Midyear Feedback:

*Overall ACI is meeting the RPAM goal of 0.95. Attention is needed to improve the significantly lower current ACI for assets in the Mission Dependent category.*

**Status:** The ACI for Mission Dependent assets is driven by the Real Property Trailers at the Lab. Currently the new Technology and Engineering Development Facility (TEDF) scheduled to start construction in FY10 will replace the majority of Real Property Trailers at the lab. The Real Property Trailers account for 96% of the Deferred Maintenance of Mission Dependent assets.

Measure 7.1.2 Requirement: Extent Contractor validates accuracy of data in the Facilities Information Management System (FIMS).

Performance Level Achieved:

Performance Level	Grade	Score
The contractor has demonstrated validation of the accuracy of data in the FIMS data base with greater than 90% statistical certainty that the data contains no more than a 5% error rate.	A	3.8

JSA Performance:

The Facility Information Management Systems (FIMS) data validation required by DOE HQ was completed in March with no errors identified, which resulted in a green scorecard. Some areas were identified for improvement and are currently being worked. The data validation revealed 100% data accuracy and 0% error rate for data analyzed using the statistical sample obtained from the random generator report in FIMS. Areas of improvement included providing an updated Space Management System to provide better information of the occupancy status of space at JLAB. The implementation of this improvement is proceeding and will be complete by the end of the first quarter of FY08 and prior to the next data validation to be held in February of 2008. The other area of improvement identified was to combine all source data spreadsheets developed by FM into a single workbook and to have the FIMS coordinator and the Director of F&L sign off on these at the appropriate time. This is being completed and will be signed once all data reporting is complete for FY07 on December 15, 2007.

The FIMS Quality Assurance Plan was submitted on May 14<sup>th</sup> and outlined the roles and responsibilities for FIMS stakeholders to provide timely updates and assure data accuracy. Additional FIMS reports submitted as scheduled included FRPC Data reporting, Actual Maintenance reporting, and Required Maintenance reporting.

**Opportunities for Improvement**

DOE Midyear Feedback:

*Attention is needed to improve accessibility of source documentation. Revised FIMS QA plan needs to be finalized.*

**Status:** The FIMS QA plan was revised and submitted to DOE in May 2007.

The need to improve accessibility to source documentation is dealt with in the paragraph above.

Measure 7.1.3 Requirement: The efficiency and effectiveness of contractor efforts for sustainment, recapitalization, and acquisition of required facilities and infrastructure to support Laboratory programs through the performance of maintenance by achieving MII of at least 2%.

Performance Level Achieved:

Performance Level	Grade	Score
MII = 2% and the contractor has demonstrated that maintenance activities, recapitalization and acquisition of facilities and infrastructure to support Laboratory programs have been performed efficiently.	B+	3.4

JSA Performance:

At the end of FY07, JLab's Maintenance Investment Index (MII) was 2.94, exceeding the annual goal of >2%. This is based on a total maintenance expenditure of \$3,231,021 on assets with an RPV of \$109,883,439. Implementation of Maximo Work Order System has improved our ability to track and manage facilities maintenance. The Lab provided additional funding to replace the aging Test Lab electrical switchgear. Additional leased warehouse facilities were obtained in FY07 at below market rate.

**Table 27. Objective 7.1 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>7.1 Manage Facilities and Infrastructure in an Efficient and Effective Manner that Optimizes Usage and Minimizes Life Cycle Costs</b>					
7.1.1 Asset Condition Index.	B+	3.1	30%	0.93	
7.1.2 Validates accuracy of data in the Facilities Information Management System.	A	3.8	40%	1.52	
7.1.3 Sustainment/recapitalization/acquisition of required facilities/ infrastructure to support Lab programs.	B+	3.4	30%	1.02	
<b>Objective 7.1 Total</b>					<b>3.47</b>

**Objective 7.2 Provide Planning for and Acquire the Facilities and Infrastructure Required to support Future Laboratory Programs**

Measure 7.2.1 Requirement: The Ten Year Site Plan is recognized by funding entities as providing a sound strategy for acquisition of required facilities and infrastructure to support future Laboratory programs.

Performance Level Achieved:

Performance Level	Grade	Score
The contractor takes extra measures, such as drawing on outside expertise, to assure that the strategy is appropriately developed, reviewed, updated, in line with the Laboratory Business Plan, and utilized as a Laboratory management document in a timely fashion.	A-	3.7

JSA Performance:

In close coordination with the TJSO, JSA assembled a team of subject matter experts, including an outside A&E firm, to develop the Science Laboratory Infrastructure (SLI) proposal as directed by DOE Office of Science in March 2007. The team completed a detailed gap analysis and needs identification of each infrastructure system and developed a proposal for four SLI projects as well as revising the General Plant Projects (GPP) list showing the Lab’s contribution over the 10 year period. A presentation briefed at the COO Meeting at Argonne on April 3, 2007 received a favorable response. As a result, the team was successful in combining two of the four proposed projects into one new project, the Technology and Engineering Development Facility (TEDF), which made the final DOE list of funded projects. The TEDF is currently funded at \$72.2M for FY09 through FY12. In addition, activities were completed to achieve

CD-0 for this project during FY07. All activities were completed to achieve CD-0 for this project during FY07. Our A-E has completed a first draft needs assessment for those functions tentatively planned for the building. Refinement of this data is in progress for use in the conceptual design report, scheduled for completion Spring 2008. An Integrated Project Team (IPT) has been formed for the project.



***Technology and Engineering Development Facility***

The Ten Year Site Plan was submitted on July 24<sup>th</sup> as scheduled. This plan was updated to reflect 12GeV conventional facilities, the new TEDF, increase to the level of GPP funding, expansion of information on energy and sustainability management, and updated the list of funded and proposed projects.

Measure 7.2.2 Requirement: Cost Performance on projects greater than or equal to \$100K.

Maintain level of construction control to limit change orders and cost overruns to only those which bring added value to the project or are appropriate to produce the desired end product. Performance level will be calculated by taking the average of initial bid (contracted) amounts compared to the final contract amounts considering all applicable funding increases for all appropriate contracts closed out during the rating period. Increases considered not applicable are those whose root cause is:

- Post-design programmatic change by user (physical or schedule)
- New technology deemed a value-added inclusion (post-award)
- Value engineering proposals accepted (both additive and deductive)

Performance Level Achieved:

Performance Level	Grade	Score
Applicable changes and cost overruns are less <del>or equal to</del> <u>than 83%</u> of the total awarded bid amount.	A	4. <u>10</u>

JSA Performance:

During FY07, the Cost Performance on projects greater than or equal to \$100K was 0.5% overrun (final cost = \$521,410). In the 1<sup>st</sup> quarter Facilities & Logistics Management completed construction of 60' and 75' Material Handling Equipment Storage Buildings (final cost \$315,693) 1.9% over budget. In the 2<sup>nd</sup> quarter Facilities & Logistics Management completed construction of Central Sidewalk Project. (Final Cost \$205,717) → 1.57% Under Budget.

Project	Adjusted Baseline (including acceptable extensions/deletions and G&A)	Actual Cost	Amount Over (-) or Under (+) Budget	% Under (+) or Over (-) Budget
MHESB	\$309,806	\$315,693	(\$5,887)	-1.90%
Central Sidewalk	\$209,000	\$205,717	\$3,283	1.57%
<b>TOTAL</b>	<b>\$518,806</b>	<b>\$521,410</b>	<b>(\$2,604)</b>	<b>-0.50%</b>

Measure 7.2.3 Requirement: Scheduled performance on projects greater than or equal to \$100K. Calculation of performance toward this goal will be the average of the actual number of days to completion of identified projects (or designated milestones) to the number specified by the original contracts. This will be expressed as a coefficient of actual divided by contracted. Additional time attributed to the following categories will not be included for the purpose of this metric:

- Acts of God (as contractually accepted)
- Labor disputes/strikes
- Documented material unavailability (contractually accepted)
- User desired post-award change orders for which additional time is appropriate

For purposes of this report, “completion” shall be when the project is physically complete; turned over to user or beneficial occupancy taken.

Performance Level Achieved:

Performance Level	Grade	Score
Index is less than 1.0.	A	4.0

JSA Performance:

- Construction of 60’ and 75’ Material Handling Equipment Storage Buildings were originally scheduled to be completed October 30, 2006. These building were delayed pending the Test Lab operations schedule that was needed to finalize the electrical connection. Actual construction was completed on December 20<sup>th</sup>, ahead of schedule.
- Central Sidewalk Project was scheduled to be completed March 15<sup>th</sup>, but was delayed until April 2<sup>nd</sup> because the primary construction subcontractor was granted an 18-day extension due to weather delays. The project was completed March 23, 2007, 10 days ahead of schedule.

Project	Contact Duration (including acceptable extensions/deletions)	Actual Duration	Index (Actual/Contract)
MHESB	187	176	0.941
Central Sidewalk	167	157	0.940
<b>TOTAL</b>	<b>354</b>	<b>333</b>	<b>0.941</b>

**FY07 Challenges**

Identify and implement operational efficiencies to fund GPP requirements.

**Status:** Facilities Management and Logistics brought property, shipping, and receiving functions in-house saving about \$200K annually. Utility conservation projects have also netted additional savings. The Lab completed a Contract Requirements Review identifying numerous duplicate or unnecessary contract requirements with a level of effort impact. Other costs saving initiatives continue to be developed however savings have been absorbed by new DOE requirements or initiatives.

**Table 28. Objective 7.2 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>7.2 Provide Planning for and Acquire the Facilities and Infrastructure Required to Support Future Laboratory Programs</b>					
7.2.1 Ten Year Site Plan recognized as providing sound strategy for acquisition of required facilities/ infrastructure.	A-	3.7	40%	1.48	
7.2.2 Cost performance on projects greater than or equal to \$100K.	A	4.40	30%	1.230	
7.2.3 Scheduled performance on projects greater than or equal to \$100K.	A	4.0	30%	1.20	
<b>Objective 7.2 Total</b>					<b>3.9188</b>

**Table 29. Goal 7.0 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>7.0 Sustain Excellence in Operating, Maintaining, and Renewing the Facility and Infrastructure Portfolio to Meet Laboratory Needs</b>					
7.1 Manage Facilities and Infrastructure in an Efficient and Effective Manner that Optimizes Usage and Minimizes Life Cycle Costs	A-	3.47	50%	1.74	
7.2 Provide Planning for and Acquire the Facilities and Infrastructure Required to support Future Laboratory Programs	A-	3.9188	50%	1.964	
<b>Performance Goal 7.0 Total</b>					<b>3.7068</b>

**Table 30. Goal 7.0 Final Letter Grade**

<b>Total Score</b>	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
<b>Final Grade</b>	A+	A	A-	B+	B	B-	C+	C	C-	D	F

**Goal 8 Sustain and Enhance the Effectiveness of Integrated Safeguards and Security Management (ISSM) and Emergency Management Systems**

Goal Requirement:

The Contractor sustains and enhances the effectiveness of integrated safeguards and security and emergency management through a strong and well deployed system.

The Sustain and Enhance the Effectiveness of Integrated Safeguards and Security Management (ISSM) and Emergency Management Systems Goal shall measure the Contractor’s overall success in safeguarding and securing Laboratory assets that supports the mission(s) of the Laboratory in an efficient and effective manner and provides an effective emergency management program.

**Objective 8.1 Provide an Efficient and Effective Emergency Management System**

Measure 8.1.1 Requirement: Conduct emergency management exercises\* as identified in the ERAP for FY07. Response to an actual or simulated emergency event demonstrates an above average level of proficiency and opportunities for improvement are identified and acted upon. Participate in at least one local emergency preparedness exercise assisting a local entity in their preparedness.

\* An actual emergency may be counted as an exercise in the quarter in which it occurs.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Revise emergency command process (i.e. Director’s Command Staff and support resources) to align with the national Incident Command System (NIMS). The extent and level of implementation should be proportional to the nature and magnitude of threats to JLab and its interaction with off-site emergency responders. Provide familiarization sessions for key personnel. Use the NIMS-based JLab model for at least one planned exercise in FY07. Bring local HAZMAT team to JLab to re-familiarize them with Laboratory protocols. Results of internal and external reviews, surveys and inspections demonstrate that Emergency Management System is effective, and Emergency Management Program has no repetitive deficiencies (or corrective actions are completed in accordance with approved corrective action plan.	A	3.8

JSA Performance:

Several emergency management exercises were conducted during FY07. In December, a “Winter Weather Decision-Making Tabletop” emergency management exercise was conducted and included TJSO staff member’s participation. Actions resulting from this exercise were revised decision making flow chart, improved the disseminated information on Lab status (using a multimedia communications

system). In March, a potential hydrofluoric acid (HF) exposure incident stimulated cross-divisional and external agency participation. This incident validated some emergency provisions including our previous training of employee and Riverside emergency room personnel, potential exposure protocols and procedures, and it created some lessons-learned for improvements. There was extensive involvement by local HAZMAT, fire, medical, and police resources. It was reported in the FY07 ERAP update as an event in lieu of an exercise for the 2nd quarter. The Emergency Management Committee conducted a Hurricane Tabletop Exercise on July 20<sup>th</sup> and it resulted in several follow-up actions, 12 of 13 actions were completed. Local emergency preparedness personnel from the city of Newport News Senior Emergency Operations Management Personnel participated in the planning and conduct of this exercise. This demonstrated our proficiency in responding to a most probable emergency situation using the NIMS model for incident command control and communications. It should also be noted that the Lab's Occupational Medical Director participated in a national teleconference with the National Institute of Occupational Safety and Health (NIOSH) on pandemic flu preparation. Lastly, a March 28<sup>th</sup> Avian Flu Pandemic Roundtable update was conducted for the Director's Command Staff and TJSO staff. This tabletop exercise provided updates to key managers on geographic progression of disease, revisions to public health guidance, and new OSHA rules for workplace guidance for pandemic conditions.

The Lab recently acquired the Connect-GOV notification system to enhance its emergency communications. This system will be used to alert staff and users in the event that the Lab is unexpectedly closed or opening is delayed due to severe weather, emergencies or similar circumstances. In addition to this mass notification system, the Lab currently has the ability to page all Lab pagers; email all staff and users; post emergency messages on the Lab website; update the Lab's status line; leave a status message on the Lab's main line; and notifies local television and radio stations of the Lab's status.

JLab responded to the request from TJSO to design and publish a continuity of operations plan to host relocated personnel from the Office of Science.

### **Opportunities for Improvement**

DOE Midyear Feedback:

*It is more appropriate to refer to the March 28<sup>th</sup> meeting on Avian Flu as a Roundtable or similar characterization, versus a Tabletop exercise. While this was a productive and useful meeting, it is DOE's perception that no attempt was made to postulate reactions to a bounded event scenario.*

**Status:** The government's guidance on Avian Flu is evolving. JLab is taking this seriously and our roundtables provide us valuable feedback and improvement opportunity.

DOE 3<sup>rd</sup> Quarter Feedback:

*Participation in a meeting by itself doesn't constitute a tangible benefit. Please elaborate to receive proper acknowledgement. This general comment has been previously issued for quarterly briefings in Section 5.*

**Status:** Year-end self evaluation has been updated to include outcomes, actions, and benefits of meetings where possible. Please note that often the performance level specifically notes participation in meetings, not outcomes.

**Table 31. Objective 8.1 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>8.1 Provide an Efficient and Effective Emergency Management System</b>					
8.1.1 An emergency response exercise is conducted.	A	3.8	100%	3.80	
<b>Objective 8.1 Total</b>					3.80

**Objective 8.2 Provide an Efficient and Effective System for Cyber-Security**

Objective Requirement:

Assure appropriate level of cyber security risk assessment and program planning and that Jefferson Lab computer systems are not compromised or used in attacks on other Internet locations.

Measure 8.2.1 Requirement: Number of times JLAB computer systems were compromised or were used to attack other systems and that any incidents were reported within the required timeframes. Potential Cyber Security Incidents (CSI) considered in this metric include system level (root) compromises on Computer Center and Accelerator Controls managed systems, as well as situations where nodes in the jlab.org domain are used to carry out cyber attacks on other locations on the Internet. Computer Center and Accelerator Controls staff will track incidents and report on them at the end of the fiscal year.

$$CSI = RC + 0.5(CA)$$

RC = the number of incidents of system level (root) compromises on Computer Center or Accelerator Controls managed systems per year

CA = the number of incidents in which a node in the jlab.org domain is used to carryout a cyber attack on other locations on the Internet.

Performance Level Achieved:

Performance Level	Grade	Score
CSI = 0; and favorable results on internal/external reviews, surveys and inspections that demonstrate the cyber security program is: effective, integrated into Laboratory culture, and Laboratory leadership’s commitment to strong cyber security performance.	A-	3.5

JSA Performance:

CSI = 0

There were no JLab computer systems compromised or used to attack other systems during the FY07 performance reporting period. There were a few user level incidents and viruses caught by anti-virus software, but none resulted in a system level (root) compromise. Additionally, no JLAB computer systems were used to carry out cyber attacks on other locations on the Internet. There was an incident in January of a JLab system being used to send spam via a compromised webpage, but this is not considered a CSI.

All cyber security enhancement projects resulting from the September 2006 Site Assistance Visit (SAV) were completed. Enhancements completed include network segmentation, two-factor authentication for the BSN and system administrators on core computing systems, daily vulnerability scanning and remediation of found vulnerabilities.

A new Cyber Security Program Plan (CSPP) was written to reflect the enhancements. The enhancements were verified and tested by a cyber security self-assessment. The self-assessment included a “white hat” penetration test. In September 2007 a Systems Testing and Evaluation (ST&E) was completed. A Certification and Accreditation (C&A) package was also completed in September 2007. In the first week of October 2008 the C&A package was delivered and resulted in a new Authority to Operate (ATO).

Ongoing efforts to improve the Lab’s cyber security practices are on track.

### **Opportunities for Improvement**

***FY06 Weakness:** As noted in the FY06 DOE Performance Evaluation Report, although cyber security metrics were successfully attained and reported on the FY06 Self Evaluation report, risks existed that could have put Lab assets at stake. There needs to be a balance in handling DOE initiatives and maintaining the Lab’s mission of delivering productive science.*

**Status:** 1) All Cyber Security Enhancement Projects resulting from the September 2006 SAV have been completed. 2) An updated residual risk statement was submitted to the TJSO. 3) JSA completed a new CSPP. 4) JSA completed a cyber security self-assessment and “white hat” penetration test. 5) JSA completed a ST&E. 6) JSA completed a C&A package.

***FY06 Weakness:** Risks existed that could put Lab assets at stake.*

**Status:** See status above.

**Measure 8.2.2 Requirement:** Performance on addressing identified cyber security vulnerabilities. The metric will measure the average completion date and/or percent of systems complete for addressing identified cyber security vulnerabilities versus the scheduled completion date and/or percent of systems complete. The scheduled completion dates and/or percent of systems to be completed will be negotiated between the TJSO Cyber Security Manager and the CIO at the beginning of the performance period with an agreement in place within the first six weeks of the performance period. Two types of identified cyber security vulnerabilities will be used:

Type A = A vulnerability correlated to completion date.

Type B = A vulnerability which correlates to a percentage that an identified system has been completed. In the paragraphs below, M is the total number of elements for Type A, and N is the total number of elements for Type B.

Type A with M vulnerabilities – Scoring for vulnerabilities that have completion dates: The percentage of available points earned for each vulnerability (A1, A2, ..., AM) shall be numerically equal to 100 plus (minus) 10 times the number of months (including fractions thereof) that the completion date for addressing the identified cyber security vulnerability is ahead (behind). No points will be awarded for a given vulnerability if the completion date is more than five months behind schedule. For the mid-year score, the coefficient shall be 20 rather than 10. The Contracting Officer may make allowance for project plan changes and/or schedule adjustments associated with causes beyond JLab’s control. The dates used

in evaluating performance at midyear and end-of-year are the project schedule dates in place at the time of evaluation.

Score  $A_i = 100 \pm 10 \times$  (no. of months) either ahead (+) or behind (-) for vulnerability  $A_i$

Type B with N vulnerabilities – Scoring for vulnerabilities that have percent of systems complete: The percentage of available points earned for each vulnerability ( $B_1, B_2, \dots, B_N$ ) shall be numerically equal to 100 times the ratio of the number of systems that are complete divided by the number that were scheduled to be complete on the specified date (mid-year or end-of-year as appropriate) for addressing identified cyber security vulnerabilities. The Contracting Officer may make allowance for project plan changes and/or schedule adjustments associated with causes beyond JLab’s control.

Score  $B_i = 100 \times$  (actual completed/scheduled completed) for vulnerability  $B_i$

The scores for the two types of vulnerabilities will be combined as follows with the composite constrained to lie between 0 and 100:

$$\text{Score} = (\text{Score}A_1 + \text{Score}A_2 + \dots + \text{Score}A_M + \text{Score}B_1 + \text{Score}B_2 + \dots + \text{Score}B_N) / (M + N)$$

One Type A milestone is due in 4Q06:

Under Authentication/Authority finding: Establish a pilot project that will test 2-factor authentication and the new model for separation of privilege for core system administrators (due 9/30/2006).

Zero Type B milestones are due in 4Q06.

Performance Level Achieved:

Performance Level	Grade	Score
Score at Least 90%	A-	4.0

JSA Performance:

There were no identified cyber security vulnerabilities as defined above during FY07.

The IT Division's on-site Systems Testing & Evaluation (ST&E) for Cyber Security is complete, and we have received excellent feedback on staff competencies and qualifications, based system builds, network segmentation, and mitigating controls from our reviewers. A computing maintenance period was set to resolve issues identified during the evaluation. The issues involved inconsistencies in BSN desktop system configurations for two-factor authentication and administrative local accounts. The configurations were updated to be identical as intended.

Other activities in this area include:

Network Segmentation

- Completed procurement and testing of firewall service modules (FWSMs) to be used for Enclave protection.
- Completed on-the-job training to develop a working knowledge of the technology to allow the design of a viable technical solution.
- Completed a high-level network-segmentation plan.
- Completed segmentation of BSN, CNI/MIS System Administrators, Cyber Analysts, Core

Servers, Level-1, Level-2, Level-3 and Level-4 Desktops.

- 10 Gig firewall evaluated which lead to the procurement of an upgradeable 4 Gig version.

Vulnerability Scanning and Remediation

- Hardware and software for scanning is operational.
- Specific list of real-time or operationally critical machines that should not be scanned asynchronously has been developed and incorporated into scanning process.
- Daily Top-Twenty scanning of all systems except specifically excluded machines has been implemented.
- Remediation procedures with System Team training on VAM are complete.
- Deep scans of all systems except specifically excluded machines has been implemented.
- Established web-based automated reporting of vulnerability status and metrics.

Patch Program Management

- Continued in-place patch-delivery under current procedures with no compromises resulting from untimely patch distribution.
- Patch management policy and processes for effective delivery of critical patches were developed.
- Critical patches were delivered to all on-line machines within 14 days of availability.

Measure 8.2.3 Requirement: Establish a SANS top-twenty scanning program to track the scanning and remediation of SANS “Top Twenty” vulnerabilities. Measure the number of completed scans including remediation of discovered vulnerabilities.

Performance Level Achieved:

Performance Level	Grade	Score
A SANS top-twenty scans and remediations will be done on at least 50% of systems (exclusive of special systems) every quarter.	A-	4.0

JSA Performance:

SANS top-twenty scans and remediations were performed on 100% of all systems (exclusive of special systems) daily during FY07.

At the end of the 2<sup>nd</sup> quarter, the system reported 135 machines with critical vulnerabilities of which 17 are part of the original 600. The validity of the reports on the remaining 17 machines was determined during the 3<sup>rd</sup> quarter and weekly deep scans were initiated.

**Opportunities for Improvement**

FY06 Weakness: *It was noted in the DOE FY06 Performance Evaluation Report that the Lab’s scanning and logging vulnerabilities using Vulnerability Asset Management (VAM) was at a low pace due to a severe lack of staff. The target number of fixing vulnerabilities was exceeded, but there was an issue of timeliness of remediation, especially for systems with old vulnerabilities. During the 1<sup>st</sup> quarter of FY07, SANS top-twenty scans and remediations were performed on 100% of the computer systems onsite during this quarter, surpassing the A+ performance level of 50%.*

**Status:** 1) The Cyber Enhancement Plan was completed in FY07. 2) JSA submitted an updated residual risk statement that reflects the enhancements to the TJSO on May 29, 2007. 3) Network segmentation and BSN two-factor authentication was completed.

FY06 Weakness: *Lab’s scanning and logging vulnerabilities was at low pace*

**Status:** Critical patching meets the three 8.2.2 requirements. The logging procedures currently use the CCPR system. All daily and weekly scanning goals have been met with daily averages below 3% for systems with critical vulnerabilities that do not have compensatory controls. (The goal was 5%.)

**Table 32. Objective 8.2 Performance Rating Development**

<b>ELEMENT</b>	<b>Letter Grade</b>	<b>Numerical Score</b>	<b>Objective Weight</b>	<b>Total Points</b>	<b>Total Points</b>
<b>8.2 Provide an Efficient and Effective System for Cyber-Security</b>					
8.2.1 Number of time JLAB computer systems were compromised or used to attack other systems.	A-	3.5	40%	1.40	
8.2.2 Performance on addressing identified cyber security vulnerabilities.	A-	4.0	30%	1.20	
8.2.3 Establish scanning program to track scanning/remediation of “Top-Twenty” vulnerabilities.	A-	4.0	30%	1.20	
<b>Objective 8.2 Total</b>					<b>3.80</b>

**Objective 8.3 Provide an Efficient and Effective System for the Protection of Special Nuclear Materials, Classified Matter and Property**

Measure 8.3.1 Requirement: Maintain an effective Security Program, demonstrated by:

- Ensuring non-U.S. citizens’ from sensitive countries who have badged access to JLab facilities, or perform work on CRADAs or Work for Others are identified, and are entered into the Foreign Access Central Tracking System.
- Current timely and approved security-related Admin Policy and Security Plans.
- Reportable and accountable “Other Nuclear Materials” are inventoried and reported with DOE approved procedures.

Performance Level Achieved:

<b>Performance Level</b>	<b>Grade</b>	<b>Score</b>
Maintain effective professional relations with threat reduction officials at DOE Headquarters, FBI Norfolk, and Newport News Police Department by participating in opportunities to share information in security, community policing, and incident management. Update JLab Security policy and plans to optimize and assure effective support with external support agencies.	A-	3.6

JSA Performance:

Registered 267 non-U.S. citizens for badged access to JLab facilities by verifying identification, U.S. Citizenship and Immigration Service documents and authority to work as appropriate. All were entered into the Foreign Access Central Tracking System at the time that they are issued a badge.

Successfully processed two T-5 national scientists for assignment at JLab who demonstrated great potential to contribute to the DOE's and JLab's scientific mission. Designed two UFV&A Specific Security Plans in coordination with Cyber Security to ensure appropriate controls. Performed continuous administrative coordination with HQ DOE's security staff and UFV&A Assignment Review Panel throughout the entire process until written assignment approval was received.

Updated JLab's UFV&A Generic Security Plans to reflect current operational controls.

Updated JLab's UFV&A Hosting Guide to reflect current operational controls.

Effective integrated security and property protection awareness resulted in staff reporting unusual losses of high grade copper sheeting and subsequent discovery by JLab Security of suspected internal property theft. Senior JLab Management's prompt referral to the DOE TJSO manager resulted in an efficient employee theft investigation led by JLab Security that resulted in an employee confessing to multiple counts of government property theft. Close coordination between senior Lab Management, DOE TJSO Site Office Manager, supervisors, Legal, HR, Newport News Central Precinct detectives, and the DOE Inspector Generals Office resulted in recovery of two van loads of government property, criminal conviction for property theft, and payment of restitution for unrecovered property.

Established a non-attribution, recorded Fraud, Waste, and Abuse Reporting telephone number for workers to report suspected illegal activity to JLab officials.

Updated JLab's Integrated Annual Security Awareness Briefing to include Cyber Security, travel, Fraud Waste & Abuse, Counterintelligence and Property Protection. 100% of all staff completed Annual Security Awareness training. To ensure that all staff had completed up to date Security Awareness Training, their JLab badges were inactivated until training certification was received. In addition, detailed explanations of cyber security and property responsibilities were posted JLab Insight News and also forwarded as an all-staff email notification.

Completed COMSEC training and documentation between the U.S. Air Force, JLab, and DOE TJSO staff to enable official use of STU-III secure voice equipment. Coordinated the transfer of national security clearances between USAF and DOE cognizant security offices.

JLab submitted a quarterly Nuclear Material Transaction and Physical Inventory Listing report to the Nuclear Materials Management and Safeguards System (NMMSS) which reports any operational loss of deuterium gas by Accelerator operations. All reports were submitted accurately and on-time.

In coordination with the Newport News Police Central Precinct, the Fire Department Rescue units, and the assistance of the Transportation Security Administration security screeners, successfully executed JLab's Open House security plan and professionally managed three emergency medical system (EMS) responses initiated by visitors during the event.

Assisted DOE in establishing and mitigating the CI threat by establishing liaison with DOE HQ Regional Counterintelligence Office in accordance with the Site-Specific Counterintelligence Support Plan.

Provided private office space co-located with JSA system of personnel records for review of official records and for private interviews. Supported both DOE HQ CI and FBI in coordinating appointments for interviews. Provided dedicated computers, message capable telephones, JLab badged access, and JLab e-mail and network access as requested. Performed conference calls among those with a need-to-know to report, share, discuss incidents, and resolve conflicting threat reduction information from all sources.

Successfully established liaison with Norfolk FBI to implement information exchange and support services as agreed with DOE HQ Regional Counterintelligence and DOE Site Office Manager. Support local officials on a bi-weekly basis.

Effective information sharing between JLab officials, DOE Washington Regional Counterintelligence Office, and Norfolk FBI resulted in detection and reporting of persons of interest for national security purposes and the development of a credible threat analysis for the laboratory. This classified threat analysis continues to serve as a basis for designing countermeasures to deter economic espionage.

Successfully obtained DOE “Q” security clearances for the Chief Operating Officer and four cyber security professionals by facilitating communication with DOE HQ and the DOE Site Office. Clearances enabled DOE threat reduction officials to share classified threat reduction information with senior management and computer/network engineers/technicians. The Chief Operating Officer was personally briefed by the DOE HQ Regional Counterintelligence Officer and the regional analyst.

Updated the Export Control Procedures Manual to reflect key personnel changes.

Maintained the Integrated Security Management web presence identifying local policy, procedures, and contact information.

**Opportunities for Improvement**

Participate in DOE Office of Science lessons learned opportunities when available.

DOE Midyear Feedback: *An effective security program is being maintained. However, at this point in the FY the JSA self-assessment did not provide a compelling case that the level of activities supported a grade above B+.*

**Status:** See write up above. Also, using results of the JSA Contract Security Requirements Definition, JLab Security Self Assessment, and Risk Analysis updated the:

- JLab Site Security Plan
- Nuclear Materials Control & Accountability Plan
- Key & Lock Control Policy, and
- Unclassified Foreign Visits & Assignments Policy

Measure 8.3.2 Requirement: Demonstrate effective Security Program through internal, self-assessment and external reviews, surveys and inspections.

Performance Level Achieved:

Performance Level	Grade	Score
Conduct and document a self-assessment of all applicable aspects of the Security Program and submit to TJSO 6-months prior to the next Security Survey.	B+	3.4

JSA Performance:

A Security Self-Assessment was conducted in the Fall of 2006 using the Inspection Process Toolkit provided by the Oak Ridge Office and a report was provided to the DOE TJNAF Site Office on January 2, 2007. This document served as a basis for the new JSA contract security requirements definition process. In August 2007 the proposed contract requirements were delivered to TJSO. Notes indicating agreements per line item of Contract Requirements Documents was provided by DOE TJSO and will be used to update the JLab Site Security Plan in preparation for the Security Survey in June 2008.

In compliance with two DOE directives, Jefferson Lab contracted with Gregg Services to complete a site-wide Security Risk Assessment aimed at identifying potential threats, vulnerabilities, and associated risks. The team reviewed JLab documents and general threats identified in the DOE Design Basis Threat, surveyed the facility, and interviewed key staff to identify vulnerabilities. The team came up with 18 recommendations concerning risk issues and validated JLab’s overall security risk level as Low using a Low-Medium-High scale. A plan was developed to address the recommendations and forwarded to the TJSO on June 26, 2007. The plan called for submitting quarterly updates through the security chain of command until issues are resolved. Since many of the issues expose potential security vulnerabilities, details are limited to facility security need-to-know through the JLab security chain of command. A plan to address recommendations was submitted, but some have been overcome by events and the plan needs updating. There is no connection between the risk assessment and the next Security Survey. The Security Self Assessment was completed to close an open finding in accordance with the Corrective Action Plan. The next security survey is scheduled for June 2008.

In addition, an independent Security Risk Assessment of physical security designs and plans for the 12 GeV upgrade project was completed, resulting in the Office of Science support in the use of less restrictive American Society for Industrial Security General Security Assessment Guidelines for all SC low hazard/security interest Labs.

**Opportunities for Improvement**

Review and update 2007 Security Risk Assessment – Plan to Address Recommendation to come up with revisited estimated completion dates.

Measure 8.3.3 Requirement: Complete all corrective actions in accordance with approved Corrective Action Plans (CAPS).

Performance Level Achieved:

Performance Level	Grade	Score
Complete all corrective actions associated w/formal CAPS on schedule.	B+	3.4

JSA Performance:

Completed all Security Survey corrective actions in accordance with approved Corrective Action Plans.

DOE TJSO letter dated 21 Sep 2006, “*Concurrence with 2006 Security Survey – Jefferson Lab Corrective Action Plan*” established the following corrective action submission dates and all were reasonably submitted on time. The results of the Security Self Assessment was submitted on 2 Jan 2007 instead of 1 Jan 2007 because the JLab was not open on New Years Day.

FINDING: 06Jun07-OR-0307-SSPS-PMS.4-001  
Due to DOE TJSO 1 Oct 2006  
Submitted 27 Sep 2006

FINDING: 06JUN07-OR-307-SSPS-PMS.7-002  
 Due to DOE TJSO 1 Jan 2007  
 Submitted 2 Jan 2007

FINDING: 06Jun07-OR-0307-SSPS-FVA.1-001  
 Due to DOE TJSO 1 Sep 2006  
 Submitted 29 Aug 2006

**Table 33. Objective 8.3 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>8.3 Provide Efficient an Effective System for the Protection of Special Nuclear Materials and Property</b>					
8.3.1 Maintain an effective Security Program.	A-	3.6	40%	1.44	
8.3.2 Demo effective Security Program through internal self-assessment/external reviews/surveys/inspections.	B+	3.4	40%	1.36	
8.3.3 Complete all corrective actions in accordance with approved Corrective Action Plans (CAPs).	B+	3.4	20%	0.68	
<b>Objective 8.3 Total</b>					<b>3.48</b>

**Objective 8.4 Provide an Efficient and Effective System for the Protection of Classified and Sensitive Information**

Measure 8.4.1 Requirement: Effectively operate a sensitive information system for the Laboratory’s Business Sensitive and Personnel Sensitive information

Performance Level Achieved:

Performance Level	Grade	Score
Meet new requirements for management of sensitive information on schedule, as applicable to JLab.	A-	3.7

JSA Performance:

Jefferson Lab completed the Annual Security Awareness training for all staff in January 2007, which included procedures and requirements for the protection of sensitive information; performed a preliminary evaluation for the new Sensitive Information and technologies at the Lab, mostly in the areas associated with the success of the FEL achieving 14.2 kW and activities and planning for 100 kW+ FEL; and updated the Sensitive Information policies, developing a process for a formal evaluation. The materials for training the FEL staff involved with sensitive information were prepared in September for delivery the first week of October. As of the end of the 3<sup>rd</sup> quarter, strong authentication had been rolled out for all core network, Linux, and Windows systems. The roll out of strong authentication for Business Administration enclave was completed in July and a broader rollout to other systems is underway.

Work in this period that enhanced Protection of Business Sensitive and Personnel Sensitive information.

- No compromises of Business Sensitive and Personnel Sensitive information.
- Firewall in place for Business Services network.
- Network segmentation was completed as part of the cyber security enhancement plan.
- Initial KPMG audit by JSA/SURA completed (Q2). System found to be very good with a few recommendations. Note, this is the first time that IT was broadly included as part of the KPMG financial audit. There was a follow-on KPMG IT audit in August 2007 as part of their on-going activities. Again, the IT systems were found to be very good with a few recommendations. These recommendations are incorporated in the cyber security POA&Ms that are a part of the new IT systems Authority to Operate.
- Independent Physical Security review completed. Informal feedback during interviews supported our planned upgrades to physical security.

**Opportunities for Improvement**

FY06 Weakness: *It was noted in the DOE FY06 Performance Evaluation Report, that the Lab's ability to protect sensitive information with moderate controls applied is not evident, leaving this data, which includes PII (Personal Identifiable Information), at risk. All JLab staff have completed the Annual Security Awareness training which included procedures and requirements for the protection of sensitive information.*

**Status:** 1) Cyber Enhancement Plan was completed. The Certification and Accreditation (C&A) package which included an updated Cyber Security Program Plan (CSPP) was also completed in September 2007. The new CSPP includes FIPS 199 Moderate controls for PII and other sensitive information. In the first week of October 2008 the C&A package was delivered and resulted in a new Authority to Operate (ATO). Initially two of the ten enclaves were considered to require Moderate controls, the Business – Admin enclave and the Core enclave, due to the presence of sensitive information such as PII in these enclaves. Based on a self assessment in August it was determined that the FEL enclave also needed Moderate controls and the final CSPP was appropriately updated. Several of the cyber security Plans Of Action & Milestones (POA&Ms) relate to moving from current mitigations to the final systems for the Moderate controls for the FEL enclave.

**Table 34. Objective 8.4 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>8.4 Provide Efficient and Effective Program for the Protection of Sensitive Information</b>					
8.4.1 Effectively operate sensitive info system for Lab’s Business and Personnel Sensitive information.	A-	3.7	100%	3.70	
<b>Objective 8.4 Total</b>					3.70

**Table 35. Goal 8.0 Performance Rating Development**

ELEMENT	Letter Grade	Numerical Score	Objective Weight	Total Points	Total Points
<b>8.0 Sustain and Enhance the Effectiveness of Integrated Safeguards and Security Management (ISSM)</b>					
8.1 Provide an Efficient and Effective Emergency Management System	A	3.80	30%	1.14	
8.2 Provide an Efficient and Effective System for Cyber-Security	A	3.80	50%	1.90	
8.3 Provide an Efficient and Effective System for the Protection of Special Nuclear Materials, Classified Matter, and Property	A-	3.48	10%	0.35	
8.4 Provide an Efficient and Effective System for the Protection of Classified and Sensitive Information	A-	3.70	10%	0.37	
<b>Performance Goal 8.0 Total</b>					3.76

**Table 36. Goal 8.0 Final Letter Grade**

<b>Total Score</b>	4.3-4.1	4.0-3.8	3.7-3.5	3.4-3.1	3.0-2.8	2.7-2.5	2.4-2.1	2.0-1.8	1.7-1.1	1.0-0.8	0.7-0
<b>Final Grade</b>	A+	A	A-	B+	B	B-	C+	C	C-	D	F