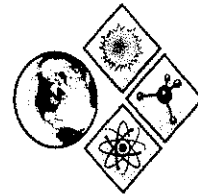




U.S Department of Energy
Office of Science (SC)
Stanford Site Office (SSO)
Stanford Linear Accelerator Center (SLAC)
2575 Sand Hill Road, MS-8A
Menlo Park, CA 94025



APR 11 2002

Dr. Jonathan Dorfan
Director
Stanford Linear Accelerator Center
2575 Sand Hill Road, MS-75
Menlo Park, CA 94025

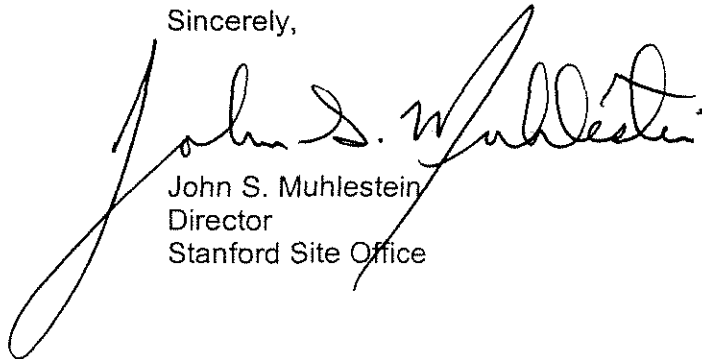
Dear Dr. Dorfan,

In accordance with the requirements of the DOE contract with the Board of Trustees for the Leland Stanford Jr., University for the management and operation of the Stanford Linear Accelerator Center (SLAC), enclosed is the DOE FY2001 Annual Performance Assessment of the Laboratory.

The FY 2001 overall rating for SLAC is **OUTSTANDING**. You and your staff are recognized for earning the highest overall rating of "*Outstanding*" for the fourth consecutive year. We would like to commend SLAC for your continued Outstanding performance in Science and Technology (S&T) Programs (e.g. B-Factory exceeded design, SLAC leads major R&D on NLC, continuous progress on the GLAST Project, SPEAR 3 outstanding operating statistics, SPEAR 3 Upgrade project on cost and schedule, and LCLS R&D proceeding well). The Overall Business Management (Including ES&H) was rated Excellent. Of the eleven Business Management areas evaluated, nine had no change in ratings from FY 2000, one (Communications & Public Affairs) had an increased rating from FY2000, and one (Environmental, Safety & Health) had a decreased rating from FY 2000.

The FY 2001 scores continue to demonstrate the increasing effectiveness of SLAC's performance-based management system. Our challenge is to safeguard the gains that have been made while continuing to strive for improvements where possible (with emphasis on Business Management System). The spirit of cooperation and teamwork that exists between SLAC and DOE is a strong foundation on which to ensure our continued success in support of DOE's missions and national goals. Please extend our congratulations to the Laboratory for this sustained level of performance. Should you have any questions regarding this report, please contact me at (650) 926-3208.

Sincerely,



John S. Muhlestein
Director
Stanford Site Office

Enclosure

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SLAC FY2001 Annual Performance Report Distribution

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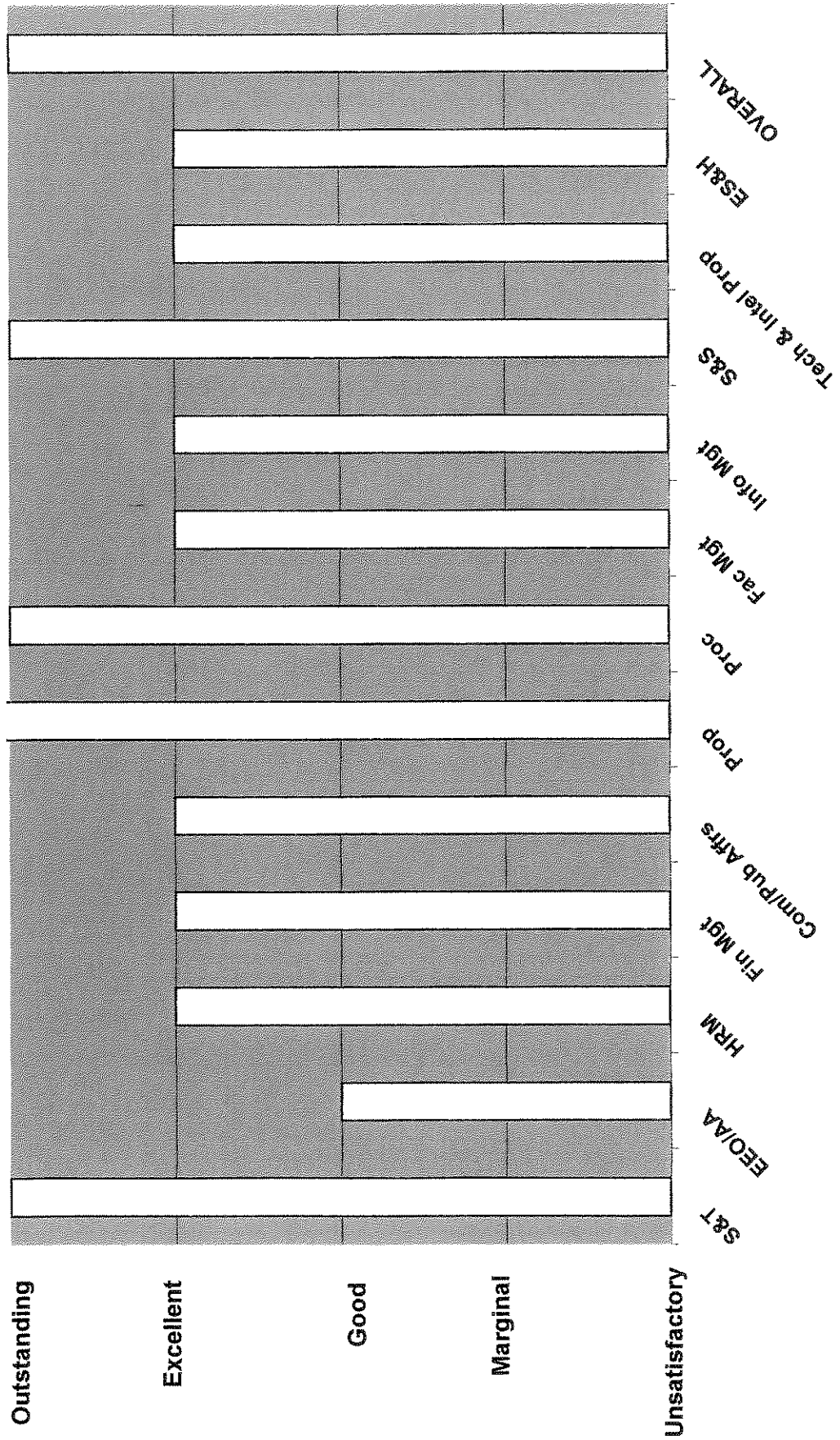
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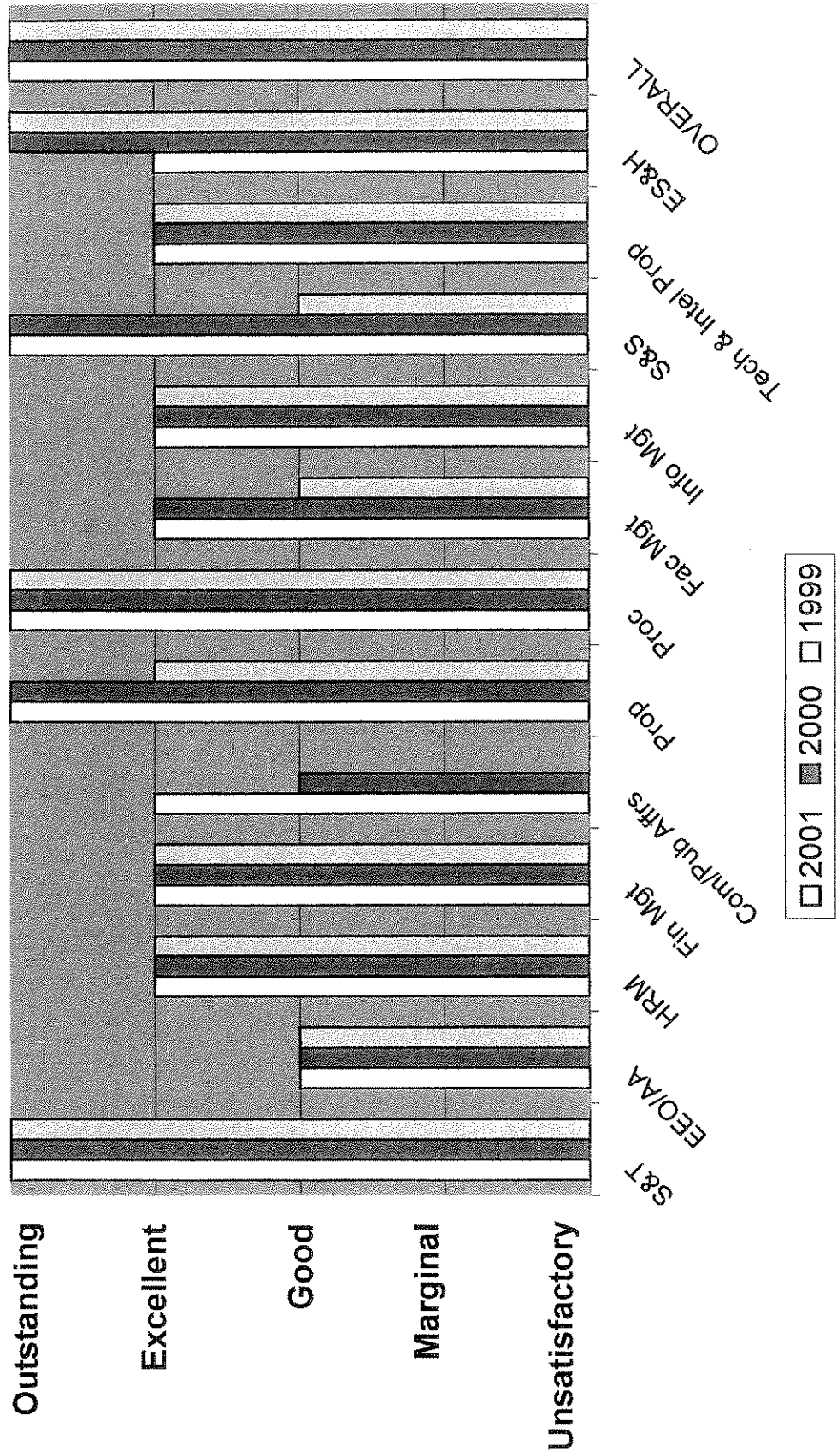
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Stanford Linear Accelerator Center FY 2001 Performance



SLAC Annual Performance FY 1999 to FY 2001



EXECUTIVE SUMMARY

I. PERFORMANCE-BASED ASSESSMENT PROCESS

This report is produced by the U.S. Department of Energy (DOE), Office of Science [High Energy Nuclear Physics (HENP), Basic Energy Science (BES), Office of Basic Energy Research (OBER)], the Stanford Site Office (SSO) and Oakland Operations Office (OAK), to evaluate the Stanford Linear Accelerator Center's (SLAC) overall performance. The evaluation areas are: 1) Scientific Research Programs and Technology Development and 2) Business Management (including ES&H). This evaluation is based upon an objective performance measurement system, validation of the Laboratory's self-assessments, scientific peer reviews, and ongoing operational awareness.

The period of performance for this Fiscal Year 2001 Annual Performance Assessment Report is October 1, 2000 through September 30, 2001. The rating is based upon a system evaluation, which provides previously agreed-to measures with weighted point scores, that are accumulated to determine the overall adjectival rating for SLAC. The rating characterization continued to be five tier, like last year, (outstanding, excellent, good, marginal, and unsatisfactory). The Scientific Research Programs and Technology Development section is weighted 60%, while the Business Management section (including ES&H) is weighted 40%. Appendix A of this report provides the methodology for the rating. Appendix B of this report provides detailed scores and ratings for each functional area.

The overall SLAC performance rating for FY2001 is **OUTSTANDING**. The Science and Technology Program summary rating of Outstanding is based upon input provided by Dr. James F. Decker, Acting Director, Office of Office (SC). The Summary Rating combines performance evaluations from the Office of HENP, BES, and OBER. The Business Management summary evaluations covers: Communications & Public Affairs, Environmental Safety & Health, Equal Opportunity & Affirmative Action, Facilities Management, Financial Management, Human Resource Management, Information Management, Personal Property, Procurement, Safeguard & Security, and Technology & Intellectual Property Management. A summary chart of the scoring and rating in each area is provided in Section V of this Executive Summary. A full text of the FY2001 Performance Assessment is provided under the Detailed Assessment Results.

II. SUMMARY OF SIGNIFICANT ACCOMPLISHMENTS:

This Executive Summary highlights noteworthy SLAC FY 2001 performance achievements, or recommended areas for improvement, rather than reiterating the scoring and adjectival ratings for each of the functional areas contained in the body of this report.

A. SCIENCE AND TECHNOLOGY

Introduction: Stanford University manages and operates the Stanford Linear Accelerator Center (SLAC) as a National User Facility for the U.S. Department of Energy (DOE). SLAC conducts research, design, construction, engineering, testing, training education, and technology transfer on behalf of DOE, in a manner that maintains a vigorous, forward-looking Scientific program. SLAC's mission is the generation and expansion of scientific and technical knowledge in: high energy physics; basic energy sciences; biological and environmental sciences; and, all appropriate areas of natural sciences, engineering, and related disciplines. High Energy Physics includes accelerator, experimental, and theoretical physics. Basic Energy Sciences included synchrotron radiation research in chemistry,

materials sciences, physics, and other disciplines. Biological and environmental sciences includes synchrotron radiation research in structural molecular biology, and medical sciences. SLAC was established as a National User Facility for the conduct of unclassified research, providing a unique resource for the DOE Office of Science and related User communities.

The very nature of scientific inquiry - its complexity, duration, and examination of the unknown - mitigate against the establishment of purely quantitative criteria for evaluating the results of this research. In recognition of this difficulty, a system utilizing the review by scientific peers has proven its worth in influencing the direction of, and establishing standards for, scientific research. In keeping with this tradition, DOE Headquarters Office of Science has used this peer review process to evaluate the science and technology programs at SLAC.

Overall S&T was rated: Outstanding for FY 2001. The breakdown is:

HEP = Outstanding
Synchrotron Radiation = Outstanding.

Last year, FY2000 overall rating was also Outstanding.

High Energy Physics Performance Evaluation

SLAC operates leading-edge HEP research programs on several fronts, including: studies using the B-Factory (PEP-II Storage Rings) Collider and its BaBar Detector; small-scale experiments using the electron or positron beam from the 2-Mile Long SLAC Linac; construction of an innovative space-based particle astrophysics experiment (GLAST); laying the groundwork for a long-range future program, by pursuing accelerator research toward the design of an energy-frontier collider; and, performing theoretical physics.

Quality of Fundamental and Applied Science

B-Factory (PEP-II Collider and BaBar Detector): Currently, SLAC is focused on studies of CP violation using the B-Factory and BaBar. The B-Factory proved to be a spectacular success by achieving design luminosity in an extremely brief time after commissioning. The PEP-II Collider has continued its impressive performance this past year with world records for integrated luminosity, and local records for instantaneous luminosity. The BaBar collaboration published the first conclusive observation of CP violation outside the neutral kaon sector, when they measured in the B meson system a non-zero angle beta in the unitary triangle, using theoretically unambiguous decay processes. This is the first of several planned measurements of CP violation in the B sector, which represents a very important, but small fraction of the physics available in the BaBar experiment. Other areas are rare B decays, mixing, decays, and charm decays. Twelve papers were submitted for publication in FY 2001, and twenty more were presented at international conferences, with publication planned for the near future. BaBar is a huge (600 member) collaboration with members from universities and laboratories spanning the US and eight other countries. There are approximately 130 graduate students and 100 postdoctoral researchers receiving training on BaBar.

Fixed Target Experiments: SLAC continues a program of fixed target experiments using End Station A. The E-158 experiment to measure parity violation in Moeller scattering has moved successfully from construction to commissioning. This experiment will measure electroweak mixing at an energy scale far below the boson mass, and test for new physics.

Advanced Accelerator R&D: SLAC continues to be an international leader with its outstanding program of accelerator technology research. For many years, the Laboratory has conducted a world-class

R&D program directed toward a TeV scale electron-positron linear collider, called the Next Linear Collider (NLC). Progress continued this past year.

Astrophysics: SLAC continues collaboration with NASA on a particle astrophysics experiment to detect gamma rays in space. SLAC is the host laboratory for the Large Area Telescope for the Gamma Ray Large Area Space Telescope (GLAST) mission, scheduled for launch in 2005. SLAC was the leader in organizing the international collaboration for the design and execution of the project. This experiment utilizes detector technologies, such as CsI electromagnetic calorimeters and silicon-microstrip trackers, to study the physics problem of how high-energy gamma rays are produced in space.

Theory: The SLAC theory group works in a variety of areas. At the HEP annual review, their work was evaluated to be excellent, with significant impact on the field. Current topics include: Physics at the Next Linear Collider; Physics at Bottom and Charm Factories; Quantum Chromo-Dynamics at High Energy; Computational Quantum Field Theory; Space-Time Physics at Accelerators; Superstring Theory and M-Theory; and New Theoretical Models.

Relevance to DOE Missions and National Needs

National User Facility: SLAC, together with Fermilab, provides the core accelerator facilities for the US High Energy Physics (HEP) Program. SLAC is the primary facility for lepton (electron/positron) beams. The Laboratory has effectively proven the linear collider concept by successfully constructing and operating a series of linear collider facilities, and remains the primary source of expertise in linear colliders in the US HEP Program. The entire international colliding beam program has benefited from SLAC's pioneering work on state-of-the-art test facilities, and simulation codes for colliding beams. This work has enormously contributed to the development of advanced free electron lasers (FEL). These facilities are open to, and used extensively by, a diverse group of national and international university and laboratory Users in development of concepts and instruments to further the goals and objectives of DOE Strategic Plans.

Advanced Physics Computing: The BaBar detector continues to pioneer advanced computing for the high energy physics community, in the B use of: object-oriented programming; C++ computer language; and, storing, retrieving and analyzing event data from multi-hundred CPU computing arrays. SLAC is working with industry, through Cooperative Research and Development Agreement (CRADA) and Small Business Innovation Research (SBIR) agreements, to develop the object-oriented database management program upon which future distributed analysis for CERN's Large Hadron Collider (LHC) and other major experiments depend. US LHC detector programs – Brookhaven's ATLAS and CMS at Fermilab-continue to benefit from BaBar's work in this area.

Advanced Accelerator R&D: SLAC, with its expertise in linear colliders, continues to be an international leader in Next Linear Collider R&D. In addition, SLAC runs a program of advanced accelerator research, beyond the design of the NLC, including: fundamental aspects of accelerator and beam physics; two-beam linear colliders; advanced accelerator structures; high power RF systems and components; plasma lens final focusing; millimeter-wave accelerators; laser-driven structures; plasma wakefield acceleration; and, a facility for advanced accelerator research.

Online Physics Database (WWW): The SLAC SPIRES database continues to be the primary on-line source for electronic access to high energy physics publications. In addition, the Beam Line quarterly magazine is an excellent source of high quality articles for the educated general public and provides a real service to the community in trying to convey an understanding of the field to the general public.

Note: This year was the tenth anniversary of the first World Wide Web (WWW) sites in America at SLAC. The WWW was invented by Tim Berners-Lee at the European Laboratory for Particle Physics (CERN) in Geneva, Switzerland in late 1990, to communicate over the Internet the

blizzards of documents generated in high-energy physics. With CERN colleague Robert Cailliau, he set up the first Web server, and developed most of the software and protocols. After learning of their invention during a September 1991 visit to CERN, SLAC physicist Paul Kunz brought back the software, and established the first North American Web server at SLAC in December. SLAC's head librarian, Louise Addis made the invaluable SPIRES-HEP database available over the Web. This quickly became the Web's first "killer app", as Fermilab physicists set up another Web server just a few weeks later. SLAC physicist Tony Johnson developed a graphical browser (Midas), which later influenced Marc Andreessen's development of the popular Mosaic browser. With these key advances, Web use surged in the high energy physics community, and word spread to the world at large of this powerful new communications technology.

Effective and Efficient Research Program Management

Research Program Management: Overall, SLAC management continues to plan for, and run, a very effective program of research. The integrated luminosity records achieved by the B-Factory in the last year demonstrate this. Although the peak luminosity record is now held by KEK-B, the B-Factory integrates more luminosity, due to the very high efficiency of the B Factory operation. A plan is in place to increase the luminosity to keep the B-Factory equal to, or better than, KEK-B. In addition, SLAC has successfully solved a computer resource problem for BaBar, by negotiating the construction of major computing centers in Europe funded by European agencies.

SLAC continues to work cooperatively with NASA and international collaborators in a very effective manner to keep the GLAST experiment on track. Steps were taken to strengthen project management. In this past year, the SLAC and Fermilab directors jointly appointed the NLC Machine Advisory Committee to evaluate the quality and direction of NLC research.

Although Laboratory management is strong, the associate director of research position has continued to be filled on an acting basis. The deputy directorship was filled by an inside candidate, not from the outside, which is generally acknowledged as preferable.

Success in Construction and Operation of Facilities

SLAC continues to construct and operate cutting edge experiments and facilities in an efficient, reliable, safe, and environmentally sound manner. As noted above, SLAC continued to improve the performance of the B-Factory. The peak luminosity achieved in FY 2001 was $4.21 \times 10^{33} \text{ cm}^{-2} \text{ sec}^{-1}$, which exceeds the design peak luminosity ($3.0 \times 10^{33} \text{ cm}^{-2} \text{ sec}^{-1}$). Operation of the B-factory and BaBar was efficient, with record integrated luminosities being achieved. The best 8-hour shift was 96.1 inverse picobarns (pb⁻¹) delivered and 91.8 pb⁻¹ collected by BaBar. Records were also set on day, week and monthly time scales. The integrated luminosity, since first events were recorded in May 1999, is 54 inverse femtobarns (fb⁻¹).

The Research Office Building is near completion (expected January 2002), and is on schedule and within budget.

Synchrotron Radiation Research Performance Evaluation

Office of Basic Energy Sciences, and Office of Biological and Environmental Sciences

Quality of Fundamental and Applied Science

The Office of Basic Energy Science's (BES) Division of Materials Sciences and Engineering (DMS&E) provides research support using the Stanford Synchrotron Radiation Laboratory (SSRL) and other synchrotron facilities. The quality of the research at SSRL is very highly regarded, with first-rate

investigators working on important research problems important to the BES program.

The on site review of the Stanford Synchrotron Radiation Laboratory (SSRL) by the Office of Basic Energy Sciences (BES) during FY 2001 indicated that the quality of the research performed at SSRL by staff and Users is impressive. The number and quality of science publications is impressive. The input obtained from individual conversations with staff scientists indicates a uniformly enthusiastic, interested, and creative attitude. The staff at SSRL continues to play a leading role in creating new fields of applications of synchrotron radiation techniques.

The SSRL research program is outstanding in developing new technologies for structural molecular biology (SMB). Leading-edge developments in robotics and automation, data analysis and management, and experimental techniques were implemented during the past year. The SMB staff are recognized internationally as outstanding. Scientific results from the SMB User program continue to receive widespread recognition through publication in the leading journals.

Users are very satisfied with the mode of operation at SSRL. There is still a significant oversubscription to the SSRL beamlines, an indicator of the scientific community appreciation of the facility. SSRL has excellent staff support for Users that can serve as a model to other facilities. The beam time distribution appears equitable. Staff does not get a disproportionate amount of beam time, and their use is highly productive.

In the past few years, DMS&E has supported the outstanding work of Z-X Shen, who has made considerable progress in pursuit of the High Tc Superconductor problem. This area is central to the condensed matter physics research supported by this division. Martin Grevin initiated a first-rate crystal growing effort at SSRL, and is using the crystals grown in both x-ray and neutron scattering--an effort consistent with the DMS&E emphasis. The addition of Jo Stohr is welcomed, and strengthens the research being carried out by SSRL scientists by adding new microstructure areas of magnetic and polymeric materials -- Photoelectron Emission Microscope 2 (PEEM2) and, potentially PEEM3. New nanoscience efforts funded by BES on the Stanford campus will result in closer ties with outstanding materials science at SSRL. This total effort holds the promise of providing an effective, coherent effort in strongly correlated electronic materials.

Other BES-supported activities include:

- o collaboration with University of Texas at Ed Paso, to enhance the participation of Hispanic students in x-ray scattering;
- o LCLS and FEL collaboration with other laboratories; and,
- o microbeam technique development with Batterman.

All of these are of great importance to the goals of DMS&E, and are being performed at an outstanding level.

Relevance to DOE Missions and National Needs

The research carried out at SSRL is strongly supportive of the DOE missions. The operation of SSRL also fills the stewardship role for the Nation, as a DOE-supported User Facility serving researchers at universities (67%), DOE Laboratories (14%), other government (1%), industry (7%), and international laboratory (1%) in FY 2001.

SSRL facilities in structural molecular biology continue to be in high demand by scientists around the country, and internationally. The SMB program serves leaders in structural biology from all sectors. The current program for upgrading the SPEAR Storage Ring, and the parallel program to upgrade the SMB beamlines, will assure continued strong contribution by SSRL to the DOE mission responsibilities in operation of User Facilities.

Effective and Efficient Research Program Management

The outstanding and relevant science performed at the SSRL equates to outstanding Program Management. Outstanding scientists have been attracted to SSRL in recent years including Jo Stohr and John Mao.

SSRL has an outstanding plan for upgrading the structural molecular biology facilities to take advantage of the new SPEAR3 Ring, when it is completed. This plan is being funded by DOE OBER and NIH-NCRR, and is on target for budget and schedule. The SMB User program is very well managed, enabling access by the largest possible number of Users through careful scheduling, and efficient use of personnel and equipment resources. Information on operations and the upgrade program is widely disseminated through the SSRL web site, and communications to Users at meetings and workshops.

Success in Construction and Operation of Facilities

SSRL has been operating in an extremely productive manner over the past year. A 95 percent availability beam time is excellent, and is indicative of quality accelerator staffing. Recovery from major disasters, such as the loss of a wiggler magnet, appears to be impressively rapid. Several Users commented that it was a "real pleasure to do science at SSRL these days."

The SPEAR3 construction project, headed by Tom Elioff, is proceeding in an exemplary manner. It is on time and within budget. The project continues to make progress on the technical system components to begin pre-assembly of the equipment girders. The project is effectively resolving technical issues and managing priorities. Efforts for the next year will focus on completing the FY03 installation schedule, receiving the RF cavities and klystron, and assembling the vacuum chambers to support the girder pre-assembly process. This is important to the BES mission in support of User Facilities.

B. BUSINESS MANAGEMENT

Introduction: Overall Business Management was rated Excellent for FY2001. Of the eleven functional areas evaluated, 9 had no change in ratings from FY2000 to FY2001:

- Equal Opportunity and Affirmative Action Good
- Human Resources Management Excellent
- Financial Management ~~Good~~ *Excellent*
- Personal Property Outstanding
- Procurement Outstanding
- Facilities Management Excellent
- Information Management Excellent
- Safeguards and Security Outstanding
- Technology and Intellectual Property Management Excellent

One functional area increased rating from FY 2000 to FY 2001:

- Communications and Public Affairs Good to Excellent

One functional area decreased rating from FY 2000 to FY 2001:

- Environment, Safety & Health Outstanding to Excellent

One success area is identified below, and the rest can be found in section II. A few areas needing improvement are summarized in Section III.

Functional Areas Increased Ratings

Communications & Public Affairs: The overall rating increased from Good to Excellent for FY01. This improvement can be attributed to the following achievements: improve its Virtual Center Web Site, additions included two on-line technology tools with access to real time data for exhibits in the Visitor Center and 2) hiring of a new Associate Director.

III. RECOMMENDED AREAS FOR IMPROVEMENT

A. SCIENCE AND TECHNOLOGY

None

B. BUSINESS MANAGEMENT

Environment, Safety & Health

SLAC's overall rating for ES&H is Excellent for FY2001. This rating is based upon the combined evaluation of SLAC's performance on the ES&H outcome measures, and the Integrated Safety Management System (ISMS) process measure. In FY 2001, SLAC performed at an Outstanding level on each of the four (4) quarterly ISMS reviews having demonstrated effective implementation on at least six (6) of the (7) elements that comprise one portion of the evaluation of performance against the ISMS process measure.

As a result of construction safety issues at Building 33 (GLAST Clean Room), however, and a stop activity initiated by the SSO Director in FY2001, SLAC was required to submit a corrective action plan to address site-wide implementation of stop activity/work authority, oversight of subcontractors and contractor pre-qualification. The overall performance on the ISMS process measure was downgraded as a result of the Building 33 construction safety issues requiring follow-up by SLAC.

Track and Trend standards are meant to be utilized for functional areas where performance gradients have not yet been established. They have been utilized in several function area for same years with SLAC receiving performance ratings well below what has been actual performance level. SLAC cannot achieve above a "Good" rating for said areas. Therefore, it is recommended that all Track and Trend standards be replaced with preferred performance gradients for functional areas to reflect objective performance at the five-tier gradient methodology. The SSO and OAK will work with Human Resources, Finance, Safeguards and Security, and Communications & Public Affairs. It is recommended that the SLAC and DOE agree to gradients for these areas will be included in modification to the contract.

Equal Opportunity and Affirmative Action

SLAC's strategic plan for improving the representation of high priority job groups reflects a status quo approach to the efforts the laboratory will undertake. The plan cites activities in which SLAC has participated for several years, which generally focus on the development of a pipeline, yet, in the Mechanical Engineering group, this approach directly contradicts SLAC's stated need to "...fill engineering positions with 'extensively experienced' applicants as opposed to recent graduates with limited experience...". It is the SSO's and OAK's intent to work closely with SLAC during the 2002 appraisal period to address methods of utilizing the strategic plan to make progress in the high priority job groups within the limitations of SLAC's financial status.