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February 6, 2002

Mr. Jerry Conley, Acting Manager
Department of Energy Site Office
Thomas Jefferson National Accelerator Facility
12000 Jefferson Avenue
Newport News, VA 23606

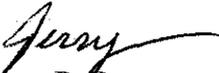
Dear Jerry:

I am pleased to transmit the Jefferson Lab's FY 2001 Self Assessment called for in clause H.32 of the current contract between the Department of Energy (DOE) and the Southeastern Universities Research Association (SURA) for the management and operation of the Thomas Jefferson National Accelerator Facility.

We believe this Self Assessment represents a fair and honest evaluation of the Jefferson Lab operations in FY2001 based on the results of performance measures and peer reviews conducted during the past year. These results for FY2001 support "outstanding" ratings in each of the major categories of the laboratory's responsibilities and an overall rating of "outstanding." The SURA Corporate Office is again grateful to the Director, management, and staff of the Jefferson Lab for achieving these ratings.

SURA appreciates the high level of cooperation from the Site Office and the Office of Science in assuring effective implementation of its contract with the Department. We look forward to productive working relationships with you and with the Department in the future.

Sincerely,


Jerry P. Draayer
President

Cc (w/o attachments): Christoph Leemann
Donald Lehman
Thomas Clegg

FY01 JEFFERSON LAB
SELF ASSESSMENT OF
CONTRACT PERFORMANCE



Thomas Jefferson National Accelerator Facility

DIRECTOR'S OVERVIEW

Jefferson Lab's performance based management contract requires ongoing self-assessment based on negotiated performance metrics. An aggressive, comprehensive self-assessment allows us to identify our accomplishments and strengths as well as areas for improvement. We approach our self-assessment program as a value-added, useful activity for line management. In fiscal year 2001, our performance metrics resulted in a rating of "Outstanding."

Peer review outcomes for Science and Technology, Business and Administrative Practices, Institutional Management (biennial, held in 2000), and Emergency Management have produced outstanding ratings for the Lab during the past year. We continue to conduct a demanding experimental program that is producing excellent physics. In delivering beam energies well above our 4GeV design, we have completed data taking for 42 full experiments and parts of 44 more. Our levels of polarized beam are unprecedented. Our leadership in the core competency of superconducting radio frequency (SRF) enables us to collaborate on world-class projects; currently, the SNS and perhaps RIA in the near future. Our performance on the SNS in FY 2001 has been strong with on cost and schedule completion of deliverables. Our Free Electron Laser is building a significant user community (over 100 members) and is undergoing an energy upgrade to 1kW in the ultraviolet and 10kW in the infrared. EH&S performance continues to shine, and in FY 2001, we set a new record for the number of consecutive days without a lost-time injury. We are proud that our "Becoming Enthusiastic About Math and Science" (BEAMS) program has helped 6th, 7th and 8th grade participants improve their math and science scores on Virginia's Standards of Learning Tests.

It is important to note that the significant progress and accomplishments of last year were made during a very difficult time, as Lab leadership was in a tremendous state of flux. The departure of then Director, Hermann Grunder in November of 2000 led to my stint as interim director and created a void at deputy director. In March 2001, we welcomed the addition of Swapan Chattopadhyay as the new associate director for accelerators. In November of 2001, I was named permanent director of the Laboratory. A top priority for this year is to firm up my leadership team by filling the vacant positions of chief scientist and deputy director.

Perhaps the most exciting news for us in 2001 was the inclusion of the 12 GeV accelerator upgrade in NSAC's Long Range Plan recommendations. At this energy, we will be able to access new and exciting science that will keep the nation at the forefront of physics. Securing the upgrade and its funding is a top priority, and we will work diligently to ensure its success.

Looking to the future, we have developed and presented our 2002-2006 Institutional Plan to the Division of Nuclear Physics, which gave the plan its full blessing. This plan sets high-level goals that provide a basis for Lab activities. It is aggressive, ambitious and responsive to the DOE and national mission needs. As stated in the plan, our goals are: to conduct a physics program of the highest scientific priority at the nuclear/particle physics interface; to maintain and further develop world leadership in our underlying core competencies; to apply Jefferson Lab innovations to enhance national goals and objectives; to achieve an effective balance between accomplishing the current program and making necessary investments in the future scientific

vitality of the facility; to continue as a recognized leader in safe, secure, and environmentally sound operation; and to serve as an asset to and an integral member of our community.

As we work to accomplish our goals, the immediate challenges will be to: (1) maximize productivity without sacrificing the longer term future; (2) maintain leadership in our core competencies; (3) implement the 12 GeV upgrade in a constrained budget scenario, and (4) recruit the best candidates for vacant, key leadership positions. As the new director, I am excited and prepared to lead the Lab through the challenges that lie ahead and look forward to our continued success.

**OVERVIEW OF
FY01 APPENDIX B PERFORMANCE MEASURES SCORING
BY PERFORMANCE AREA**

APPENDIX B PERFORMANCE MEASURES AND THEIR KEY INDICATORS

Section	Description	Key Indicator	Point Value
1	Outstanding Science and Technology	Peer Review	300
2	Reliable Operations	Delivered Physics Research Operations	250
3	Production of Scientific and Technical Manpower	Number of Student Years on Jefferson Lab-related research activities	75
4	Corporate Citizenship – Public Outreach Corporate Citizenship – Tech Transfer	<ul style="list-style-type: none"> • Public Participation • Non-DOE Investment in Jefferson Lab Initiatives 	75
5	Quality Performance in Environment, Health, and Safety	<ul style="list-style-type: none"> • Cost of Injuries • Environmental Permit Exceedances 	100
6	Business & Administrative Practices	Peer Review	100
7	Responsible Institutional Management	Peer Review	100
8	Spallation Neutron Source	Schedule Performance	30
Total Point Value			1030

TOTAL SCORE - APPENDIX B PERFORMANCE MEASURES

Section	Description	Point Value	Points Awarded	Percent of Assigned Pts	Adjectival Rating
1	Outstanding Science and Technology	300	285.1	95.0%	Outstanding
2	Reliable Operations	250	245.7	98.3%	Outstanding
3	Production of Scientific and Technical Manpower	75	74	98.7%	Outstanding
4	Corporate Citizenship	75	74.1	98.8%	Outstanding
5	Quality Performance in Environment, Health, and Safety	100	96.9	96.9%	Outstanding
6	Business & Administrative Practices	100	93.5	93.5%	Outstanding
7	Responsible Institutional Management	100	93	93.0%	Outstanding
8	Spallation Neutron Source	30	27.9	93.0%	Outstanding
Total FY01 Score Appendix B		1030	990.2	96.1%	Outstanding

DETAILS OF SCORES BY PERFORMANCE MEASURE

1. Outstanding Science and Technology						
PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
1.0	Outstanding Science and Technology	300	285.1	300	285.1	Outstanding
TOTAL OUTSTANDING S&T		300	285.1	% of assigned pts = 95.0%		Outstanding
2. Reliable Operations						
PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
2.0	Delivered physics research operations	150	150	6,814 hours	8,109 hours	Outstanding
2.1	Beam availability	25	22.1	76.8%	68.0%	Excellent
2.2	Experimental equipment availability	25	25	78.4%	84.1%	Outstanding
2.3	Effectiveness of the scheduling process	25	23.6	100%	94.4%	Outstanding
2.4	Overall operations effectiveness	25	25	30 weeks	33.6 weeks	Outstanding
TOTAL RELIABLE OPERATIONS		250	245.7	% of assigned pts = 98.3%		Outstanding
3. Production of Scientific and Technical Manpower						
PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
3.0a	Number of student years per year on Jefferson Lab related research or technical activities	35	35	1,075	1,089	Outstanding
3.0b	Number of advanced degrees per year based on Jefferson Lab research	25	25	53	67	Outstanding
3.1	Number of advanced degrees per year granted by minority universities and based on Jefferson Lab research	5	5	6	7	Outstanding
3.2	Participation of students from groups traditionally underrepresented in physical science and engineering fields	10	9	376	340	Outstanding
TOTAL SCIENTIFIC MANPOWER		75	74	% of assigned pts = 98.7%		Outstanding
4. Corporate Citizenship						
PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
4.0	Public participation (in effective person-hours per year)	20	20	80,000	109,288	Outstanding
4.1a	Public visibility: number of media citations mentioning Jefferson Lab and its science and technology	7	7	400	1,338	Outstanding
4.1b	Percentage of these citations mentioning DOE	3	3	>90%	100%	Outstanding
4.2	Customer satisfaction	5	4.7	>90%	93%	Outstanding
SUBTOTAL PUBLIC OUTREACH		35	34.7	% of assigned pts = 99.1%		Outstanding

PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
4.3	Non-DOE investment in Jefferson Lab initiatives (including direct dollars, manpower costs, and contributions in-kind)	20	20	2 – 2.5% of JLab ops budget	12%	Outstanding
4.4	Intellectual property generation as indicated by the annual number of (a) Patent applications (b) Patents awarded (c) License agreements	10	10	5 or 1 or 2	6 3 0	Outstanding
4.5	Benefit to partners based on customer surveys	10	9.4	5.0	4.4	Outstanding
SUBTOTAL TECH TRANSFER		40	39.4			Outstanding
TOTAL CORPORATE CITIZENSHIP		75	74.1	% of assigned pts = 98.8%		

5. Quality Performance in Environment, Health, and Safety

PM	Description	Point Value	Pts Awd	Goal	Raw Score	Adjectival Rating
5.0a	Occupational Injury Cost Index	35	35	50% better than DOE lab average	60% better	Outstanding
5.0b	Environmental Exceedances	20	20	4 times as good as the DOE complex average	No exceedances	Outstanding
5.1	Lost Work Day Case Rate	15	12.5	50% better than DOE lab average	JLab = 1.5 DOE Labs = .9	Excellent
5.2a	Reportable Radiation Exposures	4	4	Satisfactory ALARA program; no exposures >80% of ORPS threshold	Better than satisfactory program	Outstanding
5.2b	Hazardous Substance Exposures	4	4	No exposures above OSHA action level	No reportable exposures	Outstanding
5.3	Solid Waste Recycled	6	6	Exceed FY94 baseline ratio by 44% (increase from 15% in FY99)	Exceeded goal	Outstanding
5.4a	Radioactive Waste Generation	4	4	>90% of radioactive waste generated for useful purposes	Exceeded goal	Outstanding
5.4b	Hazardous Waste Generation	4	4	Produce <.25 of maximum useful hazardous waste	.12	Outstanding
5.5	Peer Review of the Emergency Management Program	4	4	Appropriate program = 100	98 (99% of points available)	Outstanding
5.6	“Highly Protected Risk” Rating for High-Value Facilities	4	3.4	All facilities meet highly protected risk designation	93% highly protected	Excellent
TOTAL EH&S		100	96.9	% of assigned pts = 96.9%		Outstanding

6. Quality of Business and Administrative Practices						
PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
6.0	Peer Review	70	64.3	100%	91.9%	Outstanding
	SUBTOTAL PEER REVIEW	70	64.3	% of assigned pts = 91.9%		Outstanding
6.01	% of overrun on all projects > \$100K	1	1	≤ 8%	3.11%	Outstanding
6.02	Variance of scheduled completion time for projects > \$100K	1	1	≤ 1.10	1.0	Outstanding
6.03	% of scheduled preventive maintenance tasks completed by their scheduled due dates	2	2	≥ 94%	99.97%	Outstanding
6.04	Average % of all open corrective maintenance tasks that have been open for > 3 months	2	2	≤ 10%	3.57%	Outstanding
	SUBTOTAL FACILITIES (6.1 – 6.4)	6	6	% of assigned pts = 100%		Outstanding
PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
6.05a	% of value of property not located during the inventory cycle: Capital Property	1.5	1.5	< 1%	0.0%	Outstanding
6.05b	% of value of property not located during the inventory cycle: Sensitive Property	1.5	1.1	< 1%	1.8%	Good
6.05c	% of value of property not located during the inventory cycle: Stores Property	1	1	< 1%	0.8%	Outstanding
6.06	% of values of Stores Inventory reduced	1	.9	≥ 10%	10.4%	Excellent
	SUBTOTAL PROPERTY (6.5 – 6.6)	5	4.5	% of assigned pts = 90%		Outstanding
6.07	Number of CAS violations	1	1	0	0	Outstanding
6.08	Dollar % of invoices deemed unallowable	1	1	<1%	0%	Outstanding
6.09	% of vendor invoices paid with discounts lost	1	1	<1%	.13%	Outstanding
6.10	% of annual actual cost variance from budget for each overhead pool	1	1	<3%	.18%	Outstanding
6.11	Number of occurrences that Cost Management Report had to be resubmitted to Contracting Officer – DOE Site Office	1	1	0	0	Outstanding
6.12	Number of audit errors in travel expense reports	1	1	<2%	1.63%	Outstanding
	SUBTOTAL FINANCE (6.7 – 6.12)	6	6	% of assigned pts = 100%		Outstanding
6.13	Average procurement cycle time	3	3	<11 days	7.02	Outstanding
6.14	% of total available purchasing dollars awarded to: small business concerns, small women-owned business concerns, and small disadvantage business concerns	SB 1 WO 1 SD 1	1 1 1	≥46% ≥6% ≥7%	62.3% 7.6% 8.2%	Outstanding
	SUBTOTAL PROCUREMENT (6.13 – 6.14)	6	6	% of assigned pts = 100%		Outstanding

6.15a	% of action oriented diversity commitments as established in the Affirmative Action Plan	1	1	≥ 90%	100%	Outstanding
6.15b	Representation of protected classes within each EEO-1 category	1	.9	100% Maintained	85%	Excellent
6.16	Sustainable EEOC charges	1	1	0	0	Outstanding
6.17	Compensation positions aligned with market practices	1	1	± 3% of market average	-2.6% of market average	Outstanding
6.18	% of 3-year rolling average of annual increases in premium cost relative to market	1	.8	≥ -5%	.3% above market	Excellent
6.19	% of current year's papers written by JLab staff or users placed online	1	1	≥ 97%	100%	Outstanding
	SUBTOTAL HUMAN RESOURCES AND SERVICES (6.15 – 6.19)	6	5.7	% of assigned pts = 95%		Outstanding
6.20	Number of times JLab computer systems were compromised or used to attack other systems	1	1	≤ 1	0	Outstanding
	SUBTOTAL CYBER SECURITY (6.20)	1	1	% of assigned pts = 100%		Outstanding
TOTAL BUSINESS & ADMIN PRACTICES		100	93.5	% of assigned pts = 93.5%		Outstanding
7. Responsible Institutional Management						
PM	Description	Pt Val	Pts Awd	Goal	Raw Score	Adjectival Rating
7.0	Responsible Institutional Management	100	93	100	93	Outstanding
TOTAL INSTITUTIONAL MANAGEMENT		100	93	% of assigned pts = 93%		Outstanding
8. Spallation Neutron Source						
PM	Description	Pt Val	Pts Awd	Goal	Raw Score	Adjectival Rating
8.0	Spallation Neutron Source	30	27.9	≤ one month behind schedule	-0.7 month	Outstanding
TOTAL SPALLATION NEUTRON SOURCE		30	27.9	% of assigned pts = 93%		Outstanding
Total Appendix B Score on Performance Measures						
TOTAL APPENDIX B SCORE		1030	990.2	% of assigned pts = 96.1%		Outstanding

1. Outstanding Science and Technology

Overview

PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
1.0	Outstanding Science and Technology	300	285.1	300	285.1	Outstanding
TOTAL OUTSTANDING S&T		300				

The experimental program at Jefferson Lab continues in steady state operation, with all three halls in production running at design specification. Following PAC20, the complete approved experimental program broken down by subject and Hall is:

Topic	Number	Hall A	Hall B	Hall C
Nucleon and Meson Form Factors and Sum Rules	19	7	4	8
Few Body Nuclear Properties	23	13	5	5
Properties of Nuclei	24	6	10	8
N^* and Meson Properties	39	6	26	7
Strange Quarks	17	4	11	2
Total	122	36	56	30

The Lab believes that this approved program represents some of the best nuclear physics that will be done anywhere in the next ten years. The program to date is having a major impact on our understanding of the basic quark structure of matter, and the portion of the program that has been approved but not yet run is of uniformly high quality as a consequence of both the outstanding capabilities of the accelerator and experimental equipment and the intense competition for beamtime.

As of the end of FY01, we have completed data-taking for roughly 54% of this program (though analysis of the data is not as far along). Full data is at hand for 42 of the 122 approved experiments, and significant portions of the needed data have been obtained for 44 more. We were gratified to see that the Science and Technology Peer Review Panel agrees with our assessment of the significance of this program, and that it appreciated the progress toward reducing the backlog through a combination of reliable operations and the jeopardy review process.

Other achievements of significance in the nuclear physics program included: a year of three-hall operation with good accelerator and high hall availability, and a multiplicity over 2.5; the demonstration of 6 GeV capability; and the delivery of 5.8 GeV beam for physics. The large backlog of experiments (~4 years at the present, 30 week/year level of operations) continues to be a concern. Progress has been made toward reducing it through a thoughtful review of scientific priorities via the PAC jeopardy process, and this avenue will continue to be pursued. However, the preferred solution would be increased weeks of accelerator operations and increased availability, both of which are difficult in times of tight resources. The additional operating funds required to have a significant (~25% increase) impact on overall scientific throughput are relatively modest.

We share the Panel's concerns for the Laboratory's scientific leadership that result from Nathan Isgur's untimely death. The search for a new Chief Scientist and/or Head of the Theory Group is now

underway. We are also considering the establishment of a Scientific Policy Committee to advise the Laboratory on long-range planning issues.

In the interim, the Theory Group has been functioning effectively under Franz Gross' leadership, Frank Close continues to serve as a scientific advisor, and Dr. Yuri Semenov has joined the Theory Group for a year as the first person in our newly-established, rotating distinguished visiting theorist position, which is aimed at bringing senior theorists to the Lab for extended visits. Two new theorists in Lattice QCD have been added to the group this past year, and we are delighted that the S&T Review panel shares our enthusiasm for this important new direction in the JLab theory effort.

The Panel also noted our progress toward addressing the fact that the research staff doesn't have adequate time for their own research program; there were three open positions in the Physics Division at the time of the review, and we expect to fill them in FY02.

Accelerator operations in FY01 continued to receive an outstanding rating in view of the excellent beam quality provided. Although the accelerator availability was lower than desired, the combination of physics and accelerator operations exceeded the goals for delivered physics for the year. Accelerator availability was reduced in part by a conscious decision by the Laboratory to operate the machine at energies above 5 GeV (where availability is reduced by a variety of effects) because of the enhanced physics opportunities provided by the higher beam energy. We are working hard to improve the machine availability, and the two new cryomodules planned over the next two years will contribute significantly to machine performance at energies above 5 GeV.

The 12 GeV upgrade is clearly key to the Laboratory's future. We share the Panel's enthusiasm for this important step, and their recognition that the Laboratory's (and its user community's) effective advocacy of the upgrade during the NSAC Long Range Planning process was essential for moving the project forward. The development of the new upgrade cryomodule is of great importance for both the upgrade and the operation of the present accelerator at energies approaching 6 GeV, and the Laboratory plans to move forward on this effort as quickly as available funding will permit.

The Accelerator R&D program was recognized as outstanding, with major achievements in polarized beam development, superconducting cavity design, and work on advanced accelerator concepts using the energy recovery technique. We are pleased that the Panel supports our plans to hire leading scientists for the Laboratory's new Center for Advanced Studies of Accelerators (CASA) and the Institute for Superconducting Radiofrequency Science and Technology (ISRST). We anticipate completing these hires soon, and thereby strengthening both the Laboratory's and the nation's efforts in these important areas.

The Panel also recognized the continuing success of the FEL program represented by the demonstration of harmonic lasing, which has the potential for increasing significantly the bandwidth available from a tunable FEL. An upgrade to the FEL is now well underway with Navy funding, and we continue to work hard with the potential user community for the facility to identify the best science that can be done using the FEL's unique beam characteristics and to make the case to funding agencies for operations support.

Finally, we are delighted that the Panel recognizes the enthusiasm of our user community for the Lab's responsiveness to their interests and needs. We continue to listen carefully when this community speaks through both its Board of Directors and individual interactions with Lab management. We also

continue to involve the user community intimately in the planning for the Lab's scientific future. This has paid enormous dividends in terms of the careful work they have done to identify new research areas and the enthusiasm with which they supported the upgrade proposal throughout the NSAC Long Range Planning process. The major unfilled need of the user community (beyond increased operation of the accelerator) is office space. We are delighted that CD-0 has been granted for the CEBAF Center expansion, and hope this essential project can begin soon.

Looking ahead, we have found setting overall priorities for FY02 with our severe financial constraints exceedingly difficult. We began with a decision to keep beam operations at the same 30-week level, as was the case in FY01 (note that the actual beam operation in FY02 will be at 28 weeks rather than 30 because of a shift of an accelerator down across the FY01-02 boundary in the interests of completing running experiments). We continue with the push to higher current, high polarization beam development in FY02 with the goal of providing the 32 nsec, high peak current beam structure needed for the G0 experiment. The evolution of the facility to routine, high availability operation at the 6 GeV value that appears realistic in view of the remarkable performance of the superconducting cavities has slowed somewhat. We now understand that the two new cryomodels planned are essential for reliable operations at the full 6 GeV energy and that additional funds will be needed for engineering improvements to the facility necessitated by a combination of aging equipment and the stress of higher energy operation.

The challenges of extracting physics results from the data taken using the CLAS detector in Hall B continue to be a major focus of the Physics Division. The Lab has made progress in collaboration with Hall B users toward our mutual goal of an international analysis effort for CLAS data. There has also been substantial progress in the growth of the capabilities of the data analysis farm. Physics publications are now emerging from CLAS data with regularity, and many new results are nearing publication. We will continue to follow these issues with care over the coming year.

In FY02, we will continue to maximize productivity through careful internal prioritization and resource allocation. While we remain unable to invest adequately in advanced accelerator research and development at our present funding level, we recognize that it will be essential to remedy this problem soon in preparation for the 12 GeV upgrade. It is also clearly of interest to the larger physics community to see the Lab's SRF expertise strengthened, and we will work with DOE to plan for a long-term solution to this funding problem. Space for both the user community and the Theory Group remains a pressing need, and we will work with DOE to realize the expansion of CEBAF Center as quickly as possible.

We also continue to pursue the development of the scientific case for the energy upgrade by building on our earlier work, our evolving understanding of the underlying physics issues, and the results of the ongoing research program. In FY02 we must build on the success of our efforts in the NSAC Long Range Planning process. As quickly as CD-0 is granted for the upgrade project we must begin work on a fully-developed Conceptual Design Report (CDR) for both the accelerator and the experimental equipment, and begin the difficult job of prioritizing the scientific goals of the project.

In summary, the Lab found the concrete observations of the Science and Technology Peer Review Panel to be consistent with our own assessment of the Lab's performance. We believe this Review was very constructive, extremely useful, and accurate in its observations. The full report of the Review of Science and Technology is included in this document as Attachment A.

Principal Areas of Emphasis for FY02

- Identify and recruit a Chief Scientist and/or theory head, and the heads of CASA and ISRST.
- Achieve full current, high polarization beam with the time structure needed for the G0 experiment.
- Continue to manage the approved experiment backlog toward a goal of ~3 years/hall.
- Continue development work toward the prototyping of a “next generation” cryomodule appropriate for the 12 GeV upgrade (and the FEL).
- Work with the light source user community to develop the science case for the FEL.
- Continue close interactions and involvement with the nuclear physics user community.
- Continue to work closely with the Hall B user community to optimize the physics output from the CLAS detector.
- Following CD-0 for the 12 GeV project, develop a CDR for upgrading CEBAF and its ancillary experimental areas to 12 GeV capability.
- Continue to stay within budget and on schedule in our participation with SNS.
- Participate in a modest way with RIA R&D.

2. Reliable Operations

Overview

PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
2.0	Delivered physics research operations	150	150	6,814 hours	8,109 hours	Outstanding
2.1	Beam availability	25	22.1	76.8%	68.0%	Excellent
2.2	Experimental equipment availability	25	25	78.4%	84.1%	Outstanding
2.3	Effectiveness of the scheduling process	25	23.6	100%	94.4%	Outstanding
2.4	Overall operations effectiveness	25	25	30 weeks	33.6 weeks	Outstanding
TOTAL RELIABLE OPERATIONS		250	245.7			Outstanding

The overall performance of the accelerator and experimental equipment continues to be a major achievement for Jefferson Lab. During FY01 we were able to exceed the goal for our key “bottom line” metric of delivered physics research operations by more than 19%. This was achieved because of continued high experimental equipment availability, and multiplicity that again exceeded the goals. The overall accelerator running efficiency was slightly lower than desired, reflecting, in part, the decision to run for over 28 weeks at 5.55 – 5.67 GeV. The decision to run at higher energy despite the anticipated lower accelerator availability was driven by enhanced research opportunities provided by the higher beam energy. Nevertheless, the combination of better than anticipated hall availability and higher multiplicity permitted us to exceed our goal for overall physics operations as expressed in the key metric, PM 2.0.

FY01 was the fourth year of full, three-hall operations. The Accelerator Operations Group continued to support a wide variety of different running conditions for the users. The energy per turn was tuned 5 times to 4 different energy settings from 0.780 – 1.134 GeV. In order to meet the needs of the experimenters, there were 18 pass changes for Hall A, 7 for Hall B, and 6 for Hall C requiring frequent (roughly weekly), quick changes of operating conditions that are unusual for a facility such as ours. The polarization vector needed to be re-optimized every time either the number of turns or the energy per turn was changed. In addition, each experiment required special conditions in the experimental beam-lines for Moeller runs, energy and current calibrations, etc., which needed to be set up at least once a week.

FY01 also saw continued major progress on polarized beam delivery. In FY00, we used diode lasers to provide parity-quality beam with 100 microampere current at high (~75%) polarization; in FY01 we achieved currents over 100 microampere at ~80% polarization, resulting in a 13.8% increase in the figure of merit P^2I . The new Ti-sapphire laser was used to provide high current and polarization in comparison with the diode lasers, and we were able to demonstrate 150 microampere for the halls with this laser at 80% polarization. In order to support the upcoming physics program, we have developed a new Ti-sapphire laser for the G0 experiment. This moderate average power laser provides the required substantially lower laser pulse rate (31 MHz versus 499 MHz) while increasing the peak pulse power to maintain the same average current as the 499MHz laser. This laser will be tested in the accelerator early in FY02.

As detailed in this report last year, the 6 GeV test in August 2000 revealed some serious limitations on our installed klystrons. A team was formed to address these issues and the results of implementing their recommendations have been very successful. During the 6 GeV test in August 2000, a record 8 klystrons failed in a one-week period. In the following 5.67 GeV running period, October 2001

through January 2001, on average, 3.4 klystrons were replaced due to failure each month (previous failure rates were less than one per month). Following completion of the work of the Klystron Team, there has been only one klystron replaced due to failure in the eight month period from February 2001 through September 2001, even though the majority of this time was spent running at 5.67 GeV. We have also continued to helium process cavities and replace warm windows during machine maintenance periods to increase the RF system performance for high-energy operations. By testing to identify system weakness at higher energy and implementing improvements to bolster the weak areas, we have successfully delivered 5.55 – 5.67 GeV (40% over CEBAF design energy) for physics for over 83% of our running time in FY01.

There was an unfortunate incident with the Injector in February when a vacuum leak occurred during a maintenance period and allowed air into the Chopper RF cavity while it was under power. This resulted in a burnt-out feed-through which took 2 weeks to repair. We were able to perform a great deal of routine maintenance while waiting for the repair and were thus able to extend operations into our previously scheduled down. This response ensured that the physics program was not penalized by the failure. Interlock improvements have been implemented to prevent a repeat of this kind of failure anywhere else in the Injector.

The performance measures continue to be useful, providing a straightforward means of assessing performance of the accelerator operations and the experimental program. They have the important virtue of being well understood by both staff and users and being well connected to the scientific productivity of the Lab. The associated electronic reporting system for accelerator and hall equipment performance provides a direct, common format for entering the data for all experimenters in all halls. It gives a clear, rapidly available picture of all aspects of the execution of the experimental program and, because the data are entered directly by the users, it is widely viewed as fair and accurate.

The main emphasis in FY02 will continue to be the execution of the physics program. FY02 will see major efforts to improve accelerator availability with an emphasis on system improvements that will provide the largest increase in machine availability for the cost. Improving our availability will be challenging due to the higher trip and failure rates in systems sensitive to running well above our 4 GeV design energy.

Summary of Performance Measures

2.0 *Delivered physics research operations*

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
6,814 hours	8,109 hours	150	150	Outstanding

Discussion:

This is the fourth year we have used this “bottom line” metric. We continue to believe it properly reflects the overall operation of the facility, and provides a firm basis for many detailed operational decisions by keeping the focus on overall physics output. As noted above, the combination of improved experimental equipment availability compared to the previous year, (84.1%, vs. 74.6% in FY00), and hall multiplicity that significantly exceeded our goal (2.79 versus our 2.0), enabled us to exceed our goal for overall physics operations by 19%.

2.1 *Beam availability (% of scheduled availability)*

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
76.8%	68.0%	25	22.1	Excellent

Discussion:

The beam availability was lower this year than the two previous years. The overall availability was somewhat lower than it might have been because of the decision that the scientific benefits of 5.7 GeV running outweighed the reduced availability associated with pushing the superconducting cavities, RF, and magnet systems closer to their limits. We would, of course, very much like to get the availability into the mid 80% range. This would provide a significant (>10%) increase in physics output, helping with the backlog of approved experiments, and would bring accelerator operations to a level appropriate for effective utilization of a major facility. However, with the budget levels currently available, we do not expect that it will not be possible to reach availability above 80%. With more funding, we would be able to add one or more cryomodules as well as provide “hot spares” for the power supplies.

The three areas that contributed the highest percentage of machine downtime (about 4% each) were RF trips, RF systems and magnets. The higher incidence of RF trips and other RF system problems is clearly related to the higher energy running. During the September 2001 shutdown, we continued helium processing and warm window replacements as part of an ongoing effort to squeeze additional headroom out of these systems. Magnet overheating problems have been due to over-temperature faults when the magnet coils have become blocked. Investigations on LCW chemistry, in collaboration with other DOE labs, are ongoing. Additional filtering was installed during the September 2001 shutdown and it is believed that magnet reliability will be improved due to this effort.

Major work planned for FY02 aimed at improving availability includes: automating the reset of RF trips to reduce the impact of each trip, adding two new RF separator amplifiers (5kW), and addressing the water system problems.

2.2 Experimental equipment availability (% of scheduled availability)

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
78.4%	84.1%	25	25	Outstanding

Discussion:

We had a very good record of hall availability in FY01. The notable exception was the experiment E93-038 in Hall C, which lost a month due to a vacuum window failure that required a re-build of the cryogenic target system. In spite of this, the overall experimental equipment availability was 84%, exceeding the goal of 78.4%. The high reliability of CLAS resulted in a significant completion of the experimental goals of two run groups, eg1 and g6.

2.3 Effectiveness of the scheduling process (correlation between the published accelerator schedule and the actual schedule)

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
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100%	94.4%	25	23.6	Outstanding
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Discussion:

Significant amounts of data were taken in FY01—6 complete experiments in Hall A; 2 experiments completed in run group g6, and substantial progress made in run groups eg1 (electron portion finished) and g8 (33% done); 1 major experiment in Hall C was completed and a fifth major installation experiment commissioned. We had an outstanding record of starting experiments as scheduled with most experiments starting on time. There was one notable exception where a vacuum failure delayed the start of the G_n^E (the electric form factor of the neutron) experiment in Hall C by one month.

2.4 Overall operations effectiveness (% of the planned weeks of operations for physics that is delivered)

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
30 weeks	33.6 weeks	25	25	Outstanding

Discussion:

We were able to deliver about 12% more physics running of the accelerator than originally planned in FY01. Our goal was 30 weeks, and we actually ran for 33.6 weeks. Some of the “facility development” time was devoted to physics running, and we converted the down time associated with the injector failure to maintenance, which allowed us to use a later scheduled maintenance period for additional physics operation.

3. Production of Scientific and Technical Manpower

Overview

PM	Description	Point Value	Points Awarded	Goal	Raw Score*	Adjectival Rating
3.0a	Number of student years per year on Jefferson Lab related research or technical activities	35	35	1,075	1,089	Outstanding
3.0b	Total number of advanced degrees per year based on Jefferson Lab research	25	25	53	67	Outstanding
3.1	Number of advanced degrees per year granted by minority universities and based on Jefferson Lab research	5	5	6	7	Outstanding
3.2	Participation of students from groups traditionally underrepresented in physical science and engineering fields	10	9	376	340	Outstanding
TOTAL SCIENTIFIC & TECHNICAL MANPOWER		75	74			Outstanding

* Components of these raw scores are weighted. See formulas used to calculate scores under discussions of performance measures on following pages.

Many of the performance measures in this performance objective area were first baselined in FY96. FY97 was the first year for which a complete set of such scores was available. In FY01 we have built upon previous efforts to gather our results in a more comprehensive manner thanks to increased cooperation of our users.

As in previous years, a Jefferson Lab Users Group Survey formed the major component of our data-gathering effort. In this year's survey we provided respondents with an easy means of submitting a "no students" reply by promptly returning the electronic mail survey with that two-word phrase in the subject heading. As in the past, we received many replies to our initial request within hours of sending it out. It should be noted that we have over 900 users on approved experiments within our listed users group of about 2000. Furthermore, the detailed responses received from more than 400 of our users are indicative of considerable willingness on the part of our user community to assist in gathering these important data. In addition to our e-mail survey, we have a run a crosscheck of respondents against known users and known Jefferson Lab graduate students.

For the present report, laboratory staff who oversee the work of students also were contacted for the survey. As a result of our requests, the FY01 survey is believed to be more statistically reliable than previous surveys. In the latter days of these data-gathering efforts, we telephoned 1 in 15 of the non-respondents in order to make a statistical determination of the number of student participants missed by our e-mail requests.

In FY02, our intent is to make our database of users and students as comprehensive as possible. As in the past, we will continue to remind users one or more times throughout the year to encourage them to track and report these data. We can thus hope to get prompt replies at the end of FY02 and also ensure that users not overlook the production of advanced degrees that occurred earlier in the same fiscal year. We also will make our electronic survey clearer and somewhat more detailed in order to gain as much direct information as possible. Our goal in FY 02 will be to bring our databases and user reports to a level that allows us to minimize or eliminate follow-up telephone calls.

Jefferson Lab continues to be strongly involved with the development of research programs and the corresponding production of advanced degrees at Historically Black Colleges and Universities (HBCUs) and at Minority Educational Institutions (MEIs). Most of the seven HBCUs and MEIs with which we have memoranda of understanding (MOU) agreements only recently have begun to award significant numbers of advanced degrees. During the past fiscal year, Jefferson Lab maintained MOUs with the following HBCUs and MEIs:

- Florida International University
- Hampton University
- Norfolk State University
- North Carolina A&T
- North Carolina Central University
- New Mexico State University
- University of Texas at El Paso

In FY97, FY98, and FY99, four advanced degrees (three MS, one PhD) were granted each year by those institutions based on Jefferson Lab MOUs. In FY00, two PhDs were awarded by those institutions. In FY01, three PhDs and one MS were awarded. Although these absolute numbers are small, they represent a disproportionate fraction of U.S. minority degrees awarded in physics and reflect an upward trend in the participation of minority students in physics research.

This is the fifth year in which actual numerical data were used. In FY02, we will continue to carefully review the point allocation among the four measures in this performance objective to continue to ensure that the emphasis and points are properly balanced among the four very important aspects of this objective and accurately reflect the purpose of our efforts.

Principal Areas of Emphasis for FY02

- Continue to exploit the activities organized under the Jefferson Lab Student Affairs Office to facilitate and enhance the student experience at Jefferson Lab and encourage the research effort at the Lab to become more efficient at production of trained manpower in physics and related technical fields.
- Expand the involvement and opportunities, intellectual, social and recreational, for students during their work with Jefferson Lab. In particular, we will continue to increase the activities of the graduate student association by supporting the monthly seminars organized and presented by the students as well as other activities to welcome and integrate new students into the student community. In FY00 a student representative was elected to the User's Group Board of Directors for the first time. In the past year that student was succeeded by another. We also have continued a summer course in nuclear and particle detectors intended principally for students. That course was well attended in Summer 2000 and was enhanced and expanded for Summer 2001 with the addition of a second series of lectures on scientific computing
- Jefferson Lab has been actively producing data from the three experimental halls for several years, allowing timely progress in PhD studies. In addition, many theoretical graduate students are closely associated with the laboratory. We will seek in FY02 to further publicize these unique opportunities among present and potential users of Jefferson Lab.
- The statistical analysis of small numbers, as in section 3.1, can show large percentage variations from year to year. We are pleased to note that this report for FY01 includes more accurate

assessment of this particular aspect of our manpower production obtained by reporting the average over three previous years of the production of advanced degrees by minority universities.

Suggested Changes to Performance Measures for the Future

- We have noted that PM 3.0b, (Advanced degrees per year based on Jefferson Lab Research) is potentially the most important and reliable measure of the laboratory’s production of scientific manpower. Each advanced degree is generally well-documented and is often reported in more than one way so that those data are well corroborated. Item 3.0a, on the other hand, covers a varied range of student involvement and is determined by a combination of direct and statistical methods. Accordingly, we suggest that the point value of these two metrics be exchanged and that, in the coming years, 3.0a be worth 25 points and 3.0b worth 35 points.
- PM 3.2 measures participation of students from groups traditionally underrepresented in physics and engineering. Through FY98, this PM was reported as a *percentage* of qualified students carrying out JLab-related work. In FY99, the PM was changed to a weighted *numerical value*. As with item 3.0a, however, we must use statistical methods to arrive at that figure. We propose that for FY02 and the future, we return to a percentage value—which would be determined by the known ethnic and gender data in our student database rather than results of a sampling survey. We feel that this method provides a more accurate representation of the involvement at JLab of traditionally underrepresented students. As in FY98, we suggest a goal of 35% for this measure.

Summary of Performance Measures

3.0a Number of student years per year on Jefferson Lab-related research or technical activities

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
1,075	1,089	35	35	Outstanding

Discussion:

This performance measure is based on a Weighted Student Involvement Index (WSII) defined by:

$$\text{WSII (Weighted Student Involvement Index)} = 1(\text{HSS}) + 2(\text{UGS}) + 4(\text{GS})$$

where HSS = High School Students, UGS = Undergraduate Students, and GS = Graduate Students

$$\text{The FY01 score is } \text{WSII} = 1(15.5) + 2(84.4) + 4(226.1) = 1088.7$$

3.0b Total number of advanced degrees per year based on Jefferson Lab research

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
53	67	25	25	Outstanding

Discussion:

In FY01, there were 25 advanced degrees (4 Masters and 21 PhDs) awarded that were based on Jefferson Lab research. This performance measure is based on a Composite Degree (CD) Index defined by:

$$\text{CD (Composite Degrees)} = 1(\text{MD}) + 3(\text{PHD})$$

where MD = Number of awarded Masters degrees and PHD = Number of awarded PhDs

$$\text{The FY 01 CD score is: } \text{CD} = 4 + 3(21) = 67.$$

3.1 Number of advanced degrees per year granted by minority universities and based on Jefferson Lab research

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
6	7	5	5	Outstanding

Discussion:

In FY01, three PhDs were awarded by minority institutions based on Jefferson Lab research.

The score of this performance measure is based on the following equation:

$$\text{CDM (Composite Degrees Minority)} = (\text{MD}_y + \text{MD}_{y-1} + \text{MD}_{y-2} + 3(\text{PHD}_y + \text{PHD}_{y-1} + \text{PHD}_{y-2}))/3$$

where MD = Number of awarded Master's degrees and PHD = Number of awarded PhD's and y is the current year.

In FY01 three PhDs and one MS degree were granted by minority institutions.

$$\text{FY01 CDM} = (1 \times (1 + 0 + 3) + 3 \times (3 + 2 + 1))/3 = 22/3 = 7$$

3.2 Participation of students from groups traditionally underrepresented in physical science and engineering fields

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
376	340	10	9	Outstanding

Discussion:

The Minority Weighted Student Involvement Index for women and underrepresented minorities is:

$$\text{MWSII} = 1(\text{MHSS}) + 2(\text{MUGS}) + 4(\text{MGS})$$

Where: MHSS= Women or Minority High School Students
MUGS= Women or Minority Undergraduate Students; and,
MGS= Women or Minority Graduate Students

$$\text{For FY01 MWSII} = 1(6) + 2(41) + 4(63) = 340$$

Students who qualify for more than one category can be counted more than once.

We note those figures shown in performance measure 3 are based on multiplicative factors and thus are greater than the actual numbers of students.

4. Corporate Citizenship

Overview

PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
4.0	Public participation (in effective person-hours per year)	20	20	80,000	109,288	Outstanding
4.1a	Public visibility: number of newspaper and magazine articles and number of radio and television programs mentioning Jefferson Lab and its science and technology	7	7	400	1,338	Outstanding
4.1b	Percentage of these citations mentioning DOE	3	3	>90%	100%	Outstanding
4.2	Customer satisfaction	5	4.7	>90%	93%	Outstanding
SUBTOTAL PUBLIC OUTREACH		35	34.7			Outstanding
4.3	Non-DOE investment in Jefferson Lab initiatives (including direct dollars, manpower costs, and contributions in-kind)	20	20	2% - 2.5% of JLab ops budget	12%	Outstanding
4.4	Intellectual property generation as indicated by the annual number of: <ul style="list-style-type: none"> • Patent applications • Patents awarded • License agreements 	10	10	5 or 1 or 2	6 3 0	Outstanding
4.5	Benefit to partners based on the results of a mutually agreed customer survey where the customer indicates level of satisfaction on a 1 to 5 (highest) scale	10	9.4	5.0	4.4	Outstanding
SUBTOTAL TECH TRANSFER		40	39.4			Outstanding
TOTAL CORPORATE CITIZENSHIP		75	74.1			Outstanding

Public Outreach

Jefferson Lab's approach to strong community relations and public outreach efforts starts with top management. The Interim Director serves on a regional economic development board called the Hampton Roads Partnership that serves a multi-city area. Other Lab staff are actively involved with and serve as members of committees and boards including: the Jefferson Center for Research and Technology Committee, the United Way of Virginia, the Cooperating Hampton Roads Organization for Minorities in Engineering, the Newport News Environmental Commission, the Newport News Chamber of Commerce Business and Education Council and, for the first time, Jefferson Lab has joined the Peninsula Chamber of Commerce.

Through these interactions with city officials, state delegates, local business leaders, and the citizens of the community, the Lab communicates information to the community and obtains their feedback to both strengthen our involvement with the community and to educate and inform the public of Lab activities. The Lab has a strong sense of community, and takes its role as a responsible community member very seriously. The Lab actively encourages community members to ask questions and raise concerns, which allows us to be proactive, accurate, and responsible when dealing with issues that could impact the public.

Jefferson Lab's Corporate Citizenship activities demonstrate the continued diligence of the entire staff by engaging the public in a variety of science education and awareness activities and events including: conducting tours and public outreach events—including the very popular biennial open house, giving public lectures to civic groups, and inviting the public to the Lab for guest speaker presentations. These efforts show our commitment to the community and result in continued goodwill.

All performance measures for Public Outreach and Improved Scientific Literacy are appropriate and should be retained for FY02.

Principal Areas of Emphasis for Public Outreach in FY02:

- State Fair participation in the fall of 2002
- Continued emphasis of media coverage in trade and technical journals
- Continue to work on Physics Enrichment for Science Teachers and increase enrollment for the summer of 2002

Technology Transfer

Jefferson Lab's FY01 Technology Transfer program continued its success with the IR free electron laser (FEL) by operating the device for more than 2,000 hours of user time. Using \$9.0M of FY00 DOD funding, an upgrade of the FEL to 10 kilowatts was begun. A FY01 DOD appropriation of \$4.5M to continue the 10 kW IR Upgrade and an additional DOD \$3.2M appropriation to initiate the 1 kilowatt UV FEL have been awarded. The superconducting synchrotron (HELIOS), donated by an FEL industry partner, was transported to the Lab and is being stored until funding is obtained that allows the Lab to link it to the FEL. Accomplishments for the year include operation of the machine for experiments that show the true capabilities of the FEL, unique for both basic and applied science. One highlight was the demonstration of a high production rate generation of carbon nanotubes.

The FEL is proving to be a very stable machine that continues to realize firsts in the field. FY01 firsts included reaching 5th harmonic operation (first observation) and the highest power observed for any FEL in 3rd harmonic operation. High brightness ultra-short (sub-picosecond) Thomson x-rays were produced over the tuneable range 3-19 keV. Terahertz studies initiated in FY01 produced the highest power THz radiation ever observed (~ 10 Watts)—at least six orders of magnitude higher than conventional THz generation equipment that can produce only microwatts of power.

The development of a basic science user program for the FEL continued under the guidance of the FEL Program Advisory Committee, which was created to peer review submitted user proposals. Experiments conducted by research groups from the College of William and Mary, Vanderbilt University, Rennsaelear Polytechnic Institute, Norfolk State University, and Princeton University resulted in high profile publications on topics including carbon nanotubes, defects in silicon, protein dynamics, high sensitivity spectroscopy, and terahertz radiation generation. User groups won research grants from federal agencies—including DOE, NSF, NASA, and ONR—for FEL experiments.

A second area of effort in the technology transfer program is medical imaging, which derives from the Lab's core competency in detector technology. Two noteworthy collaborations in this area currently are underway: (1) The Lab continues its work with a small business partner and research hospitals to further the development of a scintimammography medical imaging device that has the potential for

significant improvements in early breast cancer detection. (2) The Lab is collaborating with Oak Ridge National Laboratory and the Johns Hopkins University to develop instrumentation that will allow bio-medical researchers to study mice with nuclear medicine imaging techniques while the mouse is awake and unrestrained during imaging. The novel technology should offer neural scientists the opportunity to use conscious mice to study neural processes in real-time and over an extended period.

The Lab continues to play an active role in local, regional and state organizations that promote economic development through partnerships and other technology transfer activities. The Lab Director and the Technology Transfer Manager serve in organizations such as the Hampton Roads Partnership, the Hampton Roads Technology Council, the Peninsula Alliance for Economic Development, and the Newport News Economic Development Council.

The Lab’s performance generating, protecting, and transferring intellectual property continues to rate Outstanding. Six patent applications were filed, and three patents were awarded FY01. The Lab also continues to participate in the DOE’s SBIR program with four currently active partnerships. Five CRADAs were underway in FY01. The total amount of "funds in" to Jefferson Lab as a result of Technology Transfer activities is about \$8.9—more than 12% of the annual Jefferson Lab operating budget.

Performance measures should remain unchanged for FY02.

Principal areas of emphasis for Technology Transfer in FY02:

- Continue the upgrade project to the IR Demo FEL.
- Continue the nurturing and growth of medical imaging technology.
- Establish user fees/costing arrangements for the IR Demo FEL User Facility

Summary of Performance Measures

Corporate Citizenship – Public Outreach

4.0 Public participation (in effective person-hours per year):

[Number of student hours + number of public hours + 10 * number of teacher hours] per year, including visits, external public talks, science series, open house, BEAMS, etc.

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
80,000	109,288	20	20	Outstanding

* As agreed upon in the Performance Evaluation Plan, this goal is reduced from 105,000 to 80,000 due to lack of DOE funding for the TRAC program.

Discussion:

Contributions to the Commonwealth and the nation’s science education and literacy are being made by Jefferson Lab, as evidenced in Public Participation metrics. The centerpiece is the Lab’s K-12 science education program Becoming Enthusiastic About Math and Science, most often referred to as BEAMS. The BEAMS program serves all sixth, seventh, and eighth grade students and teachers from two local schools with the most “at-risk” students. Students and teachers visit Jefferson Lab for 2 – 5 days of hands-on math and science activities conducted by Jefferson Lab scientists, engineers, and technicians.

During the summer of 2001, 24 middle school science teachers participated in the Lab's Physics Enrichment for Science Teachers (PEST) program, a 4-week mini-course in physics, taught by physics professionals including staff scientists. Additional workshops were added to the curriculum this summer, allowing teachers from both the 2000 and 2001 programs to work together creating and sharing hands-on activities. Additional activities in science education include classroom visits; Physics Fest days (field trips to the Lab); supporting science and high technology high school and college internships; participating as local and regional science fair judges; and the spring and fall Science Series presentations. During FY01, Jefferson Lab served more than 10,800 students. In addition, the Lab provided in-service activities, which include access to the Lab's expertise and equipment, to more than 1,000 teachers.

4.1(a) Public Visibility "V": Number of newspaper and magazine articles and number of radio and television programs mentioning Jefferson Lab and its science or technology

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
400	1,338	7	7	Outstanding

4.1(b) DOE Citation: Percent of the articles featuring Jefferson Lab that mention DOE

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
>90%	100%	3	3	Outstanding

Discussion of 4.1a-b:

Public visibility and awareness of the Department of Energy and Jefferson Lab continues to be reinforced through the use of the media and our Web site. Local and regional news articles covered events related to Jefferson Lab including the proposed accelerator upgrade, the Free-Electron Laser, breast cancer imaging technology, public lectures, our science-education Web site, and our science program. On the national front, the Lab's physics was featured in *Physics Today* and *Science News*, and internationally the nuclear physics program and the FEL were covered in the French newspaper, *Le Figero*. FEL applications were featured in *Laser Focus World*, and other trade journals covered such diverse issues as engineering recruitment. The public's use of the Internet continues to increase our visibility as more newspapers take advantage of publishing on-line versions of their articles. The Public Affairs staff is placing more emphasis on relationship building with the media by visiting writers at their headquarters and by being more proactive in maintaining frequent contact. This activity has paid off this year by almost doubling the number of articles printed about the Lab or its science.

4.2 Customer Satisfaction

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
>90%	93%	5	4.7	Outstanding

The Lab's Open House, held every other year, took place April 21, 2001. This popular community event again demonstrated to the public, in a genial, face-to-face manner, the science and activities of Jefferson Lab and several neighboring science organizations. Other outreach activities in FY01 included sponsoring a booth in the Technology Center at the Virginia State Fair. The State Fair is the most labor-intensive Public Affairs activity the Lab undertakes. This year the booth was staffed by Lab volunteers 12 hours a day for 11 consecutive days. The Lab conducted over 40 tours—attended by

over 1,300—for industry and government officials, and professional organizations and provided speakers for civic groups as requested. Customer satisfaction ratings of public tours and student interactions is outstanding, with the negative comments most often being expressions of disappointment when specific areas of the accelerator site are closed for tours due to running experiments.

Corporate Citizenship – Technology Transfer

4.3 Non-DOE investment in Jefferson Lab initiatives (including direct dollars, manpower costs, and contributions in-kind)

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
2% - 2.5% ops (\$1.48M - \$1.85M)	12% (\$8.87M)	20	20	Outstanding

Discussion:

Various technology transfer projects totaled \$8.87MM, which is approximately 12% of the Lab’s \$74MM FY01 operating budget.

Funding Sources	Contributions
Kaliber Corp. WFO	\$956
Norfolk State University WFO	\$3,485
Norfolk State University WFO	\$20,252
Paul Scherrer Institute WFO	\$41,575
Varian/Old Dominion University/JLab CRADA (Contribution)	\$100,000
Dilon/JLab CRADA	\$2,484
NNHRA Welfare to Work	\$2,261
FEL Sharing/Virginia	\$633,456
FEL Interagency Agreement/USN	\$7,469,984
NIH Interagency WFO	\$42,129
FEL Interagency WFO/DOD JTO	\$326,385
FEL and Helios Sharing/SURA	\$229,137
Total	\$8,872,104

4.4 Intellectual property generation as indicated by the annual number of:

- (a) patent applications
- (b) patents awarded
- (c) license agreements

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
5 patent applications OR 1 patent awarded OR 2 license agreements	6 3 0	10	10	Outstanding

Discussion:

Jefferson Lab’s production of original technology developments continued in FY01:

- 6 patent applications were executed

- 3 patents were awarded to the Lab and inventors

4.5 Benefit to partners based on the results of a mutually agreed upon customer survey where the customer indicates level of satisfaction on a 1 (lowest) to 5 (highest) scale.

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
5.0	4.4	10	9.4	Outstanding

Discussion

- The general response from the technology transfer partner surveys is very positive. Jefferson Lab’s working relationships with partners remains healthy, because the exchange of information and ideas is bi-directional.

5. Environment, Health and Safety

Overview

5. Quality Performance in Environment, Health, and Safety						
PM	Description	Point Value	Pts Awd	Goal	Raw Score	Adjectival Rating
5.0a	Occupational Injury Cost Index	35	35	50% better than DOE lab average	60% better	Outstanding
5.0b	Environmental Exceedances	20	20	4 times as good as the DOE complex average	No exceedances	Outstanding
5.1	Lost Work Day Case Rate	15	12.5	50% better than DOE lab average	JLab = 1.5 DOE Labs = .9	Excellent
5.2a	Reportable Radiation Exposures	4	4	Satisfactory ALARA program; no exposures >80% of ORPS threshold	Better than satisfactory program	Outstanding
5.2b	Hazardous Substance Exposures	4	4	No exposures above OSHA action level	No reportable exposures	Outstanding
5.3	Solid Waste Recycled	6	6	Exceed FY94 baseline ratio by 44% (increase from 15% in FY99)	Exceeded goal	Outstanding
5.4a	Radioactive Waste Generation	4	4	>90% of radioactive waste generated for useful purposes	Exceeded goal	Outstanding
5.4b	Hazardous Waste Generation	4	4	Produce <.25 of maximum useful hazardous waste	.12	Outstanding
5.5	Peer Review of the Emergency Management Program	4	4	Appropriate program = 100	98 (99% of points available)	Outstanding
5.6	“Highly Protected Risk” Rating for High-Value Facilities	4	3.4	All facilities meet highly protected risk designation	93% highly protected	Excellent
TOTAL EH&S		100	96.9			Outstanding

Major Achievements

Jefferson Lab’s EH&S program is fully integrated, effective, and appropriate for our risks. The best indicator of EH&S performance for FY01 was the absence of serious injuries, environmental exceedances, overexposures to hazardous substances, and overexposures to radiation. During FY01, Jefferson Lab set a new record of 455 consecutive days without a lost-time injury; the previous record was 235 days.

Environment, Health, and Safety (EH&S) was covered in two significant Lab reviews – the Institutional Plan Review and the Institutional Management Review – in FY01. In addition, the third Emergency Management Peer Review was conducted in July 2001. The Peer Review panel determined that Jefferson Lab’s program is appropriate. Major reports submitted include the ES&H Budget Formulation Submission (formerly the ES&H Management Plan), and the annual Site Environmental Report. This year’s ES&H Budget Formulation Submission included Radiation Control and Medical Services staffing increases.

The Lab experienced four reportable (under the DOE occurrence reporting system) events in FY01. All four events were categorized as “Off Normal” occurrences (the lowest of the three DOE reporting levels):

- A January 2001 accelerator injector chopper cavity property damage event was reported. This event resulted in \$12.7K of property damage.
- A subcontract technician experienced a minor electrical shock while testing photomultiplier tube base assemblies on March 19. The technician was supporting Physics Division activities in the Experimental Equipment Laboratory (EEL) Building. Medical follow-up indicated that the technician did not suffer any significant effect from the electrical shock and returned to work on the same day with no work restrictions.
- An August 14 Test Lab Production Chem Room hoist “near miss” event was also reported. Event follow-up indicated that normal Jefferson Lab material handling equipment design review procedures were not used in the hoist’s design, fabrication, and installation. There were no personnel injuries or other property damage from the hoist failure.
- An August 17 Test Lab Building Vertical Test Area (VTA) radiation interlock fault event was reported. Event follow-up noted that an undocumented November 2000 VTA interlock wiring modification resulted in this event. No unplanned worker radiation exposures resulted from this event. The event was also determined to qualify for DOE reporting under the DOE worker radiation protection rulemaking, 10 CFR 835, of the Price-Anderson Amendments Act (PAAA).

An unannounced DOE safety and health inspection for OSHA compliance was conducted at Jefferson Lab from June 20-22, 2001. Oak Ridge Operations Office (ORO) staff conducted the inspection. An occupational injury and illness record keeping review also was conducted as a part of the ORO inspection. No DOE concerns were noted in the injury and illness record keeping review portion.

The ORO inspection did not note any Category 1 or “imminent danger” conditions in the areas inspected. The ORO inspection also focused on lab experimental review processes for the end stations and the FEL. Both processes were noted to be especially comprehensive and effective in summarizing EH&S and conduct of operations aspects.

Progress in FY01

A basic premise of Jefferson Lab’s EH&S program and the Lab’s Integrated Safety Management (ISM) Plan is the commitment that line management bears primary responsibility for EH&S issues in its areas of operation. Consequently, the EH&S effort is accomplished programmatically by line managers who receive advisory input from EH&S specialists assigned throughout the organization. EH&S specialists also serve as a functional resource for the Laboratory as a whole. To further enhance line ownership of EH&S, Jefferson Lab formally instituted comprehensive line self-assessments in FY97. Self-assessments performed by line managers evaluate performance as well as EH&S aspects of individual and departmental responsibility. The line self-assessment (LSA) program continued to mature during FY01, further strengthening the integration of EH&S with management accountability.

Following successful completion of the SC-led March 1999 ISM Verification Review, the DOE Site Office’s operational awareness activities monitored continued Lab ISM effectiveness. A favorable Site Office ISM Validation Report was issued in November 1999. The Lab’s ISM Plan is updated annually. In a related area, the revision of the Lab Self-Assessment program Manual was completed in FY01. This revision strengthened the linkage between LSAs and continuous improvement. The Lab’s ISM Plan will be revised in FY02 to highlight and strengthen linkages to the Lab’s Environmental Management System (EMS). The Lab’s independent SA/QA function further assisted line management with their EH&S responsibilities by conducting four major FY01 topical assessments. A

notable example of the Business Services Department assessment was the increasing attention to the achievement of DOE's "green" acquisition goals.

Progress continued with the Lab's integration of the DOE worker radiation protection rulemaking under the PAAA. There was one FY01 radiological event meeting PAAA reporting criteria. This was the Test Lab VTA event discussed earlier. Jefferson Lab staff attended the November 2000 TRADE PAAA meeting.

The Lab's EH&S Committee, which considers broad, cross-cutting or institutional issues submitted by any staff member, continued to effectively coordinate EH&S activities. There were no open issues at the end of FY01.

Performance measure 5.6 provides for an external evaluation of Jefferson Lab mission-critical facilities to determine the fraction meeting Highly Protected Risk (fire protection) criteria. SURA's fire and property insurance carrier, Marsh and McLennan, conducted a follow-up evaluation of Lab actions to implement previous recommendations. Hall A remediation activities will be completed in FY02. These actions will address all existing issues.

Significant Strengths

- Injury avoidance performance (occupational injury cost index, PM 5.0a) was 60% better than at other DOE laboratories.
- EH&S has been integrated into line management since 1993.
- The Lab has a comprehensive and user-friendly EH&S Manual that is frequently used by other DOE laboratories, industry, and universities.

Principal Areas of Emphasis for FY 2002

- Following the January 1, 2002 effective date for the revised OSHA injury/illness recordkeeping standard, monitor the DOE and federal OSHA interpretations of the standard for Jefferson Lab applicability.
- Develop a standard operating procedure for overhead crane and gantry wire rope inspection using a graded approach.
- Continue development of the Memorandum of Understanding (MOU) between SURA and the ARC building occupants.
- Continue ongoing 10 CFR Part 835 (and other new related DOE rulemaking) interfaces between the Jefferson Lab PAAA Coordinator and other Lab staff with DOE-sponsored groups such as the EFCOG PAAA Working Group, the TRADE Quality and Safety Management Special Interest Group, and the Quality Assurance Working Group.
- Complete vendor fabrication, on-site delivery, and system checkout of an additional tritiated liquid waste monitoring system (for end station sump) in FY02.
- After project approval, establish a schedule for NEPA documentation milestones for the 12 GeV upgrade and Hall D.
- Revise the Jefferson Lab Integrated Safety Management Plan and the Lab's Quality Assurance Program Manual to highlight and strengthen the Lab's Environmental Management System (EMS).
- Conduct an accredited American Society of Mechanical Engineers pressure vessel design/repair course for designated Jefferson Lab staff.

- Conduct a Jefferson Lab sponsored Oxygen Deficiency Hazard (ODH) workshop in FY02. This accelerator-specific ODH workshop would be the first of its kind in the DOE complex and probably the world.

Performance Measures As Valid Indicators of Performance

- In general, these performance measures are excellent indicators of EH&S performance. They cover all relevant areas, are quantitative, and do not require unreasonable data collection effort. However, in the event of a statistical fluctuation, a longer averaging period would have to be used to ensure statistical significance.
- Performance measure 5.3, Solid Waste Recycled, was adjusted in FY99 to provide a more challenging goal for the Lab’s recycling efforts.
- Jefferson Lab staff attended the SC ISM Meeting in FY01. This meeting had a number of EH&S performance measurement presentations and a performance measure breakout session. To date, no EH&S performance metrics from other laboratories have been found to be appropriate for Jefferson Lab use.

Summary of Performance Measures

5.0a Cost Index

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
50% better than DOE lab	60%	35	35	Outstanding

Discussion:

SURA staff accident experience compared very favorably to that of the other DOE research laboratories in FY01. The Lab result was 4.8, versus a DOE research laboratory average result of 7.7.

5.0b Environmental Exceedances

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
4 times as good as the DOE complex average	No exceedances	20	20	Outstanding

Discussion:

Jefferson Lab did not receive any environment permit NOV’s (Notice of Violation) during FY01.

5.1 SURA lost workday case rate

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
50% better than DOE lab average	JLab = 1.5 DOE Labs = .9	15	12.5	Excellent

Discussion:

This FY01 measure for injuries resulting in one or more lost/restricted workdays (1.5) was higher than the average (0.9) for all DOE research laboratories. Additional management attention has been focused on reducing injuries through improved work planning.

5.2a Reportable radiation exposures

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
Satisfactory ALARA program; no exposures >80% of ORPS threshold	Better than satisfactory program	4	4	Outstanding

Discussion:

There were no FY01 Jefferson Lab radiation exposures requiring special reporting under the DOE occurrence reporting thresholds and the ALARA program is rated better than satisfactory.

5.2b Hazardous substance exposure

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
No exposures above OSHA action level	No reportable exposures	4	4	Outstanding

Discussion:

There were no FY01 Jefferson Lab exposures to hazardous substances or chemicals requiring special reporting under either OSHA limits or DOE occurrence reporting thresholds.

5.3 Solid waste recycled

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
Exceed FY94 baseline ratio by 44%	Exceeded goal	6	6	Outstanding

Discussion:

Effective recycling efforts by the Plant Engineering Department (see page 30), along with broad staff support for recycling, resulted in this strong FY01 showing. The performance goal for this metric was increased from 15% to 44% during FY 99.

5.4a Ratio of radioactive waste produced to that produced including by unintentional processes

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
>90% of radioactive waste generated for useful purposes	Exceeded goal	4	4	Outstanding

Discussion:

The initial Jefferson Lab shipments of low-level radioactive waste were conducted in FY01. Operability Group and Radiation Control staff members collect information for this area.

5.4b Ratio of hazardous waste generated to that which would have been produced without countermeasures

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
Produce <.25 of maximum useful hazardous waste	.12	4	4	Outstanding

Discussion:

This performance objective was emphasized during FY01 by hazardous waste and division EH&S staff resulting in the improvement from “Good” rating to an “Outstanding” rating.

5.5 Emergency Management Peer Review (FY 01)

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
Appropriate program = 100	98 (99% of points available)	4	4	Outstanding

Discussion:

The Emergency Management Peer Review was held July 26-27, 2001. The Peer Review concept has worked well for the important area of emergency management. A copy of the Emergency Management Peer Review Report is included in the document as Attachment B. The FY01 score was 98 (Outstanding) reflecting continued improvement since the 1999 peer review score of 95.

5.6 “Highly Protected Risk” rating for high-value facilities

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
All facilities meet highly protected risk designation	93%	4	3.4	Excellent

Discussion:

The August 2000 evaluation review of Jefferson Lab actions to implement previous recommendations for high-value facilities received a score of 93 or 86% of available points. SURA’s fire and property insurance carrier conducted the review. Hall A remediation activities will be completed in FY02. This will address all existing issues. During FY 2001, this objective was revised to have the reviews conducted biennially rather than on an annual basis.

6. Quality of Business and Administrative Practices

Overview

PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
6.0	Peer Review	70	64.3	100%	91.9%	Outstanding
6.1	% of overrun on all projects > \$100K	1	1	≤ 8%	3.11%	Outstanding
6.2	Variance of scheduled completion time for projects > \$100K	1	1	≤ 1.10	1.0	Outstanding
6.3	% of scheduled preventive maintenance tasks completed by their scheduled due dates	2	2	≥ 94%	99.97%	Outstanding
6.4	Average % of all open corrective maintenance tasks that have been open > 3 months	2	2	≤ 10%	3.57%	Outstanding
	SUBTOTAL FACILITIES (6.1 - 6.4)	6	6			Outstanding
6.5a	% of value of property not located during the inventory cycle: Capital Property	1.5	1.5	< 1%	0.0%	Outstanding
6.5b	% of value of property not located during the inventory cycle: Sensitive Property	1.5	1.1	< 1%	1.8%	Good
6.5c	% of value of property not located during the inventory cycle: Stores Property	1	1	< 1%	0.8%	Outstanding
6.6	% of values of Inventory Stores reduced	1	.9	≥ 10%	10.4%	Excellent
	SUBTOTAL PROPERTY (6.5 – 6.6)	5	4.5			Outstanding
6.7	Number of CAS violations	1	1	0	0	Outstanding
6.8	Dollar % of invoices deemed unallowable	1	1	< 1%	0	Outstanding
6.9	% of vendor invoices paid with discounts lost	1	1	< 1%	.13%	Outstanding
6.10	% of annual actual cost variance from budget for each overhead pool	1	1	< 3%	.18%	Outstanding
6.11	Number of occurrences that Cost Management Report had to be resubmitted to Contracting Officer – DOE Site Office	1	1	0	0	Outstanding
6.12	Number of audit errors in travel expense reports	1	1	< 2%	1.63%	Outstanding
	SUBTOTAL FINANCE (6.7 – 6.12)	6	6			Outstanding
6.13	Average procurement cycle time	3	3	< 11 days	7.02	Outstanding
6.14	% of total available purchasing dollars awarded to: small business concerns, small women-owned business concerns, and small disadvantage business concerns	SB 1 WO1 SD 1	3	≥ 46% ≥ 6% ≥ 7%	62.3% 7.6% 8.2%	Outstanding
	SUBTOTAL PROCUREMENT (6.13 – 6.14)	6	6			Outstanding

PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
6.15a	% of action oriented diversity commitments as established in the Affirmative Action Plan	1	1	≥ 90%	100%	Outstanding
6.15b	Representation of protected classes within each EEO-1 category	1	.9	100% maintained	85%	Excellent
6.16	Sustainable EEOC charges	1	1	0	0	Outstanding
6.17	Compensation positions aligned with market practices	1	1	± 3% of market average	-2.6% of market average	Outstanding
6.18	% of 3-year rolling average of annual increases in premium cost relative to market	1	.8	≥ -5%	0.3% above market	Excellent
6.19	% of current year's papers written by JLab staff or users placed online	1	1	≥ 97%	100%	Outstanding
	SUBTOTAL HUMAN RESOURCES AND SERVICES (6.15 – 6.18)	6	5.7			Outstanding
6.20	Number of times JLab computer systems were compromised or used to attack other systems	1	1	≤ 1	0	Outstanding
	SUBTOTAL CYBER SECURITY (6.20)	1	1			Outstanding
TOTAL QUALITY OF BUSINESS AND ADMIN PRACTICES		100	93.5			Outstanding

Division Assessment

The Administration Division comprises the Division Office (including QA), Plant Engineering, Business Services, Division Environmental Health and Safety (including Medical Services), and Human Resources and Services. The primary vehicle for assessing the Division's performance is the annual peer review of business and administrative practices. The FY01 Peer Review Panel characterized the Division's performance with these words: "In the opinion of the Committee, all the administrative areas are pursuing high quality standards through the use of high quality, meaningful performance measures and are carrying out their responsibilities in the most cost effective and efficient manner."¹ Significant changes in the previous year (FY00), including new directors in Plant Engineering and Human Resources and Services, as well as a new division administrator, enhanced the Division's already solid foundation and contributed to its effectiveness in FY01. Initiatives cited for special recognition by the Peer Review Panel attest to the Division's emphasis on continuous improvement and customer service. These initiatives include: the model case management program in Medical Services; the expanded use of Best Value contracting in Business Services; Human Resources and Services' outreach to the Lab and steps taken to align their services with the needs of the Lab; and the development of a 10-year strategic facilities plan by Plant Engineering.

Secondary indicators assess performance in specific areas that influence the overall effectiveness of the Division. As in previous years, performance results for secondary indicators in FY01 are consistent with the findings of the Peer Review Panel. More detailed discussions accompany scores on all performance measures, which appear following general department comments below.

Plant Engineering

¹ Report from the Panel, FY2001 Administrative Peer Review

Plant Engineering has an aggressive and effective outsourcing program. Contracted services include: security guard force, housekeeping, refuse collection and disposal, pest control, material handling, meeting room setup and moves, grounds maintenance, mechanical system maintenance, electrical (high and low voltage) maintenance, fire protection systems maintenance, HVAC controls system maintenance, cooling water chemical treatment, plumbing, and painting. The majority of these contracts are firm-fixed-priced, and the Lab's Plant Engineering staff monitors the outsourced services to ensure quality. In a given year, over 50,000 routine maintenance checks are performed on the mechanical and electrical systems. New scopes of work were prepared for restructuring the fire protection and electrical service subcontracts. The new fire protection subcontract will combine several Blanket Purchase Agreements (BPAs), which should reduce total cost while increasing accountability. The new electric service contract will obtain a fixed price for electrical Preventative Maintenance (PM) items and provide a simpler mechanism to accomplish work costing less than \$25,000.

Notification of mechanical system trouble calls was improved or expanded in the Computer Center, West Arc LCW, East Arc LCW, Hall A Control Room, Building 67 and 37, and Injector Building controls by the use of remote paging and the SITESCAN System. About 150 late night trouble calls or outages were responded to in FY01 using this expanded notification.

In addition to the daily maintenance requirements, in-house staff accomplished the 90% design of the End Station Refrigeration Support Building, the Free Electron Laser (FEL) modification for an injector test cave, and 1MW SNS Test Stand utilities. These projects are waiting for construction funding. A life-cycle cost analysis on three different types of roofing systems was conducted to ensure a viable roof replacement system prior to the design and construction award of the CEBAF Center Reroof Project. Modifications to the VARC Building were accomplished to more effectively use available space; the second phase of this construction project is waiting for funding. The Computer Center was expanded to provide space for additional hardware.

Conceptual Planning was accomplished for five future projects – CEBAF Center Additions, FEL Addition for HELIOS, Technical Support Building, Accelerator Storage Facility, and a Visitor/Education Center. The Environmental Assessment for these projects is underway and targeted to be complete in January, 2002. As part of the environmental assessment, Plant Engineering contracted for a site wide wetlands and endangered species survey. An energy savings study was completed for the ARC Building and design started on energy savings projects for the Test Lab/Central Chiller and the VARC HVAC system. Jefferson Lab received the Gold Award from the Hampton Roads Sanitation District for excellence regarding sanitary sewer outfall and reporting.

Plant Engineering developed and initiated a comprehensive Facility Condition Assessment Program to cover all aspects of maintenance and building serviceability. Surveys have been conducted on three key buildings to date, and all buildings will be assessed over a three-year period. In support of this initiative and other functions, an RS MEANS Cost Estimating Course was sponsored locally to improve Plant Engineering's skills in developing concept estimating and accurate identification of facility maintenance costs.

DOE continues to emphasize security, and the Security Plan was completely rewritten in FY01. Jefferson Lab received a satisfactory rating, the highest, during a Security Survey this past spring conducted by the Oak Ridge Regional Office. Additional Lab security measures were quickly

implemented as required in response to the September 11, 2001 terrorist attacks in New York and Washington DC. Cost effective solutions were put in place to enhance security for the expected long period of heightened security. The common Office of Science Badge was implemented with 100% change out scheduled before the end of the calendar year.

Property management maintained its low property loss rates, recycled a total of 91,140 pounds of scrap metal, donated a total of \$43,000 of surplus property to schools, and re-utilized \$19,000 of equipment in-house in lieu of disposal. Additionally, there was a transfer of \$332,000 of equipment from other labs. There was a total of \$187,000 of equipment disposed of through GSA, EADS, and other agencies, as well as transfers of \$10,000 of equipment to other DOE Labs for reutilization.

Assessment of Plant Engineering Performance Measures

Plant Engineering recommends changes to its FY02 performance measures for schedule variance (6.2) and property management (6.5a-c).

PM 6.2 is currently stated as: Calculation of performance toward this goal will be made by comparing the actual number of days to completion of an identified project (or to a designated milestone) to the number specified contractually. We recommend changing “contractually” to “by the original contract.” When the original wording is used, the number of days for a change caused by design errors or omissions is added to both the numerator and denominator, thus negating the need for the listed exceptions. The proposed new wording would increase only the numerator.

PM 6.5a-c measures the percentage of property *not located*. This percentage is determined using a 100% inventory for PMs 6.5.a and 6.5.c and a 10% statistical sample for PM 6.5.b. A separate report required by DOE measures inventory results in terms of percentage of inventory accounted for. Additionally, this report takes into account items found during the reporting year which were not located previously. The existing metric does not take these items into account. The new metric would report the results in the same manner as the existing report, reducing preparation time and eliminating confusion.

Business Services

FY01 was a very successful year for the Business Services Department. Highlights included final reconciliation and approval of costs incurred for fiscal years 1994-1999 by the DOE Inspector General; timely completion of all major procurement milestones in support of the Nuclear Physics, Spallation Neutron Source, and Free Electron Laser programs; “Outstanding” ratings on all contract Performance Measures and the Administrative Peer Review; and attainment of all small business program goals, with our Small Business Representative being named Corporate Minority Advocate of the Year by the Tidewater Regional Minority Purchasing Council. We also instituted numerous process improvements to enhance service and efficiency and supported expansion/implementation of various online business systems (e.g., enhanced capability of the stockroom’s electronic business-to-business system; enhanced budgeting/financial data on the web; implementation of an online travel request system; and implementation of a web-based tool for posting open JLab solicitations). Finally, the Department established various business arrangements with Government and industry to advance mutual interests and needs.

Looking ahead, the Department faces many challenges in FY02 and beyond, particularly with the mounting scope of DOE oversight and the Laboratory’s broadening scientific and customer perspectives. DOE programmatic needs continue to expand, often allowing short response times, and

DOE's increased emphasis on socioeconomic and green procurement program goals will likely place additional stress on the Department's already very limited resources. Also, as budget allocations are roughly flat, the Department is challenged to ensure that systems and staff are maintained to satisfy the institutional objectives of the Laboratory (e.g., Nuclear Physics and the 12 GeV upgrade; Free Electron Laser program to achieve 10kW power; continued SNS program support; fostering and effective community outreach). Our strategies to successfully meet these challenges are the continuous training and development of a motivated and skilled workforce that is focused on the mission and our customers within the scientific community.

Division Environment, Health, and Safety

Focus on subcontractor EH&S performance continues. Plant Engineering and Division EH&S have developed a trial version of a computer-based knowledge review and testing application for new subcontractor staff. This will augment the face-to-face orientation they now receive. The first version queries knowledge of JLab's electrical safety work rules and procedures. The battery of questions has been QA'd by Plant Engineering staff, and it will be put into use as soon as it can communicate with JLab's EH&S training database. (Computer Center support is needed for this phase.) Other topics may then follow if this initiative proves useful.

Workers' compensation experience ratings continue to be among the criteria used in best-value subcontract awards. This has proved to be an excellent and objective measure of a company's commitment to safety.

In the Medical Services area, physician hours have been increased from 12 to 20 per week. This will help address the continuing growth in numbers and types of mandatory medical monitoring for Lab staff. It also will enable the physician to serve more frequently as a consultant to Lab researchers investigating bio-medical-related topics.

The majority of laser-user eye exams are now being performed by Medical Services (versus by an off-site provider). This has alleviated many of the scheduling problems caused by visiting laser users arriving with little lead-time before their experimental activities begin.

Human Resources and Services

The varied responsibilities of the Human Resources and Services (HR&S) Department, which includes Staff Services and Information Resources, as well as the more traditional HR functions of Employment, Compensation and Benefits, Employee Relations, and Training and Performance, make for a very challenging span of control. Accomplishments of note during FY01 include:

- The department is fully staffed, including an HRIS administrator, a Benefits assistant, and a Compensation analyst. Two of these positions are new to the department and were funded through an effective reallocation of resources without additional budget.
- Required subcontractor access and compliance training is now available on the Web, an innovation viewed by our customers as very positive.
- We implemented phase one of an objectives-based Performance Management System, with simplified appraisal forms and senior management approval of performance objectives for all staff for FY02.

- Information Resources scanned and posted to the intranet all Jefferson Lab tech notes (internal, informal papers) written between 1985 and 2001, totaling 1009. All CLAS notes (informal papers) were scanned and posted to the Hall B Web site, totaling 245 to date.
- We purchased and prepared to implement a new, customer-friendly Applicant Tracking System in Employment. This system will enable electronic processing of many employment activities, including preparation and submission of requisitions, screening and routing of candidate's resumes, preparation of letters to applicants, and applicant searches.

We continue to focus on attracting and retaining world-class employees. The Training Department continues to develop web and CD versions of programs to meet Lab needs. Staff Services continues to provide comprehensive logistical support services for conferences, meetings, and special events while also managing food service operations and the SURA Residence Facility. Compensation and Benefits began implementing the conversion of data and processes into the Cost Point HRIS. We received DOE authorization for a special market adjustment fund for employees in information technology and electrical engineering. In Information Resources, the JLab electronic submission and approval process is in development. This application will allow JLab authors to upload their preprints into an automated routing process which will expedite the approval process with electronic signatures and ensure Publications Management receives all papers prior to their dissemination off-site.

Future Division Improvement Goals and Initiatives

- Award contract(s) for energy savings modifications to buildings using Bonneville Power Administration arranged financing.
- Consolidate work order control systems to improve customer ease of use.
- Improve the site space management system to maximize cost effective space use.
- Rewrite the construction general condition specifications for projects over \$100K and a second set for projects under \$100K to establish uniformity among all projects issued by Plant Engineering.
- Develop a comprehensive list of backlogged maintenance projects to more effectively and proactively manage maintenance costs in conjunction with the Facility Condition Assessment Program.
- Develop and conduct Project Management training for Plant Engineering Staff to standardize project management and project closeout procedures.
- Continue efforts to locate and award contracts to HUB Zone firms.
- Initiate the development of an on-line travel expense reporting and electronic signature process.
- Review new electronic timesheet system options for possible upgrade.
- Integrate Costpoint Payroll with Human Resources Information System (HRIS).
- Identify candidates for streamlining vendor payments, with a focus on invoice-less payments to e-commerce vendors.
- Utilizing the newly available Vendor Performance reports, and other available methods, improve the vendor delivery rate by 15% to meet the DOE Balanced Scorecard standard of 85%.
- Enhance the support of the Technology Transfer Manager and the Technology Review Committee through the development of a reporting system to enhance the management of technology transfer related agreements and projects.
- Develop and implement Phase Two of enhanced Performance Appraisal System.
- Complete implementation of Applicant Tracking System.

- Fully implement the compensation and employee personnel information components in the Human Resources Information System.
- Develop proposal for management on health insurance coverage for employees on long-term disability.
- Complete migration of EH&S courses from classroom to Computer and WebBased Training.
- Provide new training to include courses on basic electrical safety, supervisor “nuts & bolts” and security awareness.
- Review the residence Facility’s relationship with the Lab and realign it to better serve the needs of the customers.
- Fully implement the Vital Records Program.

Summary of Performance Measures

6.0 Peer Review

Area Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
Division Office (Division Management, Legal, Internal Audit, Quality Assurance, EH&S, MIS)	10	9.5	100%	95%	Outstanding
Business Services (Finance, Procurement)	20	19.3	100%	96.5%	Outstanding
Human Resources & Services (Special Focus Area)	20	17.5	100%	87.5%	Excellent
Plant Engineering	20	18	100%	90%	Outstanding
SUBTOTAL PEER REVIEW	70	64.3			Outstanding

Discussion

A two-day, on-site peer review was conducted by a panel of six members representing DOE, ER labs, the scientific community, and industry. As requested in the charge, the panel examined the Administration Division Office (including QA, EH&S, and MIS for this review), Business Services, Human Resources and Services, and Plant Engineering to determine if these areas were carrying out their responsibilities effectively and efficiently. In addition to assessing overall effectiveness and efficiency, the panel also was asked to note areas that merit special recognition or warrant attention for targeted improvement. Each year the panel is asked to examine one area in greater detail than the others so that each department is subject to closer review every three to four years. The Human Resources and Services function was selected for focused review in FY01.

The review panel received presentations from Lab staff, interviewed the Lab’s Associate Directors and Division Administrators and the DOE Site Office staff, and reviewed supporting documentation, including the Administration Division Departments’ line self assessments. The format and content of the FY01 review were revised from those of previous reviews to allow greater focus on changes and improvements and to reduce time spent on base operations. Peer review scores are presented above, and the complete report of the FY01 Administrative Peer Review Panel, including recommendations going forward for each department, is attached (see Attachment C). The FY01 Peer Review resulted in a numerical score of 64.3 (91.9% of available points) and an adjectival rating of Outstanding. As noted above, secondary indicator results support and are consistent with the panel’s conclusion.

The Administrative Peer Review remains the key indicator of the quality of the Lab’s business and administrative practices. The FY02 review will take place in March 2002 and once again will include

as panel members representatives from ER labs, the scientific community, industry, and DOE. We plan to continue to use the aforementioned revised format, which was well-received by panel members.

FACILITIES MANAGEMENT

6.1 Percentage of overrun on all projects greater than \$100K

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
≤ 8%	3.11%	1	1	Outstanding

6.2 Variance of scheduled completion time for projects greater than \$100K

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
≤ 1.10	1.0	1	1	Outstanding

Discussion of 6.1 and 6.2

Plant Engineering completed three major improvement projects increasing the plant value by almost \$2 million during FY01. The projects included (1) adding approximately 12,300 SF to the Test Lab building, (2) adding another cold box pit in the Central Helium Liquefier building, and (3) installing the site wide Central Alarm Notification System (CANS) for security and fire notification.

The low percentage cost overrun is attributable to relatively few contract changes for design errors or omissions in projects undertaken in FY01.

Schedule variance is attributable to delays in two projects. The duration increase of the Test Lab Addition was due to time associated with various design error and omission changes. The two main issues were a roofing detail with the existing building and the availability of chilled water for balancing the HVAC system. Plant Engineering and the construction subcontractor worked closely with the roofing manufacturer to develop a site specific detail that mitigates roof damage in the event of differential movement of the original building and the addition. The chilled water was provided from the existing building which also fed another building from the new water lines for the Addition. Plant Engineering, with support from the HVAC balancing subcontractor, adjusted the water flow to other areas to provide adequate flow to the new addition. CANS (as noted above, for security and fire notification) is a “state-of-the-art” system and as such is susceptible to frequent changes as the software and hardware are refined. Duration increases were due to scope increases at various stages after award as well as delays in the software availability.

The percentage of overrun metric should be retained for FY02; however, a change to the variance in schedule metric is recommended. Specifically, the time variance should be based on the “*original contract*” duration rather than on the number of days specified “*contractually*.” Time associated with differing site conditions also could be taken out for the adjusted duration. This would leave in time associated with design errors and omissions and delays. As currently written, time is adjusted for acts of God, labor disputes, material unavailability, and post award scope changes. If the variance is based on the original contract time, these elements would remain in the calculation.

6.3 Percentage of scheduled preventive maintenance tasks completed by their scheduled due dates

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
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≥ 94%	99.97%	2	2	Outstanding
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6.4 Average percentage of all open corrective maintenance tasks that have been open for greater than 3 months

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
≤ 10%	3.57%	2	2	Outstanding

Discussion of 6.3 and 6.4

The above metrics measure the effectiveness of our electrical, mechanical, and fire detection/protection equipment preventative maintenance (PM) and Corrective Maintenance (CM) programs. The PM program along with prepaid response to trouble calls has kept accelerator outages caused by failure of one of these systems low. The PM program is modified as necessary based on equipment trouble or failure rate. These measures should be retained for FY02. Expansion of this metric may be desirable once a new work request system is implemented.

PROPERTY MANAGEMENT AND PROTECTION

6.5a. Percentage of value of property not located during the inventory cycle for each of the inventories conducted -- Capital Property

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
< 1%	0.0%	1.5	1.5	Outstanding

6.5b. Percentage of value of property not located during the inventory cycle for each of the inventories conducted -- Sensitive Property

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
< 1%	1.8%	1.5	1.1	Good

6.5c. Percentage of value of property not located during the inventory cycle for each of the inventories conducted -- Stores

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
< 1%	0.8%	1	1	Outstanding

Discussion of 6.5

The loss rate for Capital Property for FY01 continues to be low as exhibited in past years. A higher than normal loss rate was experienced for Sensitive Property. The majority of items not found were outdated computers and lab equipment. Inventory of sensitive property was done by a statistical method that Jefferson Lab and DOE agreed to use for the first time in FY97. As a result of the higher loss number in FY01, property management will be added to the annual awareness briefing provided to all staff. Measures similar to the above should be retained for FY02. However, the metric should be changed to be consistent with that included in the report of Physical Inventory Performed already required by DOE (i.e., results should be reported as property *located* instead of property *not located*).

6.6 Store Inventory Reduction

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
≥ 10%	10.4%	1	.9	Excellent

Discussion of 6.6

The JLab Stockroom continues to expand the number of items available (currently over 2.5 million) through the “virtual stockroom.” The physical stockroom is comprised of over 7,000 different items commonly used in a laboratory such as JLab. The FY01 reduction was 10.4%—a reduction in inventory of \$79,990 against a book value of \$768,000 at the end of FY00. This measure should be retained with a goal of greater than 10% for FY02.

FINANCIAL MANAGEMENT

6.7 Number of CAS violations

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
0	0	1	1	Outstanding

6.8 Dollar percentage of invoices deemed unallowable

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
< 1%	0%	1	1	Outstanding

6.9 Percentage of vendor invoices paid with discounts lost

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
< 1%	.13%	1	1	Outstanding

Discussion of 6.9

The Laboratory realized a savings of \$81,177 through the prompt payment of discount invoices, taking advantage of over 99% of discounts offered. The lost discounts amounted to only \$231.

6.10 Percentage of annual actual cost variance from budget for each overhead pool

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
< 3%	.18%	1	1	Outstanding

Discussion of 6.10

The accuracy of the target G&A rate has a significant impact on the budgeting process, the availability of funds for research projects, and the organization’s fiscal integrity. If the target rate is too high, excess funds could be reserved for G&A, impacting the ability of research projects to fully utilize their funding. A target rate that is too low could cause a project to come up short of funds at year-end when the rates are finalized.

6.11 Number of occurrences that Cost Management Report had to be resubmitted to Contracting Officer – DOE Site Office

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
0	0	1	1	Outstanding

6.12 Number of audit errors in travel expense reports

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
< 2%	1.63%	1	1	Outstanding

PROCUREMENT

6.13. Average procurement cycle time

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
< 11 days	7.02	3	3	Outstanding

Discussion of 6.13

Procurement cycle time is a key indicator for procurement effectiveness, not only from the standpoint of customer satisfaction but also because it directly relates to the overall productivity of the procurement process.

6.14. Percentage of total available purchasing dollars awarded to small business (SM) concerns, small women-owned (WO) business concerns, and small disadvantage (SD) business concerns

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
≥ 46%	62.3%	1	1	Outstanding
≥ 6%	7.6%	1	1	Outstanding
≥ 7%	8.2%	1	1	Outstanding

Discussion of 6.14

Our small business program exceeded all FY01 small business goals. This success was achieved through significant internal and outreach efforts by Business Services, which engaged and involved the Laboratory customers in support of these programs.

HUMAN RESOURCES AND SERVICES

6.15a Percent of action oriented diversity commitments, as established in the Affirmative Action Plan (AAP), Section VII-C, completed during the fiscal year

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
≥ 90%	100%	1	1	Outstanding

Discussion of 6.15a

A strong focus on identifying and connecting with additional minority recruiting sources and expanding our community outreach activities helped us meet all established diversity commitments. For the first time, we participated in two NAACP Career Fairs (Dallas and Washington) and received resumes from many qualified minority candidates. Also for the first time, we contacted career and alumni placement offices at all SURA universities to begin building strong relationships and tap into these potentially rich sources of qualified candidates.

DIVERSITY COMMITMENT	ACCOMPLISHMENTS
1) Employment Administrators will participate in at least three job/career fairs with high female/minority representation.	<ul style="list-style-type: none"> • Employment Administrators participated in five career fairs during the year: two NAACP career fairs, a Diversity Career Fair, an Armed Forces Career Fair, and the Hampton University (HBCU) Spring Career Fair.
2) The EEO/AA Coordinator and Employment Administrators will provide assistance to support the Laboratory’s mission of expanding minority involvement in the sciences.	<ul style="list-style-type: none"> • The Lab maintains a cooperative education program with local high schools and colleges with 26.1% minority representation and 39.1% female representation. The Employment Department continues active efforts to recruit minority and female candidates for this program which serves to stimulate interest in engineering and science. • We also continue to support the Science Education’s BEAMS Program and the Hampton University Graduate Studies program.

<p>3) In partnership with the Newport News Housing & Redevelopment Authority, Jefferson Lab will continue to support the Welfare to Work Program by providing training to program participants, typically females, to prepare them to enter the workforce with a skill.</p>	<ul style="list-style-type: none"> In partnership with the Newport News Housing & Redevelopment Authority, Jefferson Lab continues to support the Welfare to Work Program by providing training to program participants. The Lab's continuing success was demonstrated by achievement of a 2000 National Award of Merit in Administrative Innovation during this fiscal year.
<p>4) SURA's Small Business Representative will support the Lab's Small Business and Small Disadvantaged Business Subcontracting plan by contacting minority and small business trade associations and business development organizations, as well as attending small and minority business procurement conferences and trade fairs.</p>	<ul style="list-style-type: none"> The Lab's Small Business Representative is a member of the executive board of the Tidewater Regional Minority Purchasing Council (TRMPC), attended a DOE-wide Small Business Conference and two trade fairs, and was on the TRMPC's planning committee for their annual trade fair and exposition. SURA received the "Corporate of the Month" award from the Tidewater Regional Minority Purchasing Council (TRMPC). SURA exceeded all its negotiated goals in its Small Business Subcontracting Plan.
<p>5) The minority and female recruiting sources identified in FY2000, as well as any newly identified sources, will be contacted for SURA/Jefferson Lab job opportunities.</p>	<ul style="list-style-type: none"> For the first time, Employment participated in two NAACP Career Fairs in Washington and Dallas, identifying more than 130 qualified minority candidates. Employment Administrators also participated in a local Armed Forces Career Fair, an excellent resource for diverse, experienced individuals leaving the military. These efforts are ongoing.
<p>6) Jefferson Lab will continue to advertise job vacancies, will pursue targeted advertising, new ad formats, and the Internet for our computing job group to increase our pool of qualified minorities and females.</p>	<ul style="list-style-type: none"> Placement agencies were contacted for assistance in locating candidates for hard-to-fill positions, particularly in the computing area, with special emphasis on minorities and females. Specialized Web sites have been effective in recruiting Lab technical jobs. A new resource, The Ad Club, now produces and places our recruitment ads, focusing on professional formats and appropriate placement.
<p>7) A salary equity review will be conducted to identify any salary alignment disparities for females and minorities.</p>	<ul style="list-style-type: none"> As part of the Lab's annual compensation review, alignment issues were considered. As a result of the distribution of these funds, base salaries for minorities increased by .74% compared with .36% for non-minorities; and .61% for females compared with .35% for males.
<p>8) The Employment Staff will continue to utilize formal (associations) and informal (employees and colleagues) networks to locate qualified minorities and females for remaining regular positions</p>	<ul style="list-style-type: none"> The Employment Staff contacted a network of placement offices, university advisors, etc. at minority institutions to recruit qualified minorities and females. The Employment Staff contacted career and alumni placement offices at all SURA universities, expressing our interest in connecting to their alumni regarding Jlab position vacancies. Recruiting sources with other employers in the local area also were networked. The HR&S Director attended the annual DOE Diversity Conference. Employment Administrators attended Employer Advisory Board Meeting, ECPI's Spring Advisory Board meeting and the Peninsula Personnel Association meeting.

6.15b. Representation of protected classes within each EEO-1 category at end of fiscal year compared to the beginning of the fiscal year (adjusted for voluntary separations).

Goal	Raw Score	Point Value	Points Awarded	Adjective Rating
100% maintained	85%	1	.9	Excellent

Discussion of 6.15b

The Officials category includes only SURA officers, Lab Director and Associate Directors, and both vacancies and candidates with the requisite skills and experience are rare. This year a vacant position afforded us the opportunity to increase minority representation in the Officials category. We succeeded in increasing our minority Manager representation but we are still striving to obtain full utilization. We are underutilized in the female computing and minority/female engineering positions. These categories remain focus areas.

JOB CATEGORY	MINORITY %				FEMALE %			
	AVAILABILITY	REPRESENTATION		ASSESSMENT	AVAILABILITY	REPRESENTATION		ASSESSMENT
		9/30/00	9/30/01			9/30/00	9/30/01	
1A Officials	11.0	0.0	12.5	Fully Utilized	19.3	0.0	0.0	<i>Maintained</i>
1B Managers	12.3	8.5	9.6	<i>Maintained</i>	22.0	22.4	24.7	Fully Utilized
1C Buyers	20.2	28.6	28.6	Fully Utilized	53.6	71.4	71.4	Fully Utilized
2A Administrators	14.8	13.8	13.5	Fully Utilized	44.8	79.0	75.7	Fully Utilized
2B Scientists	9.4	21.5	22.7	Fully Utilized	5.8	7.8	14.8	Fully Utilized
2C Computing	13.7	12.8	15.2	Fully Utilized	32.4	33.3	26.1	<i>Not Maintained</i>
2D Engineering	13.3	12.1	10.9	<i>Not Maintained</i>	8.3	8.1	7.2	<i>Not Maintained</i>
3 Technicians	16.5	19.7	19.5	Fully Utilized	18.1	20.5	20.1	Fully Utilized
5 Office/Clerical	24.1	40.2	30.3	Fully Utilized	90.8	96.2	94.0	Fully Utilized
6 Skilled Trades	22.5	21.2	22.2	Fully Utilized	3.9	15.8	16.7	Fully Utilized

Legend:

Maintained: Underutilized but maintained/increased representation.
Not Maintained: Underutilized and representation decreased.
Fully Utilized: Achieved/maintained full representation.

6.16 Sustainable EEOC charges

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
0	0	1	1	Outstanding

Discussion of 6.16

The Lab continues its proactive approach to investigating and resolving issues that could have resulted in external complaints. As a result, no EEOC charges were filed during FY01.

This measure is a valid indicator of EEO performance and should remain unchanged in FY02.

6.17 Achieve compensation positions aligned with market practices to reflect the Lab’s mid-market compensation philosophy.

Goal	Raw Score	Point Value	Points Awarded	Adjectival Rating
+ 3% of market average	-2.6% of market average	1	1	Outstanding

Discussion of 6.17

This compensation metric aligns with the Lab’s mid-market compensation philosophy. The Lab implemented a 3.5% merit increase program across the board and focused equity adjustments to target job groups and positions. Also, in response to external market movement in the electrical engineering and information sciences professions, a special adjustment fund was negotiated with DOE and implemented mid-year. This was the primary factor in the improvement in this metric.

This metric remains a valid measure of compensation performance and should be retained in FY02.

6.18 Percent of three-year rolling average of annual increases in premium cost relative to market.

Goal	Raw Score	Point Value	Points Award	Adjectival Rating
≥ -5%	.3%	1	.8	Excellent

Discussion of 6.18

For the 2001 benefits premium year, we negotiated reasonable premium rates for all medical insurance programs in spite of increasing rates nationally. Overall, for FY01 the Lab experienced an increase of 22.0% in premium rates. This increase was significantly influenced by the rising costs of prescription drugs and unfavorable claim experience for the year. The three-year trend in benefit costs has been comparable to the market.

This valid measure of performance should be retained for FY02.

6.19 Percent of current year's papers written by JLab staff or users placed online.

Goal	Raw Score	Point Value	Points Award	Adjectival Rating
≥ 97%	100%	1	1	Outstanding

Discussion of 6.19

All of the 137 papers received by the publications office were placed online. This new measure represented an important challenge for Information Resources, since getting JLab papers online has been a goal for some time. We were very pleased that 100% of papers by JLab staff were placed online in FY01 and expect to continue this trend in FY02.

This measure of performance should be retained for FY02.

CYBER SECURITY

6.20 Number of times JLab computer systems were compromised or used to attack other systems.

Goal	Raw Score	Point Value	Points Award	Adjectival Rating
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≤ 1	0	1	1	Outstanding
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Discussion of 6.20

In the period 10/1/00 – 9/30/01 there were no system level (root) compromises of any centrally managed (Computer Center and Accelerator Controls groups) systems. There were 5 user-level compromises, none of which resulted in any system compromise, loss of functionality, or other problem; they all were rapidly detected and resolved. During the same period, there were no incidences of any systems in the jlab.org or cebaf.gov domains being used to launch attacks on other sites. The combination of physical protection measures (firewalls, filtering routers), active monitoring of systems and network traffic analysis, as well as policies, procedures, and user awareness has enabled this level of protection. These measures are continuously reviewed and updated in the light of experience and the changing threat environment in order to maintain an appropriate degree of protection.

7. Responsible Institutional Management

Summary of Performance Measures

PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
7.0	Responsible Institutional Management					
	• Strategic Planning	40	37	100%	92.5	Outstanding
	• Managerial Effectiveness	40	36	100%	90	Outstanding
	• Organizational Culture	20	20	100%	100	Outstanding
TOTAL RESPONSIBLE INSTITUTIONAL MANAGEMENT		100	93			Outstanding

Responsible Institutional Management (IM), an area of great importance to Jefferson Lab, is assessed via a biennial peer review process which looks not only at how the Lab is being managed, but also at how management plans and prepares for its future. The categories assessed include strategic planning, managerial effectiveness, and organizational culture.

Lab management considers effective institutional management essential to building a dynamic scientific future for the Lab, and therefore commits to continuous improvement through internal assessment as well as action based on comments and suggestions from all Lab reviews. Although an IM review was not done this year (it is a biennial review), institutional management received special attention. Because the Lab was in transition as it searched for a new, permanent Director, institutional management was the subject of discussions and recommendations at almost every peer review held in FY01.

Summary of 2000 Institutional Management Review

The biennial IM review held November 1-2, 2000 was chaired by John McTague, formerly of Ford Motor Company and a member of the Laboratory Operating Board. The committee included Dr. Dave Shirley of LBNL, Dr. Rudolf Bock of GSI, Mr. Mike Telson of the Department of Energy, Professor Stan Kowalski, as a representative of the Science and Technology Review, and Mr. Jerry Jobe, representing the Administrative Practices Review. The IM review consisted of a day and a half of presentations from Jefferson Lab that looked at plans for all areas of the Lab's science and technology programs and supporting functions, including business practices, communication and outreach, the ISM program, and integration within the DOE lab system. Results of the Science and Technology and Administrative Practices reviews were presented by Stan Kowalski and Jerry Jobe, and a presentation was made by the User Group. In addition, Panel members had the opportunity to take a comprehensive tour of the Lab and to interact informally with Lab staff at a luncheon.

The Panel was generally very favorably impressed, recognizing both the strong strategic planning activities of the lab that included our user community and our good DOE corporate citizenship. In the area of Strategic Planning, their primary suggestion was to work to make the case for the 12 GeV upgrade in the larger scientific community. In the area of Managerial Effectiveness, the Panel found several noteworthy assets, including new leadership in Human Resources and Services and strong performance in EH&S and Integrated Safety Management. The panel suggested strengthening succession planning activities for both the technical and administrative areas. They also identified a need for greater depth of leadership at the Lab to articulate and carry forward the scientific vision. Organizational Culture was judged outstanding, reflecting an organization with a can-do attitude.

Jefferson Lab's outreach programs, including its education outreach efforts, were singled out as noteworthy and of real benefit in enhancing the relationship Jefferson Lab has built with the surrounding community

Management Initiatives in FY01

Throughout FY01, a period of leadership transition, Jefferson Lab has maintained a high level of performance and demonstrated strong institutional management as evidenced by several key accomplishments. The recommendation of the IM Panel to seek support for the 12 GeV upgrade in the larger scientific community was, in fact, realized through strong user participation in the NSAC Long-Range Planning process. User involvement, and the conviction with which they helped make the case for 12 GeV, led to the inclusion of Jefferson Lab in two of the four final NSAC recommendations. The first recommendation called for funds to increase operations at Jefferson Lab and RHIC, and the fourth recommendation called for a timely start of the 12 GeV upgrade.

In FY01, the Laboratory also underwent its biennial institutional planning process that results in a 5-year plan for the lab and details its activities to meet the plan. Jefferson Lab management developed a plan that achieves balance between running the current program and making critical investments necessary to ensure our future at the forefront of nuclear physics. At the Institutional Plan Review by DOE, the Office of Science approved the long-range plans for the laboratory calling them "aggressive." They also stated that the only remaining obstacle to 12 GeV was the constrained budget picture. The Lab currently is working with the Program Office toward CD-0, the statement of mission need and an important milestone in the realization of 12 GeV.

At the Science and Technology Peer Review, the panel praised Lab management, and particularly then Interim Director Christoph Leemann, for pursuing an aggressive plan that builds on our unique core competencies. They felt it was clear that the SNS and FEL projects were not only *not* a drain on the NP program but rather were synergistic and beneficial. They emphasized the need for the lab and its management to be mindful of the current environment and to work hard to communicate the importance and impact of the science done here to the various constituencies.

At the end of the calendar year, Dr. Christoph Leemann was named permanent director of the Lab. Dr. Leemann's significant experience, both at Jefferson Lab and with its underlying core competencies, will be an asset to the Lab as we prepare to meet the challenges ahead. The continuity of his leadership will help create an environment where commitment to maintaining a world-class facility and to excellence in all that we undertake is translated into action and achievement.

Conclusion

As it prepares for this next phase in its history, Jefferson Lab must focus on building on its unique strengths and addressing identified weaknesses. There are still several leadership positions at the Lab that need to be filled, and we plan to develop a scientific policy advisory group to provide us additional guidance as we continue to work toward the vision of the Laboratory described in our Institutional Plan. Jefferson Lab is a well-managed institution with great potential, some of which has yet to be fully realized. Ensuring that the Lab is prepared to meet the future and growing and developing the Laboratory strategically based on our unique core competencies are the challenges

currently facing Lab management. Successfully meeting these challenges will require examination and implementation of new methods and paradigms.

Principal Areas of Emphasis for FY2002

- Develop and implement a succession planning strategy to meet the future needs of the Lab.
- Implement the Jefferson Lab Institutional Plan.
- Realize the 12 GeV upgrade on the shortest practical time scale, complete the 10kW upgrade of the FEL, begin to integrate the HELIOS synchrotron into JLab, and resolve FEL operations funding issues.
- Sharpen the vision for Jefferson Lab and its future, bring the Strategic Plan in line with that vision, and promulgate the vision throughout the organization.
- Strive for increased efficiencies, and strengthen accountability in the organization.
- Continue vigilance and performance within the areas of ISM and security, maintaining cost-effective, value added service to staff and users.
- Position Jefferson Lab to apply its unique expertise and capabilities in response to national priorities.

8. Spallation Neutron Source

Overview

JLab, one of the six partner labs building the SNS in Oak Ridge, TN., is responsible for the SRF cryomodules and the refrigeration system. JLab's SNS metric is based on the SNS "early finish" schedule milestones, which finishes the Linac and provides 1 GeV beam 18 months prior to CD-4. We were able to hold our part of the project to a schedule slip of only 0.7 months compared to the baseline.

FY01 was the first full year of JLab's involvement in the SNS partnership; our formal involvement having started 1-Feb-00. We completed and tested the first cavity of each Beta; in the vertical Dewar both reached 160% of their design gradients.

Based on SRF R&D, JLab was able to propose a cost reduction alternative for SNS to maintain 1 GeV beam energy with a reduced number of cavities and RF systems. Two electro-polished "upgrade" cavities (plus one TESLA cavity) showed gradient performance >135% of buffered-chemical-polish at higher Q's. This proposal was funded and is now the basis of the SNS Hi Beta design.

The last of the major refrigeration contracts, the 4.5K Coldbox, was awarded. Most of the auxiliary refrigeration equipment was delivered.

Principle Areas of Emphasis for FY02

- Medium beta cryomodule completion and testing
- Medium beta production start
- Electro-polish system installation and commissioning
- 1MW RF system installation and commissioning
- Fundamental power coupler testing at JLab
- Warm compressor delivery and installation start
- 4.5K Coldbox delivery and installation start
- Cold compressor design finalization
- Transfer line continued fabrication and installation start

Summary of Performance Measures

PM	Description	Point Value	Points Awarded	Goal	Raw Score	Adjectival Rating
8.0	Spallation Neutron Source	30	27.9	≤ 1 month behind schedule	0.7 month behind schedule	Outstanding
TOTAL SPALLATION NEUTRON SOURCE		30	27.9			Outstanding



Department of Energy
Germantown, MD 20874-1290

DEC 21 2001

Dr. Christoph Leemann
Director
Thomas Jefferson National Accelerator Facility
12000 Jefferson Avenue
Newport News, VA 23606

Dear Dr. Leemann:

Enclosed is the report of the Science and Technology Review held at the Thomas Jefferson National Accelerator Facility (TJNAF) on September 24-26, 2001. This annual review, as required under the SURA-DOE performance-based contract, is an important factor in the Department of Energy's (DOE) annual assessment of the scientific and technical performance of the Laboratory.

The review found that TJNAF continues to perform at an outstanding level in carrying out its science and technology mission. I commend the Laboratory management and staff for its accomplishments. TJNAF faces both challenges and opportunities as it looks to the future. I look forward to working with you to successfully meet these challenges and realize the opportunities.

I want to thank the Laboratory management and staff for the effort and time invested in organizing and carrying out this important review.

Sincerely,

Dennis G. Kovar
Director
Division of Nuclear Physics

Enclosure

cc: Dr. Jerry Draayer, SURA
Mr. Jerry Conley, TJNAF Site Office
Dr. S. Peter Rosen, SC-20

JEFFERSON LAB
DIRECTOR'S OFFICE

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U.S. DEPARTMENT OF ENERGY

REPORT OF THE
SCIENCE AND
TECHNOLOGY REVIEW
FOR THE THOMAS
JEFFERSON NATIONAL
ACCELERATOR
FACILITY

SEPTEMBER 24-26, 2001

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Introduction

The Thomas Jefferson National Accelerator Facility (TJNAF) is a Department of Energy (DOE) facility operated under contract with the Southeastern Universities Research Association (SURA).

The primary goals of TJNAF are to carry out a high quality nuclear physics experimental program and to plan and execute other related science and technology programs. Related programs include a Free Electron Laser (FEL) program, with possible projected uses ranging from research in superconducting RF (sRF) technology to materials research. In addition, TJNAF is contributing its expertise in sRF technology to the Spallation Neutron Source (SNS) project.

The primary facility at the site is the 4 GeV, Continuous Electron Beam Accelerator Facility (CEBAF) that produces a high current, high polarization, electron beam with a 100% duty factor. Because the sRF cryomodules have exceeded their design performances, beam energies as high as 5.8 GeV can be regularly produced and energies as high as 6.0 GeV have been achieved. The three experimental halls, A, B, and C, contain extensive spectrometer and detector equipment that support the experimental nuclear physics program. A FEL facility has also been constructed which has achieved an output power of 2.1 kW, exceeding the world's existing capability by two orders of magnitude. Present plans are to increase the output power to 10 kW in the infrared and 1 kW in the ultraviolet. This past year they demonstrated harmonic lasing which, combined with high power, could lead to a broadband tunable FEL.

On September 24-26, 2001, the Division of Nuclear Physics of the Department of Energy carried out the annual Science and Technology Review (S & T) of TJNAF. The S & T Review is one of a series of in-depth reviews to assess the activities of TJNAF. These reviews are required under the SURA / TJNAF Performance-Based Contract with the Department of Energy. The S & T Review examines all supported research and development activities carried out by the laboratory as well as facility operations in support of these activities. The relationship with the users, activities of the Program Advisory Committee (PAC), and plans for the future scientific program and technological upgrades are also a part of the responsibilities of this review. The following report describes the review and the overall conclusions and recommendations of the reviewers.

The review was conducted by the DOE with the assistance of seven scientists who agreed to participate and to provide individual peer reviews to the DOE. These reviewers were:

- Dr. John Galayda, Stanford Linear Accelerator Center
- Dr. Donald Geesaman, Argonne National Laboratory
- Dr. John Marriner, Fermi National Accelerator Laboratory
- Professor Shelley Page, University of Manitoba, Canada
- Professor Vijay Pandharipande, University of Illinois, Urbana-Champaign
- Professor Berthold Schoch, Universität Bonn, Germany

Each of these reviewers submitted a written report that contained their impressions of the activities and plans of TJNAF. This document combines the individual reviews into a single report. Each panel member's written findings and recommendations are provided in the main body of this report organized into the following categories: Laboratory Management, The Nuclear Physics Research Program, Accelerator Operations and Performance, Accelerator Research and Development, The Spallation Neutron Source, The Free Electron Laser, and Interaction with the User Community. A synopsis of the findings and recommendations of the reviewers for each of these categories is found in the Executive Summary.

Executive Summary

The reviewers heard presentations on activities of the scientific and technical programs, the Program Advisory Committee (PAC) and the Users' Group, held interviews with the Laboratory management and some of the academic users of the facility, and toured the CEBAF, Halls A and C, and the FEL. They evaluated the TJNAF performance according to the following categories: Laboratory Management, the Nuclear Physics Research Program, Accelerator Operation and Performance, Accelerator Research and Development, the Free Electron Laser, and Interaction with the User Community. An overview summary of the evaluation in each of these categories is given below.

Laboratory Management

Dr. Leemann has done an outstanding job as interim director and has shown considerable vision in expanding the national role of the accelerator division. Overall, the quality of the laboratory management this year is exemplified in: (1) the consistently high quality performance of the polarized beam and facilities, (2) the laboratory's successful presentation to NSAC of the importance of the 12 GeV upgrade to the future of Nuclear Physics, (3) the selection of Dr. Chattopadhyay who shows great potential to lead the Accelerator Division, (4) the hiring of additional members for the Theory Group who will strengthen and complement the laboratory's research program, (5) the establishment of the Lattice Hadron Physics Collaboration, and (6) the strengthening of the interdisciplinary activities of the laboratory's SRF expertise with projects like the SNS and FEL. The latter five items were viewed by the reviewers to be very important decisions for the long term future of the laboratory. The reviewers cautiously approved of management's decision to hire more scientific staff at the expense of technical support and reduced operational capability.

However, looking to the future, there are still concerns. The laboratory management is in need of a permanent director, chief scientist, head of theory, Hall C leader, and a director of the SRF program. Since the review was held, the permanent director has been filled by Dr. Leemann and is no longer an issue, however, the other positions remain open. The reviewers, as last year, emphasized the importance of filling the position of chief scientist with a person with strong scientific vision for the future of the laboratory.

The Nuclear Physics Research Program

During the past year, an estimated 33.6 weeks of beam was delivered to experiments with 68% beam availability and an average hall multiplicity of 2.8. There is an increasing demand for beams of high polarization, high current, and the highest possible energy to maximize the physics reach of the experimental program. In the past year, 6 experiments took data in Hall A, 8 in Hall B, and 2 major installation experiments in Hall C. As of September 2001, the CEBAF experimental program has produced 56 publications in refereed journals, 7 instrumentation papers, 67 invited talks, and 46 contributed papers to conference proceedings this year, with 24 Ph.D's awarded so far this year and another 178 in progress.

The quality and effectiveness of the overall research program at TJNAF is outstanding. Over the past few years TJNAF has carried out definitive experiments on: (1) the structure of the hadrons, (2) the transition between quark and hadronic degrees of freedom, and (3) implications of hadronic structure for nuclei. Great advances have been made with measurements of the elastic electromagnetic form factors of the proton, neutron and the pion. These form factors probe the distribution of charge and current in the hadrons, and their knowledge is essential for understanding nucleons. The new measurements probe the distributions of charge with subfemtometer resolution, using elastic and quasi-elastic scattering of spin-polarized electrons. Results in all three areas represent dramatic progress on the primary scientific issues for which Jefferson Lab was built; namely, what is the microscopic structure of the hadrons and how does this microscopic structure determine nuclear physics? TJNAF is designed primarily to examine these issues at the hadronic level, by measuring the spatial distributions of the hadrons and how these distributions may change in nuclei. Each of these scientific results is changing the way we think about these issues: What is the relation between the valence quarks and the sea? How much of the sea of quark-antiquark pairs appears

in the cloud of virtual mesons about each hadron? Over what distance scales are hadronic models able to capture the essence of the QCD dynamics? Does the structure of the nucleon change in the nuclear medium?

The reviewers were agreed, as last year, that the laboratory's progress on addressing these major themes was not clearly expressed in the presentations. They thought that the management had done an excellent job in balancing the needs of the experiments with the performance capability of the machine to optimize the productivity. The laboratory is doing a good job of continually upgrading its experimental capability. Examples include the new coherent bremsstrahlung facility in Hall B to provide a polarized real photon beam, the septa magnets to allow small angle experiments and the Big Bite spectrometer in Hall A, and the G0 spectrometer in Hall C.

As a result of last year's review, the laboratory has responded with an increase of scientific staff as one of its highest priorities. This is important in providing new blood for the lab and enables them to capture some of the best of the young scientists who are now emerging from the TJNAF scientific program. However, there was concern expressed by some of the reviewers this year as to whether or not this should continue to be one of the highest priorities. As the laboratory continues to address this issue, it is recommended that management carefully balance this need in light of budgetary realities and other priorities of the laboratory. The reviewers noted that the lab is searching for a new Hall C leader but the status of that search was not addressed during the review. The need for someone in this position is very important since the nature of the experiments in that hall require intense supervision.

The laboratory has a group of about 14 (10.5 FTE) theoretical physicists with expertise in three areas: hadron physics, physics of light nuclei and lattice QCD calculations. Progress has been made in: (1) modeling generalized parton distributions of hadrons, (2) calculating the cross sections of radiative capture reactions that generate energy in stars, and (3) building a teraflop lattice QCD computer to be operational in the year 2003 and in developing theoretical techniques to extrapolate the results of lattice calculations to realistic regimes. The results of (2) from TJNAF have been used in estimating the rate of emission of the most energetic neutrinos by our sun. Progress has also been made in solving the relativistic two-body problem with model field theories.

Generally, the interests and capabilities of the theory group are broad and appropriately matched to the experimental program. The group has provided very strong and effective theoretical support for the 12 GeV upgrade. Of particular note in this regard is the recent development of the generalized parton distribution formalism (GPD) by Dr. Radyushkin, now recognized to be a cornerstone of the physics program at 12 GeV. Another outstanding example is the work carried out by the late Dr. Isgur proposing the experimental search for hybrid mesons, which is the motivation behind the construction of Hall D.

Concerning the 12 GeV upgrade, the reviewers were impressed with the laboratory's ability to successfully defend the project during the Long Range Plan of NSAC. They also thought that the physics motivation for the upgrade was strong and that the technical planning was advanced for this stage of the project.

Accelerator Operation and Performance

The dedication and professionalism of TJNAF operations staff is equal to or better than peer organizations at other laboratories. This is evident in the excellent beam performance. Operational efficiency is given a high priority and tools such as line management responsibility, trend analysis, focusing resources on critical problems, and a reflective, rational approach to a complicated problem is very much in evidence.

The reduced operating hours this year raised a concern as to whether or not this was a trend or a single event. The accelerator down-time is rigorously tracked and areas for improvement have been identified. It was less clear whether the time taken for startup, maintenance, tuning, beam-studies and other non-physics uses of the machine was receiving as high a level of scrutiny. However, it was clear from the presentations that pushing the energy to 6 GeV was contributing significantly to the reduced efficiency of the machine and that replacing one or more of the cryomodules with new, higher-gradient cavities would significantly

improve the reliability of the machine at the higher energies. It should be noted that achieving a balance between funding operations at existing facilities and funding new capabilities is always difficult. The case for improved reliability that could be obtained with incremental funding needs to be developed and better quantified so that decisions can be made on the basis of accurate information. The reviewers encourage TJNAF to continue its efforts to maximize their scientific output with particular attention to increasing the number of priority-weighted PAC days in each Hall.

Accelerator Research and Development

The accelerator R&D staff is excellent. The performance of the TJNAF accelerator group is outstanding. Accelerator R&D is strong on a broad front and at many levels. The highlights are the continued effective development and use of highly polarized electron beams and the conception, construction, and operation of a unique, high-brightness free electron laser based on energy recovery. Their work on polarized electron sources and the development of energy recovery for the FEL is outstanding. Energy recovery is integral to many concepts for new accelerators worldwide. TJNAF is clearly leading the way in this area. The reviewers were extremely impressed with the vitality, synergy, and long-range strategy of the Advanced Accelerator R&D (AARD) program. Its several components (operations support, FEL R&D, SCRF R&D, support of SNS construction, RIA R&D, recirculating linac R&D, 12 GeV upgrade R&D, synchrotron radiation research) are well conceived from both short- and long-term perspectives and they enhance the productivity of the laboratory. Management of these "work-for-others" programs will continue to be a management challenge for the laboratory, however.

The Accelerator Division has recently been reorganized by Dr. Chattopadhyay into two new organizational structures: The Center for Advanced Studies of Accelerators [(CASA)], and the Institute for Superconducting Radiofrequency (SRF) Science and Technology. The former supports traditional CEBAF and FEL operations and upgrades. R&D work within the purview of CASA includes the design of advanced recirculating linacs, and physics of superconducting RF accelerators. The SRF Institute was formed within the last six months and is actively searching for a Director. It will mainly focus on non-project-specific SRF R&D. The reviewers noted that this group was probably the best of its kind in the U.S. and needs support to maintain that position. If the funding agencies do not support this group, other groups will spring up at other U.S. laboratories to fill the gap. Therefore, the concept of additional funding for the SRF Center of Excellence to maintain a project-independent core of SRF expertise, focused on accelerator R&D is encouraged.

The Free Electron Laser

Jefferson Laboratory has developed the world's leading high power free electron laser facility. It has unique capabilities as a laser source -- notably, tunability, high power, and sub-picosecond pulse structure. The source routinely produces 2 kW of laser power at IR wavelengths, with upgrades underway to produce 10 kW IR and 1 kW UV. The Navy is considering a 100 kW upgrade of the 10 kW IR FEL possibly in 2003-2005. Combined with the HELIOS synchrotron, the FEL will have the capability of studying dynamics via a two photon pump-probe technique. With this facility, Jefferson Lab has made a ground-breaking demonstration of the recoverability of energy in a linac, opening up possible developments of a whole new generation of accelerators that will benefit the nuclear and particle physics communities worldwide. A substantial user community (~100 users) is being developed and a program advisory committee has been formed. It is important to note that the FEL program is supported by state, Navy, and NASA funding.

The reviewers were very impressed with the progress made in demonstrating harmonic generation and the development of the user community, program advisory committee, and research program. The FEL is an important program for TJNAF, and it has great potential for future growth. The reviewers recommend that DOE Nuclear Physics trumpet the success and future capabilities of TJNAF in this area and be proactive in obtaining a continuing source of funding for operations.

Reviewers' Comments

The following section consists of a synthetic discussion of the reviewers' comments for each of the major categories by which the TJNAF was evaluated. For the most part, the actual comments by the reviewers have been used with only minor alterations to blend the discussion. The reviewers' comments have been combined for each topic in order to eliminate repetition and provide continuity. Not all of the reviewers commented on all topics, so only those remarks from reviewers that were relevant for each topic have been included.

Laboratory Management

The loss of Hermann Grunder and Nathan Isgur has created significant management challenges for the laboratory. Christoph Leemann is doing an excellent job as interim director and has shown considerable vision in expanding the national role of the accelerator division. Senior management has maintained the high quality of the laboratory . . . The combined operation of multiple polarized beams, polarized targets and polarimeters at the highest level of their performance constitute an outstanding accomplishment of the technical infrastructure of the laboratory . . . Besides operating the accelerator and the experimental hall facilities the laboratory was able to convince the nuclear physics community to choose the 12 GeV upgrade of the facilities at TJNAF as one of the three new future projects . . . Swapan Chattopadhyay appears to be an outstanding addition as the new director of the Accelerator Division. He presented a broad view of the future for the laboratory . . . Hiring in nuclear physics theory filled a desperate need . . . The creation of the Lattice Hadron Physics Collaboration fits excellently in the line of research of the Theory Division. A strong interconnection with the ongoing activities in the theory group will be important for a successful research program . . . The additional scientific staff seems also to be a smart move given the maturity of the scientific program. It must be noted, however, that the increase could only be accomplished by a reduction in technical support staff beyond what was required by a FY01 budget that failed to match inflation . . . The recent successes and activities around the TJNAF IR Demo FEL are very remarkable. A rather strong and dedicated user community has been established. The achievement of significant energy recovery in a high power linac has ignited an international interest to work on the design of a new generation of high brilliance light sources. The high standard of R&D in the field of Superconducting Radio Frequency (SRF) has positioned the Lab. in a top position worldwide. The collaborations formed within the SNS and RIA projects permit to transfer knowledge to other national labs and universities. The key competence in SRF, demonstrated in the FEL and SNS/RIA activities, provides the basis for a future upgrade program of CEBAF.

However the laboratory is facing the necessity to replace its permanent director, chief scientist, head of theory, Hall C leader, and to find a director of the SRF program so this is an area of concern. The responsibility for the director search lies with SURA, not JLAB. I understand the desire to wait for a new director before filling many of the other positions, but I am concerned that this may limit the lab in these critical times. The greatest concern is in scientific leadership and vision. The lab should consider the chief scientist appointment as a real opportunity to get the best visionary nuclear scientist, experimentalist or theorist. Larry Cardman is almost alone in carrying this load at present. I have the utmost respect for Larry but he needs help. I would re-emphasize the importance of having strong scientific leadership with a clear vision to define and promote the scientific program.

The Nuclear Physics Research Program

The Experimental Program

The quality of the overall research program at JLab is outstanding. Over the past few years JLab has carried out definitive experiments on the:

- Structure of the hadrons
 1. proton charge distribution, G_E^p
 2. neutron charge and magnetization distributions, G_E^n , G_M^n
 3. proton strangeness distribution, HAPPEX
 4. pion charge distribution, F_π
 5. structure of the $\Delta(1232)$ E_1^+ , S_1^+
 6. virtual Compton Scattering
- Transition between quark and hadronic degrees of freedom
 1. scaling in $d(\gamma, p)$ at forward angles
 2. rapid decrease of induced polarization in $d(\bar{\gamma}, \bar{p})n$
- Implications of hadronic structure for nuclei.
 1. high Q^2 , (i.e very short distance resolution) measurements on D, ^3He , ^4He .
 2. $^4\text{He}(\bar{e}, e\bar{p})$ and the change of G_E^p/G_M^p in the medium.
 3. relativistic effects in nuclear bound states in $^{16}\text{O}(\bar{e}, e'\bar{p})$

Structure of the hadrons

Great advances have been made with measurements of the elastic electromagnetic form factors of the proton, neutron and the pion. These form factors probe the distribution of charge and current in the hadrons, and their knowledge is essential for understanding nuclei, the core of matter in our universe. The new measurements probe the distributions of charge with subfemtometer resolution, using elastic and quasi-elastic scattering of spin polarized electrons.

Results of the first measurements [of G_E^p/G_M^p] in Hall A were cited in last year's S&T review as a highlight of the program, having provided the first convincing evidence that the distributions of charge and current inside the proton are substantially different. The discrepancy increases with increasing momentum transfer, Q^2 , and it is important to map this intriguing behavior systematically across the widest possible range of Q^2 in order to test theoretical models and refine our understanding of the proton's structure . . . The new, precise results for the proton charge form factor are most interesting and surprising . . . Previous data from SLAC in the same momentum transfer regime are off by a factor of up to 4 . . . They [the new TJNAF results] contradict the older measurements and beliefs. It is important that these measurements be repeated, as planned, with the older techniques using scattering of unpolarized electrons. It is also important to pursue the proton charge form factor measurements to ascertain if it changes sign at larger momentum transfers, as the present data suggests, when higher beam energies are available.

The new data on neutron charge form factors have higher precision. . . In this area of fundamental nucleon structure studies, CEBAF is providing new data of unprecedented quality where none existed previously. These measurements probe the distribution of electric charge inside the neutron, which is an observable of fundamental importance to the understanding of nucleon structure but is notoriously difficult to measure. The neutron electric form factor has implications beyond the structure of the neutron in its own right, as it is an essential input for the interpretation of present and future experiments aimed at a flavor decomposition of the nucleon electroweak form factors, ultimately shedding light on the elusive role of strange quarks in the nucleon.

New data from measurements of pion electroproduction ($ep \rightarrow ep\pi^0$) with CLAS in Hall B have been analyzed and are nearing publication. These data shed light on an important and fundamental problem in nuclear physics: the quadrupole deformation of the Δ resonance, which is excited by the electron beam and decays to produce a proton and pion in the final state. The large solid angle acceptance of CLAS is ideal

for mapping the angular distributions of the outgoing particles, which can be mapped into so-called longitudinal and transverse response functions. Previously, a small amount of data existed at low momentum transfers from work at other laboratories. The new CLAS data, together with measurements from an experiment in Hall C (E94-014), have basically quadrupled the data base and momentum transfer range over which this reaction has been studied. The data quality is very impressive, allowing a precise multipole analysis to be carried out which in turn provides a stringent test of microscopic models of the nucleon.

The laboratory is moving ahead with the commissioning of the G0 spectrometer built to measure the parity violating part of elastic electron scattering by nucleons, and extract information on the distribution of strangeness in nucleons. It reveals new facets of nucleon structure hidden in the charge and current distribution.

Significant advances have also been made in studies of hadrons using highly inelastic reactions of electrons. The highlights include the demonstration of feasibility to measure deeply virtual Compton scattering with the CLAS detector. This scattering is believed to be sensitive to correlations among quarks in nucleons, and provides a part of the motivation to increase the JLab accelerator energy.

Transition between quark and hadronic degrees of freedom

Deuteron photodisintegration measurements at energies up to 5.5 GeV have indicated that quark degrees of freedom may influence nuclear structure at 0.1 femtometer length scales; much smaller than anticipated.

Implications of hadronic structure for nuclei.

Information on two-nucleon correlations in Helium-3 nucleus is being extracted from the knock out of two protons from this nucleus. Measurements of the spin of the protons knocked out by spin polarized electrons have indicated possible differences between the charge distribution of free protons and those bound in the Helium-4 nucleus . . . The data show a distinct suppression of the form factor ratio - by about 10% - compared to the free proton values, and are challenging current theories that attempt to account for the modification of free nucleon properties in nuclei.

These [experiments] represent dramatic progress on the primary scientific issues for which Jefferson Lab was built; what is the microscopic structure of the hadrons and how does this microscopic structure determine nuclear physics? JLab is designed primarily to examine these issues at the hadronic level, by measuring the spatial distributions of the hadrons and how these distributions may change in nuclei. Each of these scientific results is changing the way we think about these issues: What is the relation between the valence quarks and the sea? How much of the sea of quark-antiquark pairs appears in the cloud of virtual mesons about each hadron? Over what distance scales are hadronic models able to capture the essence of the QCD dynamics? Does the structure of the nucleon change in the nuclear medium? . . . It was unfortunate that these major themes and progress were not clearly expressed in the presentations. This echoes a concern from last year's review . . .

During the past year, an estimated 33.6 weeks of beam delivery to experiments was achieved, with 68% beam availability and an average hall multiplicity of 2.8. There is increasing demand for beams of high polarization, high current, and the highest possible energy to maximize the physics reach of the experimental program. In the past year, 6 experiments took data in Hall A, 8 in Hall B, and 2 major installation experiments in Hall C. The committee was shown an impressive array of preliminary results from these experiments, together with recently completed and published data. As of September 2001, 56 publications in refereed journals, plus 7 instrumentation papers, 67 invited talks and 46 contributed papers in conference proceedings have resulted from the CEBAF experimental program in this year alone, with 24 Ph.D's awarded so far this year and another 178 in progress. These figures document the productivity of a scientific program that is truly outstanding, and a great asset to the US nuclear science community . . .

With the completion of the G0 experiment the strange quark distribution will be mapped out for the first time. The same parity violating technique will be used to make the best measurement of the neutron radius

in a heavy nucleus ^{208}Pb . An essential feature of QCD, the anomaly structure due to the gauge invariance and chiral symmetry of the theory, will be stringently tested in a precision measurement of the neutral pion lifetime and the neutral pion's coupling to a real and a virtual photon. High energy real and virtual Compton scattering will explore the off diagonal correlations of quarks in the proton in detail for the first time. Photon excitation of vector mesons will be used to search, in the cleanest possible way, for the proposed medium induced modifications of the vector meson masses.

The scientific interest in JLab is strong in the international community as evidenced by the high quality and volume of the proposals to each Program Advisory Committee meeting. There is much important physics that cannot be done in a timely manner because there is so much important physics to do.

The laboratory is doing a good job of continually upgrading its experimental capability. Examples include the new coherent bremsstrahlung facility in Hall B to provide a polarized real photon beam, the septa magnets to allow small angle experiments and the Big Bite spectrometer in Hall A, and the G0 spectrometer in Hall C . . . The laboratory has stated that the increase of scientific staff is one of its highest priorities. This is important in providing new blood for the lab and enables them to capture some of the best of the young scientists who are now emerging from the JLab scientific program. However, I am less convinced than last years panel that this should be at the top of their priorities.

The lab is searching for a new Hall C leader but the status of the search was not addressed. I think this is a very important step. The efficiency of Hall C remains much lower than that of the other Halls and no real plan was presented to address this. I understand that Hall C will always likely run fewer days than the others halls as a result of the significant one-time experiment installations required there. However installation time is not counted in the Hall efficiency. I suspect there is a mismatch between planning and reality.

The laboratory has a fine coherent plan for the near term - 6 GeV operations with upgraded experimental equipment- and the longer term - the 12 GeV upgrade. The strong scientific case for the 12 GeV upgrade has been made to the community and recognized by the 2001 NSAC Long Range Plan recommendation. The 12 GeV implementation plan is well in hand and the appropriate R&D is underway. There are no major technical issues in the accelerator or experimental equipment proposals . . . A number of interesting experiments are accessible on upgrading the JLab accelerator energy and equipment in existing halls A, B and C. These include studies of generalized parton distributions, distributions at large x , where the present data is inadequate, and electron microscopy of hadrons and nuclei with higher resolution, to name a few. The laboratory may consider the possibility of conducting some of these measurements, and those related to experiments proposed for the new hall D, before finalizing the plans for that hall.

The Theory Program

The laboratory has a group of about 14 theoretical physicists with expertise in three areas: hadron physics, physics of light nuclei and lattice QCD calculations. Progress has been made in all the areas. In particular:

1. In modeling generalized parton distributions of hadrons. These describe high energy exclusive and inclusive reactions of the hadrons, and contain additional information on correlations between quarks in hadrons absent in the parton distributions describing only the inclusive scattering of high energy electrons.
2. In calculating the cross sections of radiative capture reactions that generate energy in stars. The results from JLab have been used in estimating the rate of emission of the most energetic neutrinos by our sun. Progress has also been made in solving the relativistic two-body problem with model field theories.
3. In building a teraflop lattice QCD computer to be operational in the year

2003. And in theoretical techniques to extrapolate the results of lattice calculations to realistic scenarios . . .

Overall, the interests and capabilities of the theory group are broad and appropriately matched to the experimental program. The group has provided very strong and effective theoretical support for the 12 GeV upgrade. Of particular note in this regard is the recent development of the generalized parton distribution formalism (GPD) by Dr. Radyushkin, now recognized to be a cornerstone of the physics program at 12 GeV. Another outstanding example is the work carried out by Dr. Isgur proposing the experimental search for hybrid mesons, which is the motivation behind the construction of Hall D . . .

The organization of the theory program is unusual with the large number of half-time appointments . . . There are only 4 full time senior staff, but the group is enhanced with 7 senior joint appointments at nearby universities, 3 Jlab postdocs, 3 associate senior staff and 2 university-supported postdocs. Of these, 4 new positions were added in the past year . . . I suspect it requires someone of the exceptional breadth of Isgur to effectively manage such an organization and I am concerned that it may become more fragmented in the future if the right new leader is not identified.

The program as a whole is excellent with some of the work being outstanding, notably the work on exclusive reactions and generalized parton distributions (Radyushkin) and the work on few body systems (Schiavilla) . . . Particularly timely is the appointment of two new senior theorists in support of the lattice QCD initiative, and the announcement of the Isgur Distinguished Senior Postdoctoral Fellowship by SURA, to commence in FY02 . . . Lattice QCD has the potential over the next few years of making far more than academic advances . . . While the available computing power does not approach state of the art systems in Japan and Europe, there are important problems that can be solved on this scale, including a systematic study of the approximations made in lattice calculations, that can have a wide impact on the field . . . The lab could have equally well chosen a new initiative in other areas of QCD, but the coupling of the theory positions and the SCIDAQ funding of computing resources is extremely well matched . . . The QCD theorists are supported by \$400k/yr of laboratory funds for hardware, complemented by \$800k/yr from SciDAC . . . It is very important that the lattice work maintain strong connections to successful phenomenology. The theory program is heavily subsidized by the experimental program funding . . .

The group also has a few body initiative underway, which supports the interpretation of experiments in the current and future CEBAF program. A very active program of seminars, workshops, and short and long term visitors enhances the reach and overall impact of the theory group. The productivity of the group is high for its size, as evidenced for example by the number of publications over the past year: 26 in refereed journals, 29 published conference proceedings (many of these were invited talks), and 13 unpublished invited talks. The theory group is a credit to Jefferson Lab and plays a very important and strongly connected role in the science program . . .

The theory group has two thrusts, the first includes hadron physics and lattice QCD, while the second aims for quantitative descriptions of nuclei as bound states of interacting nucleons. The first uses quarks and gluons as the appropriate degrees of freedom to describe hadron structure, while the other uses nucleons and mesons to describe nuclear structure. The laboratory may consider initiating a new thrust to unify these two thrusts by attempting to describe nuclear forces and the structure of light nuclei in terms of the quark degrees of freedom.

Accelerator Operations and Performance

The dedication and professionalism of TJNAF operations staff is on a par with or better than peer organizations at other laboratories. Operational efficiency is given a high priority and tools such as line management responsibility, trend analysis, focusing resources on critical problems, and a reflective, rational approach to a complicated problem is very much in evidence . . .

There is some concern about reduced operating reliability this year . . . A number of factors enter, in a complicated fashion, in determining the amount and quantity of physics data [that] is produced, and, despite extensive discussion, it is doubtful that this committee has a good grasp of all the issues involved.

Nonetheless, there are some points that may be worth consideration. The accelerator down-time is rigorously tracked and areas for improvement have been identified . . . unless resources become even tighter or the goals become unrealistic, operating reliability will improve. It was less clear whether the time taken [for] startup, maintenance, tuning, beam studies and other non-physics uses of the machine was receiving as high a level of scrutiny. There may be opportunities for further automation of some standard procedures (possibly requiring new hardware). Finally, it should be noted that achieving a balance between funding operations at existing facilities and funding new capabilities is always difficult. The case for improved reliability that could be obtained with incremental funding needs to be developed and quantified better so that decisions can be made on the basis of accurate information . . .

The lab is doing well at optimizing a challenging set of criteria for desired beams . . . The presentations underscored the tradeoffs between energy reach, hall upgrades and stress on accelerator systems which must be taken into account in order to maximize the productivity of the CEBAF nuclear physics program. It is clear that JLAB management has given careful consideration to these tradeoffs in order to optimize the overall productivity of the nuclear physics research program . . . JLAB should continue efforts to maximize the scientific return (priority weighted PAC days). They need to communicate to DOE and users how they are doing this. For example the tradeoff between reliability and beam energy should be made clearer with distinct well-publicized lower-efficiency goals for higher energy running. They need to make it clear that 6.0 GeV is not a symbolic target and carefully weigh the physics gains . . .

We encourage them to continue to attack the operating efficiency issues with the process of assigning system ownership to elements of lab management. . . . JLAB management is encouraged to establish clear expectations for availability of subsystems at planned operating energies, and to assign responsibility and accountability for meeting these expectations to the appropriate managers in the JLAB management (group leaders, etc). JLAB management should consider assignment of numerical "downtime budgets" (at specified operating energies) to these elements. In the ideal situation, there should be a 1:1:1 correspondence between these budgets, the bars in the histogram itemizing facility availability by subsystems, and accountability of a JLAB manager who has line authority over the engineers and technicians capable of improving subsystem availability. Since major improvements in availability may take years to accomplish, it is equally important for JLAB management to articulate both near-term and long-range goals for availability, operating energy, and other prime goals of operation. This should have the effect of guiding machine development studies (including "hardware" studies of reliability problems by responsible engineering groups). . . . The committee did not conclude that the reduced availability in FY2001 was the start of a trend.

The AIP construction of one new cryomodule to replace one with a helium leak will help the reliability at higher energy somewhat. A plan was presented for 2 additional modules which is a conservative (but probably expensive) solution and begins an incremental path to the 12 GeV upgrade. But the lab cannot have its cake and eat it too. If two more cryomodules are necessary to reach 6 GeV reliably, then the full upgrade may not reach 12 GeV . . . Every effort should be made to build two new cryomodules as early as possible. These will likely improve the quality of data from ongoing experiments as well as accelerator availability in the next few years. Eventually the cryomodules can be utilized in the energy upgrade of the JLab accelerator . . .

Accelerator Research and Development

The accelerator R&D staff is excellent . . . Accelerator R&D is strong on a broad front and at many levels . . . the high-lights are the continued effective development and use of highly polarized electron beams and the conception, construction, and operation of a unique, high-brightness free electron laser based on energy recovery . . . Their work on polarized electron sources and the development of energy recovery for the FEL is outstanding . . . Energy recovery is integral to many concepts for new accelerators worldwide. Jefferson Lab is clearly leading the way in this area, and continues to do so as its FEL program progresses to higher power and shorter wavelength . . . The addition of the electropolishing facility is a major technical step forward . . . The work for the SNS has been more development than research but is also at the highest level. JLab is definitely the leading laboratory in this country in superconducting rf and leads the world in

operating experience of srf facilities . . . The committee was extremely impressed with the vitality, synergy, and long-range strategy of the AARD program. Its several components (operations support, FEL R&D, SCRF R&D, support of SNS construction, RIA R&D, recirculating linac R&D, 12 GeV upgrade R&D, synchrotron radiation research) are well-conceived from both short- and long-term perspectives . . . The technology basis for the upgrade is very firm. The laboratory's statement that there are "no show stoppers" is really too weak since these words are often used to describe projects whose technical basis is much less solid . . .

The Accelerator Division has recently reorganized with a strong new leader (Dr. Chattopadhyay) and two new organizational structures: The Center for Advanced Studies of Accelerators [(CASA)], and the Institute for Superconducting Radiofrequency (SRF) Science and Technology. The former is the larger group and supports traditional CEBAF and FEL operations and upgrades. R&D work within the purview of CASA includes the design of advanced recirculating linacs, and physics of superconducting RF accelerators. The SRF Institute was formed within the last six months and is actively searching for a Director. It will mainly focus on non-project-specific SRF R&D. The scale of activities proposed for the SRF Institute is appropriate to capitalize on the recent achievements of Jefferson Lab, and the long term interest in and importance of developing this technology in the US . . . a Center for Accelerator Science and a SRF Center of Excellence appear to be a good way to emphasize these critical pools of technical expertise. We support the concept of additional funding for the SRF Center of Excellence to maintain a project-independent core of SRF expertise, focused on R&D . . . The SRF initiative request is 1.5M\$ in 2002 to focus on higher gradient cavities. It is important for a number of fields for the U.S. to fund a center for true research on high-beta SRF and nuclear physics should be proud that JLab is the best U.S. facility . . . The more detailed questions concerning endorsement of specific research lines and levels of funding were beyond the scope of this committee's review . . . It should be noted that the accelerator R&D activities in support of the SNS, FEL, and RIA projects are funded externally to the DOE nuclear physics support of Jlab, and account for roughly half of the Accelerator Division's budget . . . The FEL program and the SCRF programs are outstanding from the points of view of pure accelerator R&D, support of programs at other laboratories, and significance to the long-range strategic initiatives of Jefferson Lab and, indeed, of other U.S. labs . . . Perhaps they are not pushing the gradient frontier, but for the projects they are currently engaged in: SNS, the 12 GeV upgrade and RIA, cavity gradient is far less important than reliability. Indeed their support for RIA has been outstanding and places RIA in the position to immediately capitalize on SNS development work . . . The SNS work is proceeding on schedule and within the established budget. RIA proponents have enthusiastic praise for the contributions of Jlab accelerator staff to the development of that project . . .

The involvement in the SNS and RIA projects is a highly appropriate activity for Jefferson Lab. When pursued at an appropriate level, these activities do not harm the effort on the core mission of laboratory. Rather, they enhance the capability of the laboratory by forging relationships with other accelerator facilities working on similar problems and by broadening the outlook, knowledge, and capabilities of the staff . . . The close relationship between the technologies for the 12 GeV upgrade, the SNS cavities, the FEL project, and R&D for RIA has had a positive and synergistic effect for the laboratory. For example, the SNS work has led to an addition to the test lab and the acquisition of an electropolishing facility, which benefits all of these projects . . . We strongly encourage TJNAF involvement in projects at other laboratories provided a proper balance with the core mission of the laboratory is maintained . . . JLAB is putting its expertise at the disposal of several US labs, to their benefit and that of DOE programs as a whole. This is not an easy task. It entails a difficult balance of other labs' priorities and consequent resource demands against those of JLAB itself. Jefferson Lab management is to be congratulated for taking on this challenge . . .

The presentation of CASA activities summarized accelerator physics support of CEBAF operations but placed emphasis on other R&D activities . . . It would be desirable to hear a bit more about CASA support of CEBAF operations at the next review . . . The large Work-for-Others funding of the SNS and FEL provides a real management challenge. It does not seem to affect core program in significant ways and is of major benefit to the lab and DOE . . .

laboratory's performance. The users community is strong and committed to the laboratory. The users noted that they are heavily involved in the laboratory planning process and strongly support the 12 GeV upgrade .

A presentation from the CEBAF Users' Group Chair, Dr. Nathan, indicated that the users are basically very pleased with the quality of beams available for experiments and with the laboratory's responsiveness to their needs. Jefferson Lab is widely recognized as an attractive and stimulating intellectual environment, and users generally want to spend time there. User feedback is provided to the management in several forms, including surveys and regular meetings regarding budgetary and operations matters. Users made specific requests to lab management for improved access to public PCs and computer terminals, ease of after-hours building access, streamlining of EH&S training procedures and a reorganization of the JLAB web site. In all cases the laboratory responded positively to user requests. Examples were given of several very effective ways in which the laboratory nurtures the scientific user community. This includes sponsorship of workshops and conferences, sabbatical visitor programs, and bridge appointments at local universities . . . one example of the attention given to users, the laboratory training procedures have finally been streamlined to allow users to complete their required training at one time in only a few hours. This has been a goal of the users for at least five years . . .

An outstanding issue is the problem of inadequate office space for users; this is recognized to be a general problem at the laboratory, but the solution requires additional capital funding to construct a new office building, which has not yet been identified. Users have also expressed concern over the continued vacancies in scientific leadership positions at the laboratory, most notably the lack of a permanent Director and Chief Scientist . . .

The CEBAF users have been heavily involved in making the scientific case for the 12 GeV upgrade and in planning for the future experimental program. Their success is reflected in NSAC's strong recommendation that the 12 GeV upgrade be carried out as soon as possible . . . The 12 GeV upgrade plan is well in-hand. It was developed in conjunction with the user community and has strong user community support . . . The only cautionary note with the users is that really effective user spokespersons with a broad vision of the laboratory's scientific advances and the science of the 12 GeV upgrade did not step forward in the Long Range Plan process. The laboratory had to carry the ball and did. I encourage the lab to work to cultivate this leadership from the users community in presenting the lab's scientific success and vision.



Department of Energy
 Oak Ridge Operations Office
 Thomas Jefferson National
 Accelerator Facility Site Office
 12000 Jefferson Avenue
 Newport News, Virginia 23606

January 30, 2002

Dr. Christoph W. Leemann, Director
 SURA/TJNAF
 12000 Jefferson Avenue
 Newport News, VA 23606

Dear Dr. Leemann: *Christoph -*

SCIENCE AND TECHNOLOGY REVIEW SCORE

The enclosed letter from the Division of Nuclear Physics indicates the summary score and the score in each of the six categories from the FY 2001 Science and Technology Review, conducted at TJNAF on September 24-26, 2001. This information should be reflected in the Laboratory's annual Performance Report.

If you have questions, please contact me.

Congratulations!!

Sincerely,

Jerry M. Conley, Site Manager
 TJNAF Site Office

Enclosure

cc w/o enclosure:
 Wayne Skinner

**JEFFERSON LAB
 DIRECTOR'S OFFICE**

JAN 30 2002

Mail Log _____
 File 06 (S&T Review)
 Action _____
 CC LC, SC, RW, FD, SF, TF
DD, LW, DOE Log
S. Wood



Department of Energy

Germantown, MD 20874-1290

January 29, 2002

Mr. Jerry Conley
Thomas Jefferson National
Accelerator Facility
MS: 12F, Room 12/C202
12000 Jefferson Avenue
Newport News, VA 23606

Dear Mr. Conley:

This is to formally transmit to you the decisions regarding the FY 2001 evaluation of the Thomas Jefferson National Accelerator Facility (TJNAF) that our office has arrived at in consultation with you and your staff. The weight of the Science and Technology (S & T) Review in the overall evaluation of the TJNAF performance is 300 points as outlined in the FY 2001 Performance Evaluation Plan (Appendix B). This scoring is based on the six categories identified in the report of the FY 2001 Science and Technology Review with the relative point weighting for each category given in parenthesis: Laboratory Management (50), the Nuclear Physics Research Program (100), Accelerator Operations and Performance (50), Accelerator Research and Development (40), the Free Electron Laser Program (25), and the Interaction with the User Community (35). Scoring is based on the following numerical scale:

90-100%	Outstanding
80-89%	Excellent
70-79%	Good
60-69%	Marginal

The score for FY 2001 for each of the six categories is:

1) Laboratory Management	50	96%	(Outstanding)
2) Nuclear Physics Research Program	100	95%	(Outstanding)
3) Accelerator Operations and Performance	50	92%	(Outstanding)
4) Accelerator Research and Development	40	95%	(Outstanding)
5) Free Electron Laser Program	25	98%	(Outstanding)
6) Interaction with the User Community	35	96%	(Outstanding)
Total	300	95%	(Outstanding)



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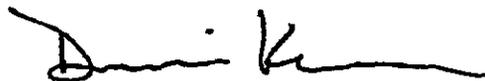
Comments:

- 1) The Laboratory management was given an outstanding rating for its performance of advocating the 12 GeV upgrade during the NSAC Long Range Planning process, addressing staffing needs identified in last year's S & T review, and accomplishing the accelerator operation goals for the year. Management accomplished these goals while working without a permanent Director of the Laboratory or Chief Scientist. An area of concern, however is the reduced availability of the accelerator this year. Concerns were raised as to whether management has focused sufficient resources on the causes of operating inefficiencies.
- 2) The Nuclear Physics program was given an outstanding rating for the quality of the results coming from the three halls. Hall B has begun publishing results. The process for addressing the experimental backlog appears to be working well. Additions have been made to the Theory group which are considered to be well matched to the future program of the laboratory. There is a need for a Chief Scientist to complete the restructuring of the Theory group.
- 3) Accelerator Operations was given an outstanding rating this year for continuing to provide excellent beam quality although the accelerator availability was lower this year. Causes have been identified and the laboratory gives high priority to the improvement of this availability. Apparently the operation of the accelerator above 5.0 GeV, which is driven by the scientific program, contributes significantly to this performance.
- 4) Accelerator Research and Development was given an outstanding rating for the significant role this group is playing in the development of polarized electron beams, superconducting RF cavity design, and the energy recovery technique that potentially will play a significant role in future high intensity electron accelerators. The restructuring of the group into the Center for Advanced Studies of Accelerators (CASA) and the Institute for Superconducting Radiofrequency Science and Technology (ISRST) was viewed as a positive move to strengthen the laboratory's role in Accelerator R & D. Presently the ISRST is without a Director. While this group is considered the best in the country, there was concern that it will not be able to maintain its international ranking without additional resources.

- 5) The Free Electron Laser program was considered outstanding at the S & T Review. The demonstration this year of harmonic lasing that holds the potential for a tunable FEL over a much wider bandwidth was impressive. The development of a growing user community and a program advisory committee to oversee the research program associated with the FEL was also considered positive.
- 6) The user community expressed satisfaction with the laboratory's support of their activities on site. They were impressed with the laboratory's response to their suggestions provided via surveys and regular meetings concerning budgetary and operations matters. They were particularly impressed with the streamlining of safety and radiation training procedures. There is still a space problem, however, and the laboratory is trying to solve this problem.

I would like to thank you and your staff for your assistance in performing this important responsibility.

Sincerely,



Dennis Kovar
Director
Division of Nuclear Physics

July 27, 2001

Dr. Christoph Leemann
Interim Director
Thomas Jefferson National Accelerator Facility
12000 Jefferson Avenue
Newport News, VA 23606

Dear Dr. Leemann:

On July 26 and 27, 2001 an emergency management peer review was conducted at the Thomas Jefferson National Accelerator Facility (TJNAF). The members of the Peer Review Committee consisted of: Stephen P. Kopczynski, Fire Chief/Coordinator of Emergency Management for York County, VA; Dickie Burroughs, Fire Chief for the BP Yorktown Refinery; Donald Bell, Security and Emergency Services Manager for Berkeley Lab in Berkeley, CA and Rusty Sprouse, Plant Engineering Director for TJNAF. The review included a combination of: facility overview, staff presentations, question and answer sessions, policy and procedures reviews, discussions of recommendations from previous reviews, exercises and events, health and safety program improvements and a facility tour.

The committee was most impressed with the overall depth of the TJNAF's health, safety and emergency management programs as well as the knowledge and commitment to the programs demonstrated by your staff. In particular we wanted to recognize the extraordinary efforts of Mr. Tom Hassler and other associated staff, which have worked hard to ensure a comprehensive "all hazards" program. In addition, we believe that your facility has benefited from the involvement (currently as chairman) by Mr. Hassler on the regional Local Emergency Planning Committee (LEPC).

In 1999 the Peer Review Committee provided three primary suggestions for improvement, as a result of the 2001 committee review it appears that timely action was taken by the staff of the TJNAF and each of these improvements are now in place. In fact, it was recognized that the concept of "continuous improvement" is obviously being used as evidenced by the many more changes that were self-initiated by staff to ensure that the improvements were actually accomplishing their intended goal(s).

As a result of our review over the past two days the committee would like to offer the following suggestions for further refinement and improvements to your fine program:

- Consideration should be given to ensuring that the "Directors Command Staff" primary and alternate operating areas have "back up" generator power for lighting and computer operations.

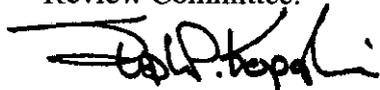
- The TJNAF is encouraged to continue with its plans for the "Directors Command Staff" tabletop exercises. Further, it is recommended that they be scheduled on a regular basis addressing a variety of potential emergency situations. In addition, it is suggested that at least some of the tabletop exercises as well as any full-scale exercises incorporate the element of coordinating with the Newport News EOC and its staff.
- It is suggested that the TJNAF meet with the Newport News Fire Department to pre-plan issues relative to power shut down and to perhaps develop a decision tree particularly for areas that are power critical from both a safety stand point as well as an economic stand point. Obviously with safety of on site personnel and emergency responders being paramount.
- It is suggested that the Emergency Management Procedures include guidelines for integrating with the local incident command and EOC structure as well as coordination for emergency incident media releases in conjunction with the local fire, rescue, emergency management and law enforcement agencies.
- It is suggested that a procedure be developed for the testing of the paging and other emergency communications systems on a scheduled frequency; i.e., weekly or monthly.

Overall, the committee rates the facility and its programs at a level of outstanding with a score of 98 percent. We also would like to particularly make note of a number of excellent innovative improvements as indicated below:

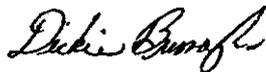
- The Crisis Alert Program on the phone system.
- The provision of on site automatic external defibrillators (AED).
- The CANS program.
- Additional back up power capability.
- The radio paging system.
- The process for managing non-work related illnesses/emergencies.
- The alternative mechanism that was developed for certain areas that required "sand bagging".

In conclusion, the committee would like to commend you and your staff on your in depth, well managed health, safety and emergency management programs. It is obvious that the overall corporate culture of your organization is committed to the highest degree of excellence in these programs. Through our observations it is apparent that the TJNAF maintains a high state of readiness through effective and efficient programs and that you have an excellent working relationship with the local government response community. Each of the committee members appreciates the opportunity for input to you and feels honored to have been able to participate in this review.

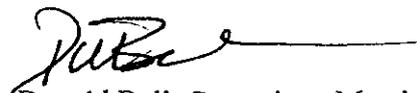
Review Committee:



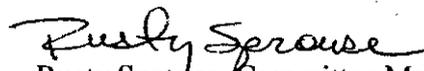
Stephen P. Kopczynski, Committee Chair



Dickie Burroughs, Committee Member



Donald Bell, Committee Member



Rusty Sprouse, Committee Member

March 22, 2001

Administrative Peer Review

of the

Thomas Jefferson National Accelerator Facility

Conducted for the

Southeastern Universities Research Association

March 6-7, 2001

Submitted by: _____
Jerry L. Jobe, Chair

Review Committee Members:

Klaus Berkner, LBNL
Jerry Bellows, NREL
Haiyan Gao, MIT
J. Christopher Hill, DOE ORO
Marsha Grubbs, Lillian Vernon Corporation

I. EXECUTIVE SUMMARY

The quality of the support provided by the Administration Division continues to be exceptional. In the words of one customer, "The Administration Division is doing the best job it has ever done." As it did last year, the Administration Division has earned an overall rating of "outstanding" with a composite point total of 64.3 or a 91.9% rating.

In the opinion of the Committee, all the administrative areas are pursuing high quality standards through the use of high quality, meaningful performance measures and are carrying out their responsibilities in a most cost effective and efficient manner. There are many areas meriting special recognition (note, the following list is representative not all-inclusive). In the Division Office, these include: (1) Sherri Wood's responsiveness and timeliness of action; (2) the improved medical services program; and (3) the model case management program. Areas rating special recognition in Business Services include: (1) the business-to-business program; (2) the effectiveness in handling the increased workload of the SNS and FEL programs; (3) the expanded use of Best Value contracting; and (4) their continual search for ways to add value to the laboratory as illustrated by the new phone card pilot program. Human Resources and Services exhibited a remarkable level of improvement over last year and has a number of areas rating special recognition. These include: (1) the addition of Kelly Caccetta to head the organization; (2) the teamwork and team spirit exhibited by the HR&S staff; (3) the organizations outreach to the lab and steps taken to align their services with the needs of the lab; (4) the priority placed on improving communications with the leadership of the technical divisions; (5) the thoroughness, attention to detail and customer service orientation of the Conference Services Group; (6) the organizations shift to becoming problem solvers rather than problem enhancers; and (7) the staff cross training program. The list for Plant Engineering includes: (1) the addition of Rusty Sprouse to head the organization (2) development of a 10-year strategic facilities plan; (3) plans for implementation of web based training for security and counterintelligence briefings; (4) removing critical spares from central stores and gradual buy-down of the inventory; and (5) preparation of export control procedures for DOE approval.

All of the recommendations from the FY2000 Peer Review have been satisfactorily addressed and this review uncovered no significant problems. The Human Resources Information System has not been implemented but it has been purchased and is scheduled for implementation shortly. The panel did not identify any Administration Division areas that warrant special attention. All of the recommendations of the panel fall into the category of minor changes that will, in the Panel's opinion, enhance the administrative operation of the Laboratory and provide some marginal improvement in an organization that is already outstanding. However, there are two areas that should receive continuing attention in the coming year (1) HR&S alignment with the needs of the Laboratory and (2) communications between the Lab's technical managers and the Administrative Services groups. Our concern in the HR&S area is that this area is still evolving, requiring continued vigilance on the part of the new HR&S Director and the Director's Council to ensure that the recent cultural changes in HR&S that have resulted in the progress made to date are nurtured and encouraged and not taken for granted. The issue with regard to communications between the Lab's technical managers and the Administrative Services groups involve two things. The first is a desire on the part of the technical managers for more frequent and timely interaction on process and policy changes being considered by the Administration Division. The second is an observation by the Lab Managers group that it would be very helpful if there were more frequent opportunities for exchange with the Administration Division groups regarding what is going well and what could be improved. Regularly scheduled periodic meetings between

the Lab Management group and the leaders of the Administrative Services groups could address both of these issues.

In our discussions with laboratory staff we became aware of three issues, which, in the Panel's opinion, need to be addressed as Laboratory issues not Administration Division issues. These include the organization and management of the computing resources of the laboratory, the Laboratory's management of space, and the health of the physical infrastructure.

The issue with computing resources is that it appears to the Panel that this is not considered to be a core competency of the Laboratory. However, computing is vital to the Laboratory's operations and it should be managed as a core competency. The Panel believes that computing, lab wide, should be reviewed for appropriateness of resource allocations, staffing, salary levels, and organizational placement with a view to possible changes that might enhance and streamline the management of this vital resource.

As noted in our report, the Plant Engineering Department is planning to implement a space database during the coming year. Although this database will provide necessary information for space management, it is not a space management system. As the Panel understands it, space in the Laboratory is currently managed on an ad hoc basis with individual space "owners" and seekers negotiating for changes when needed. In the Panel's view this is not an efficient or equitable way to administer a resource as limited and valuable as space. The Laboratory needs to establish the principle that space is owned by the Laboratory Director and to define space management guidelines to be used in planning and assigning space to the various organizations and programs with space needs. A space manager needs to be identified with the authority and top management support necessary to enable space to be managed cost effectively and rationally.

Although JLab is a relatively young laboratory, there are infrastructure capital items that already need replacement, not to mention pending long-term maintenance such as roofs, paint and roads. It is important for JLab management to carry out these tasks in a methodical way, before they pile up to a crisis level. The Laboratory should aggressively pursue funding for these infrastructure replacement/maintenance tasks. Energy savings contracts will help, but may not satisfy all the needs.

II. INTRODUCTION

At the request of the President of the Southeastern Universities Research Association, Inc. (SURA), an Administrative Peer review of the Thomas Jefferson National Accelerator Facility (JLab) was held at the Laboratory on March 6 and 7, 2001. The purpose of the review was to meet the requirement contained in Appendix B of SURA's Management and Operations Contract with the U.S. Department of Energy which calls for a peer review to assess the overall strengths and weaknesses of the Laboratory's administrative infrastructure.

The charge to the Panel was to review each administrative area to determine:

1. Whether each area is pursuing high quality standards through the use of relevant performance-based criteria.
2. The effectiveness of each area in carrying out its responsibilities in a cost effective and efficient manner.
3. Administrative areas meriting special recognition and areas that warrant special attention for improvement.

Administrative areas to be evaluated included the Division Office, Business Services, Human Resources and Services, and Plant Engineering with special emphasis being placed on Human Resources and Services. The Peer Review Panel was asked to assign a numerical value to each area. Numerical values assigned are summarized in Appendix A.

During the two days of the review, the Panel met with and/or received presentations from SURA, the DOE Site Office, The Jefferson Lab Interim Director, the Associate Lab Directors, the Directors of Plant Engineering, Business Services, and Human Resources and Services, the Administration Division Safety Officer, and key lab managers from both the administrative and operating divisions. The results of the Peer Review, as reflected in this report, are based on these interactions, documentation received both prior to and during the review, and a review of selected Lab documentation. Panel members responsible for the write-up of a particular report section are indicated in that section; however, all sections contain contributions from other panel members and the report represents a consensus opinion of the entire panel.

III. DIVISION OFFICE

Jerry Jobe

INTRODUCTION

The Administration Division Office continues to operate in an efficient and cost effective manner while pursuing high quality standards. For purposes of this review the functions of the Division Office are considered to include those of the Administration Division Office and the Division EH&S Office. The office handles a wide variety of functions including DOE contract management, SURA and government interactions, security management [physical security is in Plant Engineering and cyber security is in the Physics Division Computer Center], space, division quality assurance and self-assessment, medical services, asbestos management, risk management, and backup support for the laser safety officer. The office has a staff of nine (9).

FINDINGS AND COMMENTS

The Division Office is well run. It is lead and staffed by highly competent individuals who provide first-rate support to the laboratory. That the office is pursuing high quality results was confirmed by interview comments from the individuals in the laboratory who use their services. During this last year, the Associate Director for Administration has been very effective in identifying and hiring three topnotch individuals to fill three key Administration Division positions. While there was a comment or two about getting things through the division office in a timely manner, it was recognized that the workload is high and the staff stretched thin. There was a notable absence of negative comments when people were asked to identify areas for future improvement. Conversely, when asked for noteworthy areas several were identified including the improved medical services program and the improvement Sherri Wood has brought to the Division in addressing the timeliness issue.

EH&S is viewed as a valuable and accessible resource. The effectiveness of the EH&S effort is clearly demonstrated by JLab's case management program which was reported to have been cited as a model for the DOE by an EH representative from DOE Headquarters.

RECOMMENDATIONS

1. Alignment with the laboratory could be enhanced by seeking input on changes being pursued by the Division Office in laboratory policies or procedures that have the potential to impact life in the laboratory.
2. The Associate Director for Administration is stretched very thin. This has impacted his ability to address issues in a timely manner. Serious consideration needs to be given to divesting him of his CIO duties to allow him time to concentrate his considerable talents on issues appropriate to his Associate Director for Administration duties (see the computing comments in the Executive Summary).

POINTS AWARDED: 9.5 out of 10

IV. BUSINESS SERVICES

Jerry Bellows, Haiyan Gao

INTRODUCTION

The Business Services organization has again demonstrated its ability to operate in a highly effective and responsive manner, while keeping resource requirements at a minimum. This organization consistently displays its capacity to align itself with overall laboratory goals and to communicate effectively with both internal and external customers.

Both elements of the Business Services organization, Procurement and Finance have developed and used high quality and meaningful business standards to measure and evaluate their performance. The series of measures used to track the Laboratory's use of its business-to-business system to reduce the dollar value of inventory tied up in the Technical Stockroom is but one example of the use of high-quality performance measures.

An area that is particularly noteworthy was Procurement's ability to respond to the new and significant requirements of both SNS and FEL with a relatively small increase in staff and no drop in the overall service level for existing requirements. Additionally, Finance successfully managed an Inspector General Audit spanning a six-year period (FY 1994 through 1999) that resulted in no findings of unallowable or questioned costs.

PROCUREMENT

FINDINGS AND COMMENTS

Procurement is well managed and highly regarded by all areas within JLab. Noteworthy is the expanded use of Best Value contracting. One of the hallmarks of Procurement is its effective communication with the scientific divisions within the laboratory. The business-to-business program has been greatly expanded and has been well received both by JLab and its DOE sponsor. An addition to the Laboratory's overall procurement service is the Mentor-Protégé program. This is an important first step that should be nurtured and developed. It should also be noted that the procurement buying team concept, which teams senior staff with newer staff, enhances both staff development and customer service.

In summary Procurement at JLab is a cost effective, efficient and responsive organization with high quality staff and leadership that is well respected both internally and externally.

RECOMMENDATIONS

1. In tracking the reduction of inventory in the Technical Stockroom, establish a metric that will track the dollar value of the inventory over time.

FINANCE

FINDINGS AND COMMENTS

Like the Procurement organization, Finance is well managed and broadly respected within JLab. Finance continues to improve and expand its capabilities through the use of Cost Point. The standard reports provided to management are timely, accurate and usable. Finance continues to provide special reports that have been requested by specific users. Both the accounting, payroll and travel support provided to the laboratory have been deemed effective and of high quality. Finance aligns itself in a value-added way to the overall mission of JLab and continues to look for ways to add value to the laboratory. Noteworthy examples of this are the phone card pilot program and the implementation of the travel card. Effective communication with both management and staff continues to be demonstrated.

RECOMMENDATIONS

1. Examine the staffing level dedicated to travel auditing.

POINTS AWARDED: 19.3 out of 20

V. HUMAN RESOURCES AND SERVICES

Marsha Grubbs, SPHR and Chris Hill, SPHR, CCP

INTRODUCTION

The varied responsibilities of the Human Resources and Services (HR&S) Department, which includes Staff Services and Information Resources, as well as the more traditional functions of Employment, Compensation and Benefits, Employee Relations and Training and Performance, make for a very challenging span of control. It is rendered all the more intense in a scientific environment as complex as Jefferson Lab. The Jefferson Lab Human Resources and Services department appears to be a very different place from that of last year's peer review. The addition of the new HR Director has resulted in two high priority initiatives:

1. Uniting and inspiring the staff, a very competent group of people, to work together as a team.
2. Aligning the department with the mission of the Lab through an outreach effort.

FINDINGS AND COMMENTS

1. Responses to FY2000 review recommendations:
 - The HR leadership issue has been resolved with the placement of Kelly Caccetta as Director in June 2000. The apparent turnaround appears to primarily be due to this addition. In a relatively short time, the new Director has been able to convey to Laboratory management that HR&S wants to provide services that are valued, and assist them in accomplishing their scientific mission in as cost effective and efficient manner as possible. The new leadership has been able to foster a sense of purpose, teamwork and pride within the HR&S staff.
 - An HR Information System package has been purchased, and full implementation is expected by the end of this year.
 - The HR Director has placed a priority on improving communication with the leadership of the technical divisions. The department staff has "walked the spaces" throughout the Laboratory facilities, and makes it a habit to go out into the field. In addition, an employment administrator is assigned to each operating division to expedite staffing. This demonstrates the HR&S commitment to implementing a tailored, customer-oriented approach to providing services.
 - An effective reallocation of resources without additional budget dollars has resulted in the addition of new staff, including an HRIS administrator and a Benefits assistant.
2. HR's Conference Service group is highly regarded by customers for their thoroughness and attention to detail. The review team noted that the list of accomplishments in the briefing material provided substantive and quantifiable information upon which to base the assessment.
3. Kelly Caccetta's involvement with the Directors' Council has been positive for both HR&S and the Directorate. Kelly has provided advice and counsel, and improved the credibility of the department.
4. The move of Training and Performance back to HR&S was indicative of senior management's confidence in the new leadership.

- Required training for sub-contractor access and compliance training is available on the Web, where it can be accessed as needed within each individual's own time frame. Customers view this positively.
 - Concern exists regarding the viability of the current management development training, as well as in the areas of required training in sexual harassment and workplace violence issues. (See recommendation below.)
5. In the area of performance assessment, Laboratory management stated that they were not pleased with the reception of the 360-degree feedback system that was rolled out in 2000. A major objective for the upcoming year is to revise the performance appraisal system to align it with Laboratory goals, and to support addressing the succession planning issue. This is being implemented with management input.
 6. The staff is cross training within the department in order to develop their skills as generalists and position their organization as problem solvers for their customers.

The Jefferson Laboratory Human Resources and Services function has made significant strides toward enhancing their performance since the conduct of the Peer Review last year. The Panel is very encouraged by the improvements made.

RECOMMENDATIONS

1. Ensure that HR&S goals are results-oriented and aligned with senior management expectations. While the department is moving forward in a positive way, the goals need to be defined in terms of results, not actions or initiatives. An ongoing program of critical self-assessment is key toward assuring the HR&S organization has aligned its goals with senior management.
2. Develop and implement a defined employee concerns process. Currently, employees with concerns have no formal way of communicating issues to management.
3. Involve Laboratory management with the implementation of the HRIS to ensure that the new system meets not only the needs of the HR&S department, but also those of the Lab.
4. Develop and assure the delivery of required management training in sexual harassment and workplace violence. The Panel believes this type of training to be basic to management development.
5. Review and enhance the current management development programs to assure they are value-added and meet the needs of the customer.
6. Review diversity data and utilization methodology. The Panel had some questions regarding this data, and within the time frame, could not explore it more thoroughly. In addition, assure that adequate resources are utilized to perform the Diversity Management function to promote workforce diversity.

POINTS AWARDED: 17.5 out of 20

VI. PLANT ENGINEERING

Klaus Berkner, Jerry Jobe

INTRODUCTION

The JLab Plant Engineering Department (PED) is responsible for providing facilities engineering, construction management, fire protection, plant maintenance (including LCW system maintenance, experimental area high voltage system maintenance, cryogenics system cooling tower maintenance), as well as physical security, export control, property management, mail service, and shipping/receiving. A recently added task is to implement a space database. The Laboratory's physical plant is comprised of 611,000 square feet of buildings on 214 acres. In addition, PED is responsible for maintenance of the 112,000 square foot ARC building, in which the Laboratory leases 42,000 square feet. PED has a staff of 19 with a FY01 operating budget of \$5.3M, \$0.4M for security, \$0.6M for GPP plus approximately \$1M transfer of funds from other Divisions. Many of its functions are accomplished through eleven subcontractors.

FINDINGS AND COMMENTS

The PED has experienced considerable turnover in leadership during this past year, with the departure of two senior managers who had familiarity with the Laboratory. The Laboratory is to be complimented on quickly hiring a highly qualified leader for the department, one who has rapidly gained familiarity with the needs of the Laboratory and reorganized the department to meet those needs.

The PED is a relatively small department with a broad range of responsibilities. Particularly noteworthy this past year is the development, in short order, of a 10-year site strategic plan. This extra effort put a strain on the department, but the plan had a high priority in the Laboratory, and the PED delivered a quality product. From this experience we note the need for getting some pre-qualified A/E firms under contract to provide the capability for quick response in the future; the PED has recognized this need and is developing the appropriate procurement actions.

The Laboratory subcontracts on a fixed-price basis for almost all maintenance functions. This has the advantage of assuring regular completion of routine maintenance tasks, since they are incorporated as contractual requirements. Oversight of the contracts is provided by technical representatives through the SOTR program; they are responsible not only for assuring the technical performance of the contractors, but also for their EH&S performance. This program has resulted in an enviable safety performance by the contractors – no recordable injuries during FY00. With the increased number of subcontracted activities in the Laboratory, it is important to continually assess the SOTR program to assure that there is adequate staffing to provide the requisite oversight. There was some criticism from the program divisions that contractor oversight could be improved, and that some maintenance jobs balloon in cost.

Last year we commented on the need for improved liaison with the experimental halls to coordinate PED and contractor activities with the research activities. The situation appears to have improved somewhat, but needs continual attention. We are fully aware that coordination with the halls is much more complex than with the accelerator and that schedules there are constantly shifting; however, they are important customers. One mechanism for better

coordination may be the bi-weekly status reports issued by PED. These reports received considerable praise from those who were on the distribution list, but it is not clear that all who could benefit from these reports are on this list.

Although the Laboratory is assuring prompt and continuing routine maintenance through the subcontracting mechanism, there is also the need for timely major maintenance of the infrastructure, e.g. painting, roofing, and roads, and capital replacement of major mechanical components, e.g. HVAC units and chillers, that will require investments in the near future. For the long-term health of the Laboratory, it is essential that these requirements not be ignored, especially during periods of tight budgets. The Laboratory is negotiating for energy savings contracts to help fund some of the capital replacement needs, and such contracts may go a long way toward meeting some of the needs. These capital needs must be met somehow, if the Laboratory is to avoid the fate of the older labs who, in the past, skimmed on such investments.

As the Laboratory user base has grown and new projects such as SNS and FEL have been added to the Laboratory's mission, space management has become a serious issue. PED is planning to implement a space database during the coming year. This is a laudable first step that will provide necessary information for space management. However, a database will not solve the problem – a space manager must be identified in the Laboratory's senior management structure, and PED can provide staff support.

There were several noteworthy accomplishments this past year: establishment of a central database for security/HR/training; taking critical spares out of stores and gradual buy-down of the inventory; planned implementation of web-based training for security, counterintelligence briefings, and export control; preparing export control procedures that are close to receiving DOE approval.

PED, in general, received high marks from the customers we interviewed, but we also sensed some frustration that PED tended to develop policies and plans (ARC occupancy, security, space, to name a few) in isolation, and that they could benefit from "bouncing ideas" by the programs before they are finalized. PED might want to consider establishing a customer advisory board as a mechanism for enhancing two-way communication.

Another opportunity for improvement is to work more effectively with customers in iterating designs and making suggestions for more efficient ways of achieving a stated outcome, the quality of cost estimates, and tracking jobs to completion.

RECOMMENDATIONS

1. Review staffing support for contractor oversight to determine whether it is at the right level.
2. Pre-qualify at least one, preferably more, Architect/Engineering firms to help load level personnel needs during periods of high activity.
3. Expand distribution of the bi-weekly status reports.
4. Laboratory management should aggressively pursue funding for essential capital replacement of the infrastructure; energy savings contracts will help, but may not satisfy all needs.
5. Timelines should be established for the implementation of the space database. A senior manager (or group) should be assigned responsibility for space management.
6. Consider establishing a customer advisory board to enhance two-way communication with the program divisions.

POINTS AWARDED: 18 out of 20

APPENDIX A**Points Assigned**

<u>Unit</u>	<u>Value</u>	<u>Assigned</u>	<u>%</u>
Division Office	10	9.5	95%
Business Services	20	19.3	96.5%
Human Resources & Services	20	17.5	87.5%
Plant Engineering	<u>20</u>	<u>18</u>	<u>90%</u>
Total	70	64.3	91.9%