Report to the
High Energy Physics Advisory Panel

Submitted by the Committee of Visitors
to the Office of High Energy Physics
Office of Science
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Executive Summary

The Committee of Visitors (COV) for the Office of High Energy Physics (OHEP) was formed as a subcommittee of the High Energy Physics Advisory Panel (HEPAP). It met for two days on March 8-9, 2004. The meeting began with presentations by the associate director and senior staff for OHEP and covered the organization of the office, as well as reports on the major activities in the program: Accelerators, National Laboratories, Universities and Projects. The COV then divided itself up into four subgroups that had interactive sessions with the responsible OHEP program officers in each sub-area and the groups read samples of folders, in order to validate the process and funding actions. The samples of folders that were read were chosen randomly within various categories that were representative of the different parts of the program. This review covered actions in OHEP for the period of FY2001-2003.

In addition to the proposal reviews of research proposal actions, this COV concentrated on the large HEP investments that are dedicated to the national laboratories, the accelerators and the major detector facilities. The methods used by OHEP for monitoring, reviewing and prioritizing these programs were evaluated.

The principal outcome of this COV review was that we validated the integrity and efficacy of the processes for treating proposals and for making funding actions. A second important outcome is that we also validated the OHEP program management of the national laboratories and large facilities. One important observation of the COV is how much the overall success of OHEP relies on the dedication and skills of the staff to carry out their mission.

The COV would like to thank Dr. Robin Staffin for giving us such a broad charge for this review and the encouragement to think deeply about how to improve the office. We hope that some of our observations and suggestions will be helpful. As importantly, we want to thank the professional staff of OHEP for supporting all our attempts to understand and evaluate the functions and processes of the office. The preparations and responsiveness to our questions and requests were essential in enabling us to learn enough about this complex office to carry out our charge in two days. We hope our report will lead to an even stronger OHEP and we believe that such improvements will in turn reflect themselves in a stronger and more robust HEP research program.

Below we highlight several overall recommendations, and we make other suggestions throughout the body of the report.

Overall Recommendations:

The COV found the overall functioning of the OHEP office to be very professional and we are impressed with the responsible and excellent job that is done in soliciting and evaluating proposals, making grants and monitoring the funded programs. However, the COV did find some areas of concern. In this report we make a variety of observations, recommendations and suggestions where we believe that the functioning of the office could be improved. And, we believe that such

improvements will lead to similar improvements in the quality of the research program that is carried out in high energy physics.

The first and most serious problem that we found throughout our review is that OHEP is very seriously understaffed, due to a combination of unfilled positions, and needs for new positions to carry out functions where the office is presently deficient. Unfortunately, we believe this staffing problem is so paramount that several other areas of concern that we have identified in this report may well just represent consequences of the understaffing. As a result, our first and most important recommendation is that a vigorous effort be made to recruit staff to fill the unfilled positions in OHEP and that requests be made to increase staffing in selected areas that are pointed out in this report. Succesful recruitment is crucial to the operation of all of HEP and it will take the help and cooperation of the entire community to identify and recruit the very best candidates.

Recommendation: OHEP should strive to fill its unfilled positions as soon as possible and to request authorization to create the new positions outlined in this report.

The lack of travel funds is limiting the ability of OHEP to carry out its program evaluations and review processes in an effective manner. Site visits are an essential part of the process.

Recommendation: OHEP should make every effort to increase the travel funds available for site visits to review and monitor the program.

The committee believes that the functions of the office would be greatly improved by adding a dedicated program-planning function. This function will require dedicated personnel, as well as putting financial and other HEP data into a database and developing and using modern computer tools. We believe this will enable analysis of budget action implications, improve the ability to do long range studies or analysis, etc.

Recommendation: OHEP should develop a program-planning function to optimize the use of program resources, including implementation of modern software tools and data bases.

The COV concludes that a concerted effort should be made to make sure that, as much as possible, funding decisions are based primarily on the factors that will lead to the strongest possible program. In general, the highest priority should be given to excellence, program priorities and more generally, dedicating the resources in ways that will enable the most successful program.

Recommendation: OHEP should make funding decisions based primarily on excellence, priorities within HEP and the overall success of the program. Where possible, budget reductions or increases should be implemented strategically, rather than simply across-the-board.

1 Introduction

The Committee of Visitors (COV) for the Office of High Energy Physics (OHEP) for fiscal year (FY) 2004 held a review at the Department of Energy (DOE) in Germantown, Maryland, on March 8-9, 2004. The COV is an *ad hoc* subcommittee formed in response to a request to the High Energy Physics Advisory Panel (HEPAP) to assess its program management, to provide advice to improve OHEP performance, and to ensure openness to the research and education community served by the DOE for the periods FY01, FY02 and FY03. In particular, the COV was asked to report on:

- The integrity and efficacy of processes used to solicit, review, recommend, and document proposal actions;
- The integrity and efficacy of processes used to review, recommend, authorize, and document funding actions under the Management and Operations contracts in place at the DOE national laboratories
- The overall quality and significance of the results of the Office's program-wide investments;
- The relationship between award decisions, program goals, and Office of Science-wide programs and strategic goals;
- The Office's research investment, balance, and priorities;
- The organization, effectiveness, and adaptability of the OHEP operation to the evolving research environment.
- Any other issues that the COV feels are relevant to the review.

The membership of the COV committee is given in Appendix A, the agenda for the review meeting is given in Appendix B and the complete charge to the committee is given in Appendix C. The committee was organized into subgroups reviewing four areas that cover the major activities in the HEP program: National Laboratories, Universities, Accelerators and Projects. Each group reviewed the funding actions in their area of concentration handled by the Office during the years 2001, 2002 and 2003. The efficacy of the OHEP processes was reviewed, as well as how the actions reflect the priorities, investments and balance in the field.

Prior to the meeting, a website was created that contained much useful materials for the COV, including information on the grant processes, important statistical information on grants and a complete list of University grants. The COV subgroups selected sample folders representative of the program, as well as other pertinent information. Several parallel sessions were dedicated to reviewing these materials. In addition, overview presentations were made to the entire committee at the beginning of the meeting and each group carried out detailed question and answer sessions with DOE program managers in their sub-area. Finally, the committee met in executive session to formulate initial findings, which were presented to the Associate Director and the OHEP staff in a "close-out" session. This report represents the final report of our committee.

1.1 The National Laboratories

The Office of High Energy Physics funds HEP programs at five national laboratories: ANL, BNL, Fermilab, LBNL, and SLAC. The funding for these laboratories comprises about 80% of the U.S.

HEP budget. Fermilab and SLAC operate major accelerator facilities that enable international collaborations of physicists to perform cutting-edge research in high-energy physics at those laboratories. The operations related costs for the Fermilab and SLAC accelerator facilities together comprise about half of the U.S. HEP budget.

The COV subcommittee on the National Laboratories met jointly with the subcommittee on Large Projects to hear presentations on both topics from the Facilities Operations team-leader, Dr. Aesook Byon-Wagner, who described the relationship between OHEP and the national laboratories with HEP programs. The laboratories propose, through annual Field Work Proposals (FWPs) and other communications, a program of activities each year. Input to OHEP decisions on laboratory funding (for example, funding as proposed in the President's Budget request) is made primarily through "budget presentations" made by laboratory managers to OHEP staff. After the Congressional Budget is passed, funding is provided in work authorizations that include specific programmatic guidance regarding the disposition of funds.

OHEP reviews each laboratory's program annually. These reviews cover each laboratory's entire HEP program, which for Fermilab and SLAC include the operations of the accelerator facilities. The review committees include experts from the HEP community, thus providing a form of peer review. Letters from the Director of OHEP to the relevant laboratory official (the lab director for Fermilab and SLAC, associate director at BNL, and division directors at ANL and LBNL) result from the program reviews and provide the laboratories with the conclusions of the review and guidance for dealing with any problems that were identified.

A new initiative, soon to be carried out, will be to conduct "operations reviews" at Fermilab and SLAC that will assess the resource needs to operate facilities over the next few years and identify opportunities to optimize efficiency and performance.

1.2 The University Program

The University Program in OHEP represents the primary strength for carrying out the particle physics research program. While it is necessary and appropriate that the majority share of OHEP resources is allocated to operate the major facilities and to the infrastructure at the National Laboratories, it must be recognized that the University Program is supporting much of the frontier research in particle physics. This campus-based work is distributed throughout the HEP experimental program in the following ways: 1) provides much of the scientific leadership of HEP experiments (from both DOE and the NSF); 2) design, engineering, and fabrication of detector components often rely on university researchers at their campuses; 3) software development and coding depends heavily on both university researchers; 4) the data-taking and analysis is driven by university teams; and 5) finally, the recruitment, education, and training of virtually all the graduate students in U.S. HEP.

Hence, experimental research in HEP is conducted through a synergistic collaboration of university research groups and the national laboratories. In short, the campus-based experimental university program plays an integral part in the success of the DOE laboratory program in HEP.

The importance of the University Program in theoretical HEP research is perhaps even more pronounced and includes the most important advances in the field from the newest formal ideas to

the most detailed phenomenological analyses. In addition, the training of students in theory is overwhelmingly the domain of the University program.

In High Energy Physics, the university responsibilities are carried out by physicists supported by the OHEP (roughly 2/3 of all U.S. supported experimentalists) and the EPP Office of the Division of Physics within the National Science Foundation (approximately the other 1/3). Within the OHEP, for the year 2001, this amounted to 1485 DOE funded FTE researchers. The breakdown by function and by title is shown in the Table below.

Program	faculty	postdoc/res scientists	grad students	**TOTAL**
Theory	225	110	116	451
Experiment Acc.-based	284	332	312	928
Experiment Non-Acc.-based	35	36	35	106
TOTAL	544	478	463	1485

In aggregate, this amounted to support for 236 groups within 102 universities for 75 accelerator-based experiments, 32 non-accelerator-based experiments, and 68 theoretical physics groups. Regrettably, the COV was unable to obtain numbers for any later year than 2001.

1.3 Accelerators

The dominant tools responsible for the dramatic development and understanding of particle physics, since the original cyclotrons, have been the high energy accelerators. Particle physics has continually been able to explore new frontiers through developing and building new high energy accelerators reaching new energy regimes. Although exciting new areas, especially in particle astrophysics, have been and are pursued without accelerators, the central tool of the field continues be accelerators and this will continue through the coming decades, first with the LHC and then a Linear Collider.

Technology, particularly accelerator technology, plays a central role in the DOE program in HEP. Accordingly, there is an Advanced Technology R&D Group within the Office of High Energy Physics. This group operates a program in technology R&D as well as providing advice for the facilities operations group and physics research groups on accelerator related matters.

1.4 Large Projects

Research on modern accelerators, especially colliders, involves very large detector facilities. Large particle physics detectors require large teams and represent the primary means of doing experimental particle physics. These major investments require advanced technologies, large resources and good project management. This is especially true on the colliders, but is also

becoming the case for the new generation of non-accelerator experiments. For that reason, we formed a specific COV subcommittee to concentrate on large detector facilities.

In addition to the plenary presentations to the entire Committee of Visitors (COV), the Large Projects subpanel met with Dr. Byon-Wagner and others from the Office of High Energy Physics (OHEP) and heard presentations on the oversight of the HEP Laboratory programs and of line-item construction projects and major equipment projects. The subpanel examined documentation on major projects and had a presentation, at the subpanel's request, on one specific project so that all the processes and actions could be followed in one case. The subpanel's work was facilitated by the extensive materials provided and by open, candid, and thorough discussions of the oversight by OHEP of major projects.

2 Integrity and Efficacy of the Processes for Treating Proposals

2.1 Proposal and Review Processes

2.1.1 National Laboratories

The subcommittee on laboratory facilities and operations met in closed session and examined documents of a number of types, including laboratory FWPs, copies of budget presentations made by laboratory managers, letter reports for annual program reviews, an initial financial plan and one of its monthly amendments, and a variety of tables summarizing funding to laboratories over time and by category. Subsequently, the subcommittee met with Dr. Byon-Wagner and Dr. Mike Procario of the Facility Operations team to pursue a number of questions and issues. The subcommittee was impressed by the careful preparation that had been made prior to our visit, and with the straightforward and open way in which our questions were addressed. The findings of the COV are that the proposal and review processes for the national laboratories are validated as being effective and well conducted.

2.1.2 The University Program

The university program subcommittee divided its review effort into two broad activities including approximately four hours of interviews with the OHEP University Program team plus approximately seven hours of reading (with internal deliberation) of proposal jackets. The interviews were with the entire University Program staff and consisted of a short presentation of numerical, organizational, and budgetary information and a review of a set of talking points prepared ahead of time by the university program team.

A collection of proposal jackets was requested beforehand and all were made available for the review. Additional jackets were requested as the review developed, and all were made available in a timely fashion. The jackets are indexed by university and, of the approximately 100 universities represented, the COV read 25, which were chosen to be representative of large groups (roughly characterized as above $2M per year), medium groups (characterized as between $800K and $2M per year), and small groups (less than $800k per year). All 25 jackets were studied by at least one team member, approximately 10 were studied by two, and 5 were studied by more than two. All rejected proposals for the years 2001-2003 were read (excluding OJI proposals). This amounted to 17 proposals, which had the status of “declined,” as distinct from “withdrawn” or “deferred.”

The overall finding of the COV University Program team is that the strength of the proposals and the quality of the peer reviewing of the individual groups within the university component of the OHEP Research Portfolio is very high and consistent with the level of excellence demanded of the highly visible, expensive international laboratory efforts. However, we believe increased efforts could be made to insure a "tight" program that is able to respond to changing circumstances and inevitable budgetary difficulties.

2.1.2.1 The Mechanics of the OHEP Peer Review Process

Peer review is the cornerstone of the competitive, scientific award system and a smoothly functioning process is critical. Records are organized by university, and within each university a grant is subdivided by "task," with a funding subtotal associated with each task. In the OHEP most grants that are reviewed are renewals from existing grants, most of which have been in place for years. The proposal and renewal process is generally handled for each university by a single monitor, combining theoretical and experimental tasks, and the complete OJI program for both theorists and experiments is handled as a unit. All groups are required to write progress reports and renewal proposals every year, but in general, on-going grants are peer-reviewed every three years. In the years in which grants are reviewed, the progress reports/renewal proposals are submitted six months before the grant's end date. The information is sent to several reviewers, in some cases as many as ten or more, in order to obtain a broad range of viewpoints. After all reviews are in, the grant monitor writes a summary that serves as the basis for funding.

2.1.2.2 Effectiveness of the use of the Merit Review Process

We found the list of reviewers to be adequately representative of the field, and on inspection of representative files found a generally adequate coverage of the multiple tasks in multi-task contracts. Proposals are forwarded (nowadays electronically) in full to all reviewers, and reviewers are free to comment on any aspect of the full proposal. Generally speaking, this is a constructive procedure, and invites insightful, cross-cultural comments by experimentalists toward theory and vice-versa. In general we found the number and quality of reviewers to be excellent and broadly representative: for the years 2001-2003, there were more than 800 reviewers called upon, with an average of just over one jacket per year for review for each and approximately an average of 6-10 reviews per proposal.

There seem to have been few newly funded university groups in the past few years. New faculty members are supported through existing tasks, or be the creation of new tasks within existing grants. In addition, it appears very difficult for NSF-funded groups to shift to DOE funding and probably vice versa. In fact, the COV was told that no review or action is required for such a proposal -. One of the important strengths of the HEP university research program is that two agencies with different styles and approaches fund the research and therefore, this issue is a matter of concern for the field. The question is a complicated issue, especially due to limited resources in both agencies, but one worthy of further consideration.

The 1998 HEPAP subpanel report recommended that a trial review process be implemented in which university grant proposals are reviewed comparatively. Although we saw evidence that this had been done in some cases, a regular program does not appear to be in place. Instead, reviewers are requested to consider the present and proposed funding levels in the context of a histogram of

the funding levels of all DOE-supported experimental and theoretical HEP grants. We note that a program-wide review was undertaken in 1983 under the auspices of the Technical Assessment Committee of University Programs (TACUP). That review was an enormous undertaking, but we suggest that in times of declining budgets, some form of regular review of the entire program is important, in order to be able to make the best funding decisions.

In summary: In examining representative files chosen by the committee in detail, we found the review process to have the requisite intellectual and professional integrity. Reviewers take their role seriously, and generally provide thoughtful and insightful comments. In almost all cases, we were able to see a direct justification for positive renewal decisions in the responses of reviewers. We did, however, note cases with too few reviews for the theory components on some large grants with many tasks.

2.1.2.3 The OJI program

The Outstanding Junior Investigator (OJI) program, a primary route for new faculty, appears to us as an outstanding success. Whenever a new assistant professor joins an existing university group, he or she is encouraged to submit an OJI proposal. Many more OJI proposals are submitted each year than can be funded, but the reviews for unfunded OJI grants are also valuable in determining the level of funding for new faculty members within the regular University program. The committee was already familiar with many of the names of recipients, and found our good opinions confirmed in our review. An important strength of this program is that it guarantees continuity of funding to awardees over a substantial period. It has generally been a successful stepping-stone to ongoing support as investigators become more senior.

2.1.2.4 University Program Conclusions: Proposal and Review Processes

- OHEP is continuing its traditionally excellent oversight of the university program. Proposals are given thorough peer review, often with ten or more reports from knowledgeable scientists.

- In most cases, the change in support level for renewing grants reflects the external assessment.

- The decision on approving new proposals, which are mostly in theory, seems to be well grounded in peer review, but also appears to be limited by budget constraints.

- The ability of referees to provide timely reviews of proposals is adversely affected by the multi-hundred-page length of some proposals. The COV understands that the OHEP will place a strict limit on the size of proposals and endorses that modification.

- The issue of groups seeking to move from one HEP agency to the other is a matter of concern for the field. It is a complicated issue, but one worthy of further consideration.

- The COV believes that some form of comparative review for university grants should be instituted, perhaps periodically, in order to assure that resource allocations best reflect the quality of the research programs at the individual universities. .

2.1.3 Accelerators

The solicitation process for accelerator R & D proposals is done via the Federal Register. The procedure appears adequate for the universities, the smaller National Lab HEP programs and industry. A possible refinement would be to establish deadlines for proposal submission, which would allow comparisons among the proposals for the purpose of establishing priorities.

The roster of reviewers used in the recent past is appropriately large (~250), including both accelerator experts and experimental particle physicists with technical expertise. However, we are concerned that the review load be more evenly distributed among available experts and suggest that adding more technologically knowledgeable particle physicists to the list of reviewers for accelerator R & D would beneficially broaden the pool. Unfortunately, we find that lack of on-site monitoring due to the lack of travel funds limits the ability to manage the program and adversely affects the quality of the research.

As for the review of larger accelerator R&D programs at the laboratories, the program managers do include accelerator-specific breakout sessions during the HEP program reviews and we believe this enhances the quality of reviews. We suggest that it would further enhance the quality and continuity of the review and monitoring process if more expert accelerator consultants were included on these program review committees.

The Advanced Technology program has had and continues to have significant successes given the modest resources allocated to it. High Energy Physics continues to lead the way for all fields in developing accelerator concepts and this is a significant contribution to the overall science and technology program in the U.S. We believe that the quality of and the support for this program is extremely important to HEP and other fields and would benefit from periodic external reviews of the program.

2.1.4 Large Projects

The mechanisms and processes of making proposals and conducting reviews for potential new major facilities, whether they are accelerators or large detectors, go beyond the purview of this committee. The National Laboratories have internal processes for developing new accelerator and facility projects. Detailed proposal mechanisms for new detector facilities include solicitations of letters of intent, acceptance and review of proposals by a Program Advisory Committee or SAGENAP for non-accelerator projects, plus priority setting by HEPAP and HEPAP subpanels. Finally, the new process (P5) has been created to help prioritize proposals across the field. In this COV review, only R&D proposals were considered for large detector or accelerator development, but the processes for funding and monitoring approved large projects has been considered in detail.

2.2 Documentation

2.2.1 National Laboratories

Overall, the subcommittee is satisfied that adequate processes are in place to review, recommend, authorize, and document funding actions at the DOE laboratories with HEP programs. There is no question that these processes are being executed with integrity. Also, improvements to these processes are underway. For example, this year, for the first time, the laboratories have been tasked

to provide formal responses to the letter reports from the annual program reviews. The operations reviews, which are being planned and will be conducted in the near future, represent an additional improvement in OHEP oversight of these complex organizations.

2.2.1.1 National Laboratory Conclusions: Documentation

- Field Work Proposals are not used. This appears to be for multiple reasons. They are received on a schedule that is poorly matched to the DOE budget-making schedule. For instance, initial decisions are made in February and March, while FWPs typically arrive in late April or May. In addition, for some labs, FWPs appear not to adhere to realistic funding scenarios and do not represent the lab's actual priorities. Indeed, in some cases, the contents of FWPs appear to be out of date and/or inaccurate. This probably reflects the fact that there is recognition at the labs that the FWPs are not used. It is a waste of effort and time for the labs to prepare these large documents that are not used in determining the lab's funding.
- The subcommittee recommends that FWPs either be made useful, or eliminated. Making them useful would minimally require advancing their due date by about three months and developing a format that makes the laboratory priorities apparent within realistic funding scenarios.

2.2.2 University Program

The documentation effort within the university program was difficult to navigate. The only information available is in paper format in the form of university jackets. These are large bound folders of chronologically arranged material–some even measuring in linear feet in length for the 2001-2003 period. There appears to be next to no electronic documentation and this was a concern to the COV, especially in the issue of numerical data, fiscal and demographic. This lack of electronic data limits the OHEP's ability to be nimble in the face of mandated changes and must make it difficult to test critically the potential effects of different future scenarios. For example, how would one decide how much of an existing program might be available for future investment in a new experimental direction and what effect such an investment would have on existing programs? Such analysis is normally done only for the laboratories and large detector construction. Steering the evolution of university programs would be significantly improved with availability of a database with critical information and some analysis tools. We note that besides having the needed tools, the collection of information, especially demographic data, requires the cooperation and participation of the grantees themselves.

There was discussion but not agreement between the COV members and the university program officers regarding the wisdom of making more information regarding funding decisions publicly available. This question needs more thought, but it seems that comparative review and consequently more openness will help strengthen the program's credibility. For example, if data were more accessible within the OHEP through a modern database, additional average statistical information would be informative, but still preserve necessary confidentiality. Again, anticipating difficult financial times ahead, credibility of funding decisions is the most important currency that the OHEP has for making potentially difficult decisions.

2.2.2.1 University Program Conclusions: Documentation

- Improvements in documentation organization and limits on proposal length would help both visiting committees and OHEP staff. Although we do not want to be prescriptive, we could imagine an organization according to function (proposal reviews, staff summaries, and the budget sheets), and then according to chronology. Ready comparison between requests and awards should be clear in the documentation and the distinction between continuing proposals and awards and supplementary proposals and awards should be clearer.

- The COV recommends requiring data from grantees containing useful demographic information such as the number of faculty, senior scientific staff, postdocs, graduate students, undergraduate students, engineers, and technicians. These data should be kept in a modern database so that it is easily accessible for studying funding trends, responding to changes in priorities, and more generally planning for the future of the field.

- More statistical, average information should be made available publicly on the world wide web

3 Integrity and Efficacy of the Program Management of the National Laboratories and for Large Facilities

3.1 Monitoring the Programs of the National Laboratories

The subcommittee found that despite the fact that ~80% of the HEP budget goes to the national laboratories, the number of OHEP staff providing laboratory oversight is extremely small. The result is that the small Facilities Operations team (consisting currently of two DOE staff and one IPA) is very overworked and their ability to provide proper and effective oversight is badly compromised. It is crucial that the open position in this area be filled as soon as possible.

About half of the HEP resources go for operations of the National Laboratories in the form of infrastructure to support the accelerators and experimental programs. However, this part of the program is not specifically reviewed as to the level and types of support that are funded and how well it is matched to the needs of the program. OHEP is responding to this problem by plans to implement new operations reviews that should give more visibility into this large resource and cost. This will add to the workload of OHEP, but the committee feels that such reviews are very badly missing and will lead to a better justified and optimized infrastructure support for the program. Clearly, implementing this review and some of the other recommendations of this subcommittee add to the workload and therefore, the subcommittee emphasizes the need that at least another IPA be added to the Facility Operations team, beyond the currently planned (but not fully filled) staffing level.

Travel to the National Laboratories for OHEP program managers is a necessary part of performing the appropriate oversight. The OHEP staff makes frequent use of telephone conferences and videoconferences to conduct meetings. Nonetheless, there are key meetings and events that cannot or should not be attended remotely. Regular site visits are essential to maintaining a good working relationship with laboratory managers and staff, as well as gathering timely information on the

progress of the research program and status of operations within the laboratories. At the present time, inadequate travel funds are available to the OHEP to adequately provide this oversight.

3.2 Monitoring Accelerator Research

The Advanced Technology R&D Group plays a supporting role to the Facilities Operations Group in dealing with the accelerator facets of large National Laboratory programs. Under the new OHEP management this role is still evolving, but the improvements in this function are apparent.

The documentation is generally adequate given the relatively small number of proposals, but could be markedly improved if the material were more systematically arranged and modern data handling tools were implemented. In particular, there should be a summary sheet for each proposal showing briefly dates, actions taken, funding, resources, personnel, highlights, in order to provide a quick history without digging through the folders. In addition, basic information should be recorded in a database to allow better tracking, trend summaries, etc. For example, it would be useful to be able to obtain summaries of totals or averages of funding, duration, number of students, postdocs, and more. This is not possible as long as the key data is only stored in individual folders. Finally, the procedures for carrying out funding actions should be formalized and recorded.

The Advanced Technology R&D Group plays an important role in advising on and monitoring accelerator program elements in the programs of the large National Labs. The results indicate that this role is carried out well.

3.3 Establishing and Monitoring Equipment Fabrication Projects

3.3.1 Laboratory Budgets

OHEP decisions on laboratory funding are based primarily on information received in budget presentations made by laboratory managers to OHEP staff. These presentations typically present the physics case for the proposed program, followed by an incremental budget analysis. That is, the lab managers describe the impact of incremental changes in funding as compared to the previous year. Recently, OHEP has requested incremental analysis for the cases of −10%, −2%, 0%, + 2%, and optimal funding.

This style of budget analysis has both positive and negative aspects. On the positive side, it is a format that is useful for OHEP staff, since the internal budget documents prepared by OHEP take a similar form. OHEP typically is asked to prepare its budget for three funding levels: a target level, a decrement level (i.e., lower than target), and a program planning level (i.e., higher than target). Also, the HEP ranking sheet consists of a breakdown of the HEP program into a number of discrete activities that can be treated as funding increments. On the negative side, it means that a large fraction of the labs' HEP budgets (about 90%) are not given much scrutiny during the budget making process. The subcommittee recommends that laboratory HEP budgets be subjected to bottom-up analysis periodically, although the period should not be every year owing to the complexity of the task.

Closely related to obtaining a better understanding of laboratory budgets is the need to put budget information in a format that is standardized across the HEP laboratory program. In addition to

providing a better understanding, this will facilitate meaningful comparisons between the costs of similar activities in different labs. Therefore, the subcommittee recommends that OHEP establish a common format for budget information to be presented by the national labs. The key element of this is to establish clearly defined and meaningful budget categories. This is intended to be a simple table displayed on one or two pages. The subcommittee has not attempted to design such a table, but presumably it includes items such as salary costs by job categories, operating costs by category, purchases of equipment by category, purchases of materials and supplies by category, travel costs, security costs, and so on. The intent of this recommendation is not to encourage OHEP to second-guess laboratory managers. It is intended to help achieve a situation where laboratory funding is relatively transparent and understandable.

3.3.2 Monitoring Large Facilities: Construction

Project oversight activities have been significantly strengthened in the last several years. This is very important, since significant resources are dedicated to large projects and much of the success and risk in the program depends on how well they are done. Starting at the top of the Office of Science (SC), and reinforced by the Director of the OHEP, it is clear that emphasis is placed on thorough and substantive oversight of major projects and that there is great focus on project performance and on correction of errant project developments. The management of SC and OHEP has properly tasked and delegated responsibility in this area. Dr. Byon-Wagner has joined OHEP and taken responsibility for this activity and is carrying out her mandate to extend this new emphasis on oversight and project performance and accountability.

This task is supported by the use of a very appropriate DOE-mandated Critical Decision (CD) process, and includes use of monthly earned value reporting by the projects and the creation of a highly visible DOE "watch list" of projects failing to make milestones and earned value targets. This measurement process is effective and is taken seriously by all levels of SC. Corrective action and project repair is required in an open, visible and responsive process. This is a thoroughly rational and appropriate process that is now being employed consistently.

However, we need to emphasize that the staffing level is not adequate to support this mission critical activity properly. This task has support from the university and technology program teams in OHEP. With two vacant positions in her own organization, and indirect reporting of matrixed staff, the oversight cannot develop the much needed quality and attention. Furthermore, with an undersized team, the staff is driven to a reactive and responsive mode of operation. Core activities are necessarily supported outside of the immediate organization. Attention to strategic planning and collection of data to support assessment and planning are sharply reduced. These adaptive patterns have not prevented a noticeable improvement in project oversight, but they limit reform, process development and process improvement towards creating the kind of project oversight that is needed.

Even as it is developing new strength and improved practices, OHEP project oversight and management remains principally adaptive and reactive. This is unsatisfactory for both function and staff motivation. We recommend that program-level strategic planning should provide the basis for OHEP project development and budget planning. The stages of early support, R&D, baselining, project execution, integration, operations, and decommissioning or upgrade should be fully included in OHEP strategic planning. Cradle-to-grave lifecycle costs should be included in

planning. A computer model should be developed to encompass the full lifecycle plan for projects, and this model should include budget and program impacts on laboratory and research programs. This is essential as the full lifecycle costs for a new facility may be twice initial investment, which means that planning only for construction costs guarantees undesired budget pressures later. In fact, such planning will more clearly define the sustainable queue of projects and interaction with other elements of the program. The computer model should be maintained and used to develop program options. It should be fully consistent with models for the University and Laboratory program planning. Shortage of staff and the pressure of other activities have impeded activities in this area, but they are now urgent.

3.3.3 Monitoring Large Facilities: Operations

The OHEP office has teamed effectively with Dan Lehman (SC-81) to continue the long recognized and exemplary mechanism of project cost, schedule and technical reviews by specialized review teams chaired by Lehman. The OHEP office is now in the process of initiating similar reviews of laboratory operations with the first of these conducted by Lehman. The initiation of such reviews is a positive development and the use of Lehman's capabilities is a good way to start this new process at a time when the project oversight staff is too small. However, operations oversight falls within the remit of OHEP and this will require some growth to become capable of operating this new review process within the organization.

Filling the two identified vacant positions in Dr. Byon-Wagner's team is urgent. Recruitment must be a top priority. Elsewhere in the COV report attention is paid to both strategic and longer term planning. This will also require staff support that is critical for project oversight. With the needed staff, the project oversight function will gain depth and detail, but it will also achieve breadth by making real planning possible.

Oversight by OHEP of major projects involves a line management role provided by a Federal Project Director for each project. This position is filled in the DOE field offices proximate to the major project's office or host laboratory. The Federal Project Director must be an experienced and skilled project manager. The DOE has proposed a certification process to mentor and to identify qualified project managers with defined levels of training and experience corresponding to graded levels of project oversight authority. This certification process should be implemented.

The use of monthly earned value reports by projects to DOE is now the accepted standard. This is as it should be. Together with technical narrative of project performance, such reporting provides the basis for identifying projects that require additional review, corrective action or intervention. OHEP follows DOE requirements and makes use of the monthly reporting to define a green-yellow-red rating system for all projects. Projects with yellow or red ratings are elevated to a watch list for additional attention and dialogue. This system is employed at all levels of SC for projects signaling performance issues. This focus and attention is the keystone that lends credence to the other oversight practices and we recommend that this process be continued. This high visibility accountability is an essential element that drives the priority and effectiveness of the review process.

3.3.4 Laboratory Budgets and Facility Monitoring: Conclusions

- A bottom-up analysis of laboratory budgets should be undertaken every few years.
- The information on laboratory budgets should be collected in a uniform format and tracked annually.
- Operations reviews for the laboratories should be conducted by OHEP staff
- Implement certification for DOE project managers
- Fill open positions and possibly expand the number of positions to perform large facility and laboratory monitoring. A larger team is required to perform adequate monitoring.

4 Outcome of the Program's Proposal Processes and Program Management Functions

4.1 Overall Quality and Significance of the Results of the Office's Program-Wide Investments

4.1.1 University Program

4.1.1.1 Distribution of resources

The distribution of funds to University experimental programs broadly reflects the Department and nation's history of investment in facilities. Activities based at proton accelerators, represented by the Tevatron and the Large Hadron Collider, account for nearly half of the dollars distributed in 2003 distributions by amount. Electron accelerator-based activities, represented by BaBar, Belle and CESR, and non-accelerator activities, including a variety of neutrino and other experiments, carried 16% and 12% of 2003 funding, respectively. Theoretical physics, covering the entire gamut of high energy research from standard model phenomenology to the most formal aspects of string theory received nearly one quarter of total University support. In terms of distribution, twenty-three institutions were granted over one million dollars each in 2003, accounting for over $40 M. The funded university projects support the priorities of HEP as documented in many HEPAP recommendations.

4.1.1.2 The role of history

Most of the largest grants are in support of research groups involved in experiments at proton and electron accelerators, or with international neutrino experiments such as SuperK and SNO. In view of the time scales for large experiments, and the manner in which projects within experiments are the responsibilities of well-defined groups, demands of continuity alone will require funding that tends to stability in the largest university grants. "History", therefore, plays a significant role in carrying out the program and in individual funding decisions. Operationally, OHEP puts large weight to the importance of continuity. The success of this approach depends on the continuity of commitment from the institutions to maintain their traditional strength in experimental HEP with appointments to replace retiring or departing faculty. How to balance the programmatic reasons for funding continuity, stated above, with funding uncertainties, changing needs, changing institutional strengths, etc presents difficult challenges of judgment for OHEP.

The COV specifically sought, and found, evidence of targeted decreases in funding for groups which have not performed well or individuals who have changed direction, or slowed their research efforts. This is always a difficult decision, especially when it involves a program of long-history. The COV found that in recent years, as resources have become reduced, a more aggressive effort at redistribution of funds away from under performing groups has accelerated and the COV applauds this approach.

In general, we found the university grant program to be relatively stable. The program mostly consists of continuing grants and periodic reviews of these grants make up the vast majority of positive funding decisions. In fact, there were rather few (of order twenty) unfunded, or declined, proposals over the past three years, with a roughly equal number of proposals withdrawn for a variety of reasons. Of the declined proposals, most were proposals for theoretical work. Nearly all funding of new faculty is thus either through the dedicated OJI program, or through new faculty coming under existing tasks.

4.1.1.3 Outcomes

The overwhelming impression of the committee is that the current program has consistently produced, and continues to produce, much of the leading research in high energy physics worldwide. The university program of the OHEP is one of the great successes of publicly funded research, and it is impossible to imagine high energy physics without it.

The year-to-year turnover in principal investigators is generally modest, reflecting to some extent the long-term stability necessary in the design, construction and execution of modern accelerator and non-accelerator experiments. In the Universities, OHEP dedicates significant resources to theoretical, as well as experimental physics, and these grants have relatively stable long-term support.

A general question arises as to the balance of support to large in-house laboratory-based research programs, as compared with university-based research programs. The COV could not assess whether the balance is appropriate or the process by which it is decided, but was aware of the dominant investment of resources assigned to the laboratories. For proton physics, the laboratory (university) based research budgets were $46M ($28.5M) and for electron physics the amount was $16.8M ($10.0M). It seems that a review of the "Research Portfolio' (defined in OHEP as the sum of University-based research support plus on-site laboratory-base research support) is warranted. .

4.1.1.4 University Program Conclusions: Quality and Significance

- Funding history and program continuity play important and appropriate in OHEP renewal decisions. However, it is also important to be able to respond quickly to changes in scientific effectiveness at institutions so that the limited resources can be used to best advance the priorities of the field. Hence, strong justification should be required for making budget decisions based to any large extent on continuity.

- The multiple agencies funding of particle physics research is a real strength of the University HEP program. This encourages different approaches, styles and even goals.

- One problem that that we have identified, however, is the difficulty investigators have in seeking funding from the agency that is not their traditional source. As serious, this "identity" of researchers with agencies can present difficulties for an "NSF" scientist to participate in "DOE" projects and vice versa.

- Recent improvements in joint advisory structures, partnerships on large projects and better communication between OHEP and HEP at NSF are a very healthy development.

- The OJI program and the provision of equipment construction funds to NSF institutions by the DOE laboratories are welcome examples of such cooperation.

- Some members of COV found it troubling that some proposals are not sent out for peer review, and encourage the OHEP to reconsider this practice. We want to emphasize that DOE and NSF should continue to work toward building on the strengths of having two funding agencies, while finding ways to minimize the problems associated with separately funded individuals and research groups.

4.1.2 Accelerators

In the Advanced Technology R&D program the results have generally been very good with outstanding examples, such as superconducting magnet R&D and the developments in superconducting materials that have enormously wide impact (beyond HEP), plasma devices for acceleration and manipulation of beams, fundamental beam theory and experiments and support for future facilities such as linear collider and neutrino factory R&D.

Support for basic accelerator science is both unique and outstanding. Many important areas would likely be without support, if it were not for the pro-active approach of the Advanced Technology R&D Group. The University program supported by the Group has been a major source of PhD's having a broad array of cross-disciplinary skills. The SBIR funds represent a significant fraction of program funds and the group's efforts to keep SBIR aligned with overall program goals are commendable

4.1.3 National Laboratories

The HEP programs in the U.S national laboratories are well aligned with the program goals and strategic priorities of the field. Fermilab's proton accelerators are the foundation of much of the U.S. HEP program, with CDF and D-Zero currently running and NuMi/MINOS preparing to take data in 2005. Fermilab is also prominent in the U.S. participation on the LHC accelerator and the CMS detector for LHC. SLAC's electron accelerators provide another focus of thee U.S. HEP program, as currently manifested in the PEP-II B-factory experiment BaBar and the lab's leadership role in linear collider R&D. Programs at other labs provide key support to these flagship programs as well as carry a large role for the US participation in LHC. ANL is a major participant in CDF, LBNL is a major participant in CDF and BaBar, and ANL, BNL and LBNL are each major contributors to the Atlas detector at LHC.

4.2 Relationship between Award Decisions, Program Goals, and Office of Science-wide Programs and Strategic Goals

4.2.1 Universities

During the past few years HEPAP has made recommendations to OHEP to make funding adjustments to favor high-priority activities. The University Program officers have complied appropriately with these recommendations to support U.S. HEP program goals. We anticipate a possible manpower and resource problem in the coming years, as the LHC experiments will need increased University participation at a time when the Tevatron experiments CDF and DØ are still accumulating and analyzing their best data.

4.2.2 Accelerators

Support of the basic science and advanced concepts is generally well conceived and very appropriate. The accelerator development component of the program is well aligned with current program goals.

4.3 Research Investment, Balance, and Priorities

In a time of tight budgets, it is especially important that national and international priorities be set and followed. Not only must NSF and DOE work closely with each other, but they must also work closely with organizations outside the US. National and international funding priorities must be clearly articulated, and funding decisions should mirror these priorities.

We emphasize the central role of university groups in HEP in general, and in the implementation and operation of large facility projects. Universities play a crucial role in all aspects of detector design, construction, commissioning and operation. Adequate resources to fully utilize existing facilities must by necessity include adequate funding for the university groups that are so directly responsible for all aspects of facility operations. How the balance is determined between the University and Laboratory programs was not made clear to the COV.

The OHEP has a delicate balancing act between the needs of the national labs and the needs of the university program. Everyone has suffered in recent years by poor budgets, but as was pointed out in the 1998 Gilman HEPAP subpanel report, the university program has been especially hard hit with one consequence being that University technical infrastructure has been substantially decreased. Unfortunately, a strong recommendation of the Gilman HEPAP subpanel in 1998 to maintain and improve the infrastructure within the University Program has not been realized. In response to the recommendation, the University Program was increased by OHEP by about 5% above inflation over the two-year period in FY00 and FY01. This achieved about half of the Gilman panel goal of 10% above inflation, but unfortunately budget problems in FY02 caused a subsequent 5% reduction, which canceled the earlier gains.

As for the distribution of resources within the University program, the COV received detailed individual and aggregate grant information for the year 2001 only during the meeting. We note that there are large differences in resources per faculty member across the university grants. Differences are inevitable-are expected-in a competitive system, and can even be due to varying definitions of faculty status at different institutions. However, we were not able to determine

whether the differences were justified on the basis of the quality of the programs. As pointed out above, the issues of history and lack of comparative review increase the burden of justification for the differences. .

4.4 Organization, Effectiveness, and Adaptability of the OHEP Operation to the Evolving Research Environment.

The OHEP office is going through some renewal due to some departures and retirements over the past several years. This has put more strain on manpower, but at the same time presents opportunities for reorganization. The Program Officers have adjusted very well over the years to supporting the increasing focus of HEP research on very large, long-term accelerator experiments, and to exciting new opportunities in particle astrophysics via non-accelerator experiments. Such flexibility requires reallocating budgets on a merit basis at the level of a few percent each year. It is already evident that the next few years will require skillful and sensitive management to optimize the available resources among currently operating high-priority experiments and the approaching LHC experiments.

The national laboratory programs are also evolving and the new approaches to monitoring the operations and infrastructure needs is an important component in adjusting to the future. Finally, as we noted elsewhere, the use of modern databases and planning tools could help in planning and in adaptability by realistically assessing the needs for resources.

Parts of the Advanced Technology R&D program have evolved well into new areas (see above comments about program successes). However, we stress that this evolutionary trend would be strengthened by periodic review of this program. In the area of Advanced Technology R&D, the best people are being supported. There are a few exceptions, which are recognized by the current managers. It is expected that these exceptions will be rectified in a timely fashion

4.5 Opportunities for Proposal Process and Program Management Improvement

4.5.1 National Laboratories

The COV was impressed with the quality of annual program reviews and their ability to identify problems at an early stage. No major changes in the annual review process appear to be needed, although the subcommittee does suggest adjusting policy in two areas. The annual program reviews should provide timely feedback to the labs and the labs' responses should be tracked. Recent practice appears to have been good, but establishing more formal policies is appropriate. The COV recommends that OHEP set an internal deadline of providing the letter report to laboratory management no later than two months after the review is completed. There may be exceptional circumstances that may justify a longer period on occasion, but two months should be adequate under normal circumstances. The new policy that laboratory managers provide a formal written response to the annual review report is a positive step, although the subcommittee could not see a useful sample of these, since only one had been received by the time of our visit. The COV further recommends that OHEP implement a mechanism to follow up on laboratory responses when specific problems have been identified.

At Fermilab and SLAC, the annual program reviews focus on the physics program of the laboratory in an appropriate way, but they do not include any mechanism to review the physics research groups of those laboratories. Indeed, users often represent elements of the lab's program during the reviews. At the labs that do not operate HEP facilities (ANL, BNL, LBNL), this is less a problem, since the labs' in-house research groups carry out the programs under review. Nonetheless, for these labs, this process can be improved by developing a means of cross-comparison between the laboratory research groups and university-based research groups (particularly large groups with significant technical infrastructure). The subcommittee does not recommend a specific process, but strongly recommends OHEP develop such a process to provide more uniformity of review between physics research groups in the national labs and those in the university community. It seems likely that this mechanism will need to operate outside the annual program reviews.

4.5.2 Large Facilities

As part of most large project Execution Plans, change control thresholds are defined above which federal approval is required. For significant change control actions, approval authority is vested in the local field offices. While this assures tight communications with the project office proposing a change, it risks a communication gap with the program oversight function in OHEP. The subpanel recommends that change control approval by field office staff be carried out in close and prompt communication with the cognizant staff in the OHEP office. Change control actions are made after considerable analysis and discussion of cost, schedule, and technical responses to a project development. These actions are made when the analysis and discussion are mature. Both the field and program offices must be informed as early as possible of significant project changes. The program office should not be surprised by cumulative project changes, informed too late in the process, or left out of needed analysis by DOE.

Major acquisitions/contracts require DOE review before contracts can be signed. Acquisition officials in the DOE Forrestal organization perform this review. Their review is intended to provide assurance that the Federal and DOE acquisition process is properly followed. However, in addition to legal and regulatory review, the OHEP should be in a position to provide programmatic oversight of major acquisitions or contracts. The panel recommends that the OHEP staff be included in parallel in the DOE acquisition review.

Projects oversight in OHEP is currently performed in a matrix manner, involving staff from the Technology and Universities teams. Though the current oversight is effective, the current matrix arrangement potentially dilutes accountability within OHEP. Even at full staffing strength, the use of matrix arrangements will be sensible for particular projects and purposes. Matrixed staff must be fully accountable for the project oversight result.

As the OHEP project oversight capability is being developed, we recommend, in addition, that the OHEP project oversight staff should interact with counterparts in other government organizations to learn techniques, practices, and insights. For example, similar developments of practices are taking place in DOE/BES and NSF. Learned lessons and best practices should be shared in a timely way.

Many OHEP projects are hosted and managed by the HEP Laboratories. It is essential that HEP

Laboratory human resources must include a critical mass of project management and project engineering skills in order to sustain the queue of projects over time. An assessment should be made of the existing skills at the HEP Laboratories. With the results of such an assessment, planning should consider whether weaknesses at the Laboratories, if any, should be addressed by hiring into the Laboratory staff, or by the use of contracted experts when needed.

The HEP Laboratories must be fully accountable to deliver project performance within realistic resources. These include realistic deployment of financial, human and technology base resources. The Laboratory directors must size Laboratory appetites to their realistic capabilities to succeed.

4.5.3 Universities

We wish to emphasize that the senior staff carries out the management of the University Program with great insight into both the science and the scientists supported by the program. They represent the highest levels of dedication and professionalism. Given this context, and looking toward the future, we have identified a few opportunities for positive adjustments in the proposal process and in program management.

We were appalled to learn that many groups have not had a site-visit from a DOE program officer within the past 3 years because of a lack of travel funds. Before then, it was customary for each large grant to receive an annual site-visit from at least one DOE program officer. We feel site visits are of critical importance in evaluating the groups, and can be of significant help in persuading and assuring University administrations to continue and enhance the support of HEP at their institution. A bare-bones, but effective site-visit program would have at least one program officer visit all major institutions, as part of the review of their 3-year grant proposals.

As noted above, we welcome the University Program's decision to place length limits on new proposals. This will make proposals much more accessible to reviewers, and will contribute as well to record keeping. We suggest that a more uniform proposal format and list of requirements would also help.

Because of the relatively slow turnover among grants, the system is to some extent self-guiding as individual groups make progress on well-defined and long-term programs. In this context, detailed and accessible records are not a pressing requirement. Decisions on a year-to-year basis can be handled by relatively modest adjustments, responding to fluctuations in overall budgets and slow shifts in priorities. We can imagine, however, that this relatively steady state may not last indefinitely. The erosion of the University Program budget may reach a point where difficult, qualitative decisions on funding must be made. In the future, initiatives may require shifts of funds between old priorities and new. In such a climate, it be necessary to have available both global and detailed budget information, organized by institution and program. Our review, for example, was provided a table on funding by task, with information on numbers of faculty for each task, only for the year 2001. We would suggest that this represents only the minimum of information that should be available on demand within the Office of High Energy Physics.

The magnitude of the program appears to be more than the current University Program staff can manage while keeping ahead of fast-changing circumstances and the increasing burden of management and reporting demands. Also, we note that checks and balances are weakened when a

single senior scientific staff manages is responsible for program oversight and individual grant reviews. Another problem is lack of travel funds to make on-site reviews. Apparently, many groups have not had a site-visit from a DoE program officer within the past 3 years because of a lack of travel funds. We feel site visits are of critical importance in evaluating the groups, and can be of significant help in persuading and assuring University administrations to continue and enhance the support of HEP at their institution.

At the time of review, such basic information for years other than 2001 only appears to be obtainable by actually reading the individual files, where, as we have observed, useful information is often diluted by voluminous proposal material. It is clear that the current officers in the Program are in command of much of this information, but there are no guarantees that when difficult decisions arise the staffing will necessarily have the same experience on average. Requiring more uniformity in proposal formats and implementing a relatively straightforward database are two obvious steps to address this problem.

4.5.3.1 University Program Conclusions: Office Effectiveness

- It is imperative that travel funds be allocated to allow program officers to make regular site visits to their university programs.
- A more uniform proposal format would, with length limits, make more efficient review and planning possible.
- Consideration should be given to increasing the University professional staff by at least one person in order to make planning possible and to separate overall management responsibilities from individual grant-monitoring responsibilities.

5 Further Observations and Recommendations

Large experiments in HEP receive funding through many channels. These channels include DOE project funding, national laboratories funding for facility operations at Fermilab and SLAC, laboratory physics research in all the labs with HEP programs, and grants to university groups. In addition, experiments receive funding from NSF grants to university groups and from non-U.S. funding agencies through the participation of non-U.S. groups. It is clear that good communication between the DOE OHEP, NSF, and non-U.S. funding agencies is important. A much simpler goal, and at least as important, is for the DOE OHEP to internally optimize the distribution of funding through the different channels that it provides. Specifically, the question arises whether OHEP support for large experiments such as CDF, D-Zero, and BaBar is optimized with respect to the division of funding between the national labs and the university groups. We saw no evidence that this type of analysis is currently done within OHEP. It is also not clear that the distribution of funds among different university groups on a given experiment is optimal.

Both Fermilab and SLAC currently are active in a number of non-accelerator experiments. The trend is apparently toward more of this type of research in these labs. If a university group develops an interest in a non-accelerator experiment, the process for obtaining funding is clear. They submit a proposal to a funding agency, which is then peer reviewed and which competes within a rather tightly restricted pool of funds. The question arises how research groups in accelerator laboratories should be treated under similar circumstances. Labs can probably be expected to solicit the advice of their program advisory committees, but that process is unlikely to

address some important questions, such as whether laboratory participation is cost-effective in comparison to the same effort being located in a university. OHEP needs to define a process for appropriate consideration of such laboratory initiatives.

Increasingly, major project opportunities arise that involve multi-agency support. This is a healthy development that supports a rationalized and efficient national program in HEP. The initial examples developed through ad hoc means of interagency teaming. We recommend that the process for identifying, developing, executing, and monitoring interagency projects must be better defined. Identifying these should make full use of shared advisory mechanisms such as HEPAP, SAGENAP, or P5. We further recommend that orderly and consistent means of consultation and coordinated review and coordinated funding decisions be developed.

It should be noted that the recent difficulties with the Tevatron indicate that the system, by which we mean the totality of the Labs, the HEP User community, as well as OHEP, did not work as well as it should have. How can such problems be avoided in the future? This COV review was too brief to probe the issue and it needs further attention to find out the "lessons learned."

Finally, the COV would like to finish this report by again stating that we were greatly impressed by the dedication and the competence of the OHEP. It is clear that HEP is well served by the OHEP and that the many successes of the field owe a great debt to the professional management of the program at DOE.

Appendix A - Committee of Visitors Membership

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Appendix B – Agenda

Office of High Energy Physics
Committee of Visitors
Agenda

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5 Monday, March 8

8:00 am	Continental Breakfast *(A-410)*
8:30 am	Welcome, Charge to Committee, COV Guidelines — Robin Staffin, Associate Director, Office of High Energy Physics (HEP)
9:00 am	HEP Overview — Robin Staffin Budget Process Overview — Glen Crawford
9:45 am	Executive Session *(Committee and Robin Staffin only)*
10:15 am	Review of Individual HEP Activities *(Move to Breakout Rooms)* • Laboratory facilities and research (joint overview for this item and project management by Aesook Byon-Wagner) *(G-207)* • Project management *(G-207 for overview and then J-108)* • University research *(overview by P.K. Williams) (G-436)* • Accelerator R&D (overview by David Sutter) *(G-258)* A. The integrity and efficacy of processes used to solicit, review, recommend, and document proposal actions; B. The integrity and efficacy of processes used to review, recommend, authorize, and document funding actions under the Management and Operations contracts in place at the DOE national laboratories; C. The quality and significance of the results of the Office's programmatic investments; D. The relationship between award decisions, program goals, and SC-wide programs and strategic goals;
12:30pm	Working Lunch *(set up in H-412)*
1:30pm	Review of Individual HEP Activities *(continued in Breakout Rooms)*
4:00pm	Preparation of Individual Program COV Reports
7:00pm	Adjourn

6 Tuesday, March 9 (Room G-207)

8:00 am	Continental Breakfast
8:30 am	Executive Session
9:00 am	Distribution of Individual Program COV Reports and Presentation of COV Reports by Program COV Chairs
10:30 am	Office Level Review A. The Office's research investment, balance, and priorities; B. The organization and effectiveness of the HEP operation (The HEP organization has been "stable" for a long time while the field, both domestic and international, has changed dramatically. Has the HEP organization adapted or is a reorganization of HEP in order?); C.. Any other issues that the COV feels are relevant to the review.
12:00 pm	Working Lunch
1:30 pm	Preparation of Office-Level Report *(breakout rooms available if needed)*
5:00 pm	Closeout Session with Robin Staffin and Office of High Energy Physics staff
5:30 pm	Executive Session *(Committee and Robin Staffin only)*
6:00 pm	Adjourn

Appendix C – Charge

Department of Energy
Office of Science
Washington, DC 20585

March 1, 2004

Professor Barry C. Barish
Department of Physics
California Institute of Technology
1200 E. California Boulevard
Pasadena, California 91125

Dear Dr. Barish:

Thank you for agreeing to chair the fiscal year (FY) 2004 Committee of Visitors (COV) for the Office of High Energy Physics (OHEP). The COV Review will take place at the Department of Energy (DOE) Facility in Germantown, Maryland, on March 8-9, 2004. The COV is an *ad hoc* subcommittee formed in response to a charge to the High Energy Physics Advisory Panel (HEPAP).

DOE is looking to the COV to assess its program management, to provide advice to improve OHEP performance, and to ensure openness to the research and education community served by the DOE. Reports generated by this COV will be used in assessing agency progress in order to meet government-wide performance reporting requirements, and will be made available to the public. The COV is charged to address and prepare a report on:

- the integrity and efficacy of processes used to solicit, review, recommend, and document proposal actions;
- the integrity and efficacy of processes used to review, recommend, authorize, and document funding actions under the Management and Operations contracts in place at the DOE national laboratories
- the overall quality and significance of the results of the Office's program-wide investments;
- the relationship between award decisions, program goals, and Office of Science-wide programs and strategic goals;
- the Office's research investment, balance, and priorities;
- the organization, effectiveness, and adaptability of the OHEP operation to the evolving research environment.
- any other issues that the COV feels are relevant to the review.

Decisions to award or decline proposals are ultimately made by OHEP staff whose informed judgment is based on evaluations by qualified reviewers who reflect the breadth and diversity of the proposed activities and the community. Systematic examination by the COV of a wide range of OHEP's funding decisions provides an independent mechanism for monitoring and evaluating the overall quality of the Office's decisions on proposals, program management and processes, and results.

The review will assess operations of individual activities in OHEP as well as the Office as a whole for three fiscal years: FY 2001, FY 2002, and FY 2003. The activities under review include:

- Laboratory facilities and research
- University research
- Accelerator R&D
- Project management

The general outline of the meeting will be an introductory session in which I will present an overview of the Office's activities, programs, and plans. Following this session, the COV will break into subgroups, and at these individual meetings, an appropriate OHEP staff member will provide a more in-depth discussion of the particular group activity as well as a review of statistical information and procedures. The subgroups will then examine program documentation and results and prepare program-level review reports. The following day, there will be a review of the Office as a whole and preparation of an Office-level report, based on the program-level reports and other material as appropriate.

Drafts of the program-level reports and the Office-level report will be completed during the COV meeting. I ask that you finalize and submit the full report by April 5, 2004, to allow time for comment and distribution of the report to the full HEPAP prior to their meeting on April 18-19.

The agenda for the review will be made available to you in the near future. Also, to assist the committee, we have established a private web site (http://doe-hep.hep.net/COV/) on which we will be posting background information for your perusal prior to the review. The password for this site has been provided to you and the other members by an email from Marsha Marsden. The material posted to this website and other information will be available for the Committee's use at the Review. Please feel free to contact me (301-903-3624, robin.staffin@science.doe.gov) or Ann Kirtland, (301-903-2623, ann.kirtland@science.doe.gov) if you have questions about the review.

Travel and hotel arrangements are being handled by our support services contractor, ORISE. A representative from that organization will be contacting you and the other committee members shortly to make arrangements.

Thank you again for your willingness to participate in this important activity. I look forward to seeing you at the meeting.

Sincerely,

/S/

Robin Staffin
Associate Director
Office of High Energy Physics

Enclosures

Department of Energy
Office of Science
Washington, DC 20585

August 12, 2003

Office of the Director

Professor Frederick Gilman
DOE/NSF High Energy Physics Advisory Panel
Carnegie-Mellon University
5000 Forbes Avenue
Pittsburgh, PA 15213

Dear Professor Gilman:

This letter requests that the High Energy Physics Advisory Panel (HEPAP) establish a Committee of Visitors (COV) through which HEPAP can provide an assessment on a regular basis of process-related matters pertaining to the management of the Department of Energy Office of Science High Energy Physics program. The COV should review High Energy Physics (HEP) program management every three to four years providing an assessment of the effectiveness, efficiency, and quality of the processes used to solicit, review, recommend, and document proposal actions and monitor active projects and programs. In addition, the COV should also comment on how the award process has affected the breadth and depth of the HEP portfolio elements, and its national and international standing. The High Energy Physics Advisory Panel should work with the Acting Associate Director of the Office of Science for High Energy Physics to establish the processes and procedures for the first COV to occur in 2003.

I appreciate HEPAP's willingness to take on this important activity, and I look forward to meeting with you and learning of your progress in this important task.

Sincerely,

Raymond L. Orbach
Director