Science & Technology Facilities Council

Department of Energy Office of High Energy Physics Committee of Visitors 2007

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Committee members

COV was formed as a subcommittee of HEPAP

Met for two days on June 18-19, 2007.

John Womersley *(chair)*

Dave McGinnis, Patrick O'Shea, Nan Phinney, James Rosenzweig *(Accelerator group)*

Jim Alexander, Nigel Lockyer, John Seeman, Paul Slattery *(Laboratory group)*

Marjorie Corcoran, Ron Poling, Ian Shipsey, George Sterman *(University group)*

Murdock Gilchriese, Satoshi Ozaki, Ken Stanfield, Jim Yeck *(Projects group)*

Process

Covered actions in OHEP for the period of FY2004-2006.

Presentations by the associate director and senior staff for covering the organization of the office and major program activities – accelerators, national laboratories, universities and projects.

We divided into four subgroups for interactive sessions with the responsible OHEP program officers in each sub-area.

To validate funding processes and actions we read a selected sample of proposal folders. We looked at the large HEP investments in the national laboratories, the accelerators and the major detector facilities. The methods used by OHEP for monitoring, reviewing and prioritizing these programs were evaluated.

Observations

The first conclusion of this COV review was to validate the integrity and efficacy of the processes for treating proposals and for making funding actions, and to validate the OHEP program management of the national laboratories and large facilities.

An important observation 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 a broad charge for this review and the encouragement to think about how to improve the office.
- The highly 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 impressive and were essential to our ability to carry out this review.

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 our report, we make eighteen recommendations for ways in which the functioning of the office and program could be further improved; we believe that improvements in the office will lead to improvements in the quality of the research program that is carried out in high energy physics.

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Organisation and Effectiveness of the Operation

John Womersley

Recommendation 1

The first and most serious issue mentioned in the 2004 COV report was that OHEP was very seriously understaffed. Overall, the staffing deficit is if anything worse now than in 2004.
The current situation is unsustainable.

We *strongly* recommend that an urgent effort be directed to filling all the vacant staff positions in the office, and indeed to consider adding additional IPA positions.

Positions in OHEP are challenging, highly rewarding, and carry a great deal of influence in the field and the office should work to educate members of our community as to the interesting and exciting nature of these positions in order to attract the highest level of applicants.

We make the following concrete suggestions to help in this process:

- Mobilize the help of the community in the search process – for example, by setting up a "search committee" of community members to identify and recruit potential candidates, or by mobilizing the laboratory user groups.
- Take steps to raise the profile and awareness of OHEP staff's role and how interesting and important these positions can be. Existing staff could be profiled and used as role models.
- The office should be open to using IPA posts wherever appropriate and be proactive about their recruitment
- The office should try to help applicants through any additional hurdles created by the hiring process

Recommendation 2

We note that the quality of office documentation and access to data about the program has improved in a number of areas since the previous COV review, but that there remain areas that could be improved.

We recommend that documentation and access to program data continues to be improved and that data is put into electronic form where this is not yet the case (the university grants program being one example).

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Research investment balance and priorities

John Womersley

The planned program balance correctly reflects the priorities expressed by the field through HEPAP, P5 and the EPP2010 advisory panels. However, the resulting mix of projects (LHC, ILC, and a portfolio of smaller projects) makes program management both challenging and important. The current desire to maintain focus on the ILC as the major long term goal for US HEP while at the same time providing additional medium term discovery opportunities will be a challenge; P5 and HEPAP should be fully engaged in this process.

The scale and international nature of the ILC also mean that its success depends on the commitment of other stakeholders (in the US government and abroad) to a much larger extent than has been the case for other projects; need to engage proactively and ensure that positions and concerns are understood.

Recommendation 3

We recommend that

- The office should continue to work with P5 and HEPAP in evolving the medium term program.
- Ensure that the program planning function within the office is adequately staffed and supported given its importance.
- Ensure continuing effective and ongoing engagement with all other potential stakeholders in the ILC, both in the US government and abroad

Recommendation 4

We note that in the past few years, the community has not always understood the methodology or reasoning behind some major program decisions and how they were made in OHEP. This lack of understanding can and sometimes has led to dissatisfaction in the past. Good communication is critical to ensure confidence in the decision making process.

We recommend that OHEP decisions and the rationale behind them should be effectively communicated to the community

Recommendation 5

It is not obvious how the balance between university and lab programs is appropriately optimized. With the missions of all the laboratories (except Fermilab) now evolving away from HEP accelerator operations, it is timely to consider whether this balance is optimal and how the laboratories should be comparatively reviewed as part of the broad program.

We recommend that the office develop a process to globally optimize and comparatively review the balance of support for HEP research at Fermilab, the universities and the other laboratories in light of the evolving program.

Recommendation 6

We had a lively discussion of the conduct of reviews and the need for review committees to be given sufficient time to explore issues in detail, not to sit through a very large number of presentations without time for questions; to be able to meet privately in executive session; for meaningful closeouts, and timely feedback. There were also some concerns over the consultancy model used in laboratory reviews and whether this limits their contribution to the process.

We recommend that the office understand and communicate appropriate best practices for reviews, as suggested above, and ensure they are followed.

The office should consider whether the consultancy model is optimal.

The University Program

John Womersley

Recommendation 7

The Outstanding Junior Investigator (OJI) program continues to be very successful in launching the research careers of some of the most talented junior faculty. The OJI review process serves as the primary mechanism for evaluating new faculty for additions to existing grants. It also provides flexibility in funding young physicists not associated with a major research group. OJI grants are exceedingly competitive, with 68 applicants in the most recent cycle and only 6 awards granted.

The number of Outstanding Junior Investigator awards should be increased by devoting more funds to this program.

Recommendation 8

Following the recommendation of the last COV, the university program staff have implemented guidelines for page limits and proposal format. This is a positive development, and we propose further strengthening of the policy.

New and renewal proposals should be limited to a maximum of 10 pages per senior investigator. Proposals not meeting page-length limits or lacking required information should be returned for revision before being sent out for review.

Recommendation 9

The use of visiting panels of consultants for renewals of large grants has been a valuable enhancement to the review process and a source of useful feedback for research groups. Organization of these reviews has imposed an additional burden on university program staff. This additional load could be partially compensated by eliminating routine annual site visits by program officers in continuation years.

Outside visiting consultants should continue to be used for 3-year renewals of large grants. The office should consider eliminating site visits in continuation years unless some unusual circumstance warrants such a visit.

Recommendation 10

Proposal reviews vary widely in style, evaluation criteria employed and degree of specificity of recommendations. When theory and experimental groups are together in the same grant, there were concerns that the theory component is sometimes under-reviewed.

OHEP should consider providing a template to reviewers to provide guidance and greater uniformity of reviews.

The office should ensure there are sufficient reviewers for the theory component of multi-task grants.

Recommendation 11

Reading through the grant jackets, we often found it difficult to locate important information in the documentation. It would be very helpful to have key information about each grant readily available.

Each proposal jacket should contain as the first page a brief summary sheet which shows a history of funding levels by task, current funding, and personnel supported by category. As the proposals are moved online, this summary sheet should also be online.

The Laboratory Program

John Womersley

Recommendation 12

Overall, the OHEP should be congratulated on the success achieved thus far with the ILC program and for implementing the advice received from the community through HEPAP and P5.

However, there were concerns about the division of funds between accelerator R&D and detector R&D (where the US appears to lag behind Europe) and how it is determined.

The Office should establish a formal advisory mechanism to best optimize the split between ILC accelerator and ILC detector R&D funds.

Recommendation 13

OHEP should work with the community and the laboratories to formulate a plan for stewardship of accelerator science in the US during the coming transition to a period without an energy frontier machine.

This plan should recognize the centrality of maintaining and developing high energy accelerator science and technology in the US, and training the next generation.

This goal can be accomplished through US-centered mid- and long-term research, through collaborative activities overseas and through participation in other Office of Science projects.

Accelerator R&D program

John Womersley

HEPAP subpanel

Recently, DOE OHEP and NSF created a HEPAP subpanel to review and advise on accelerator research in the US. This subpanel issued a number of recommendations, several of which have already been adopted: OHEP has added the stewardship of accelerator science in its mission statement and the planned budgets for advanced accelerator research follow their recommendations.

Recommendation 14

The oversight of mid-term accelerator research would be improved by anonymous peer-reviews modeled on those for the long-term R&D program.

The peer-review process in accelerator research should be expanded to cover mid-term accelerator research to provide comparative evaluation of the merit of different research efforts.

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Large Projects

John Womersley

Observations

The OHEP relies heavily on the advice from advisory committees (HEPAP, P5, Scientific Assessment Groups – SAGs, etc) as well as from Laboratory mechanisms for proposals and review.

The interaction between the OHEP and these advisory bodies has led, in general, to support closely tied to the priorities established for the field.

However, there will be significant changes in the field in the next 2-3 years. The PEPII/BaBar effort at SLAC and the Tevatron program at Fermilab will be phased out. The LHC will turn on and there will be a significant investment in ILC R&D. Exciting new opportunities in neutrino physics, dark matter searches and dark energy studies are on the horizon in the same time period.

Recommendation 15

- The project initiation and management process in the OHEP should continue to be closely aligned with the HEPAP/P5 prioritization process for HEP and the strategic goals of the Office of Science.
- Interactions with the appropriate advisory bodies should increase in frequency.
- The detailed budget and schedule planning for major projects needs to be more proactive, particularly at this critical juncture for high energy physics.

Recommendation 16

Recent successes (e.g.Numi/MINOS, CDMS, LHC accelerator, etc) show effective project management oversight within the OHEP, including tailoring the requirements of DOE 413.3 to smaller projects

However, some recent efforts terminated after a significant investment of resources and effort were made; the decision process in such cases is perceived to be less transparent than is desirable.

To the greatest extent possible, only those major projects for which the physics goals are well matched to the priorities in the field, and whose overall scope, cost estimate and funding requirements are consistent with each other should be advanced to construction status. In this regard, establishing a funding cap prior to establishing a realistic baseline should be avoided because it introduces risk that a project can not be completed within budget or that its scientific scope will not be delivered.

Recommendation 17

The program managers for individual, ongoing projects are working effectively with other US agencies and multi-national funding bodies. It is recognized that future program success is now closely tied to making these multi-agency relationships effective.

The office should continue to pursue opportunities to support projects in collaboration with other agencies, both domestic and international. The Office should recruit an individual (or an IPA position) to be proactive in coordinating and facilitating these efforts, including international agreements, at a high level within the OHEP.

Recommendation 18

The OHEP works closely with the SC Office of Project Assessment (OPA - headed by Dan Lehman) to review major projects. This arrangement is effective and working well.

The program managers currently provide oversight for about seven major efforts. The same program managers also provide oversight for some Laboratory and research operations outside these projects. Additional projects are anticipated to require program management in the next 2-3 years. Staffing levels in the OHEP need to increase to maintain the high quality oversight needed to initiate and oversee major projects.

The office should add staff to the Facilities Division to provide sufficient project management oversight for upcoming major projects.

Overall conclusions

We validate the integrity and efficacy of the processes for treating proposals and for making funding actions, and the OHEP program management of the national laboratories and large facilities.

The Strategic direction taken by the office reflects the priorities of the field, but also reflects the tensions therein

- ILC

OHEP relies on a highly dedicated and very overworked staff to function

- The current understaffing situation is not tenable
- If the HEP community is not willing to be a part of the solution, it will have only itself to blame for what follows