

Report from the 2013 Committee of Visitors

COV Review

A Committee of Visitors (COV) was formed and asked to review the management processes of the DOE Office of Science's Office of Nuclear Physics (NP) Program for the period FY2010 – 2012.

The COV was asked to evaluate and provide its findings, comments and recommendations on the following items :

- The effectiveness, efficiency and quality of the processes used to solicit, review, recommend, and document proposal actions.
- The monitoring of active projects and programs.
- Effect of the award process on the breadth and depth of the Nuclear Physics portfolio elements.
- The national and international standing of the portfolio elements.
- Progress made towards addressing action items from the previous COV review.
- Suggestions regarding the COV process.

The COV visit and review of NP took place 7 – 9 January 2013.

2013 Committee of Visitors Membership

Composed of 22 members with scientific expertise across the portfolio of the NP program or technical expertise in operations or project management:

Joseph Arango	JLAB Site Office
Kelly Beierschmitt	ORNL
Elizabeth Beise	Maryland
Jeffery Blackmon	LSU
David Dean	ORNL
Latifa Elouadrhiri	JLab
Olga Evdokimov	Illinois-Chicago
Paul Fallon	LBNL
Alexandra Gade	MSU
Susan Gardner	Kentucky
Donald Geesaman	ANL
John Harris, Chair	Yale
Stuart Henderson	FNAL
Kate Jones	Tennessee
Joshua Klein	Pennsylvania
Reiner Kruecken	TRIUMF
Berndt Mueller	Duke-BNL
Michael Pennington	JLAB
Aundra Richards	LBNL Site Office
Lee Roberts	Boston
Thomas Roser	BNL
Susan Seestrom	LANL

Agenda of COV at NP-DOE – Day 1

Monday, January 7

8:00 am Meet at DOE

8:15 am Executive session: COV charge, etc..., procedures

8:50 am Welcome – T. Hallman

9:00 am Office of Nuclear Physics Overview – T. Hallman

9:40 am Physics Research Division Overview – T. Hallman

10:10 am Facilities & Project Management Division Overview – J. Gillo

10:40 am Break

11:00 am Program Managers Presentations - Research Division: Sowinski (HI),
Barnes (ME), Baktash (LE), Fai (TH), Barnes (SciDac/NucData)

12:40 pm Working Lunch

1:40 pm Program Managers Presentations: Facilities & Project Management Div:
Gillo (Facilities), Farkhondeh (Accelerator R&D),
Marsiske (Instrumentation), Hawkins (Major Initiatives)

3:00 pm Isotope Program Overview – J. Gillo

3:30 pm Budget Process - J. Wolfe

3:50 pm Information Tracking (PAMS) – L. Blevins

4:10 pm Discussion with Hallman and Division Directors

4:50 pm Break

5:00 pm Committee Breakouts (Program Managers available for discussion with
breakout groups as requested): Grants 1, Grants 2, Lab Res., Facility Ops,
Projects, Isotopes

6:15 pm Executive session – Committee generates list of additional information
desired for presentation on Wednesday.

7:30 pm Adjourn

Agenda of COV at NP-DOE – Days 2 & 3

Tuesday, January 8

8:00 am Meet at DOE

8:15 am Executive session

9:30 am Committee Breakouts (PMs available for breakout groups on request):
Grants 1, Grants 2, Lab Res., Facility Ops, Projects, Isotopes

10:30 am Break

10:45 am Committee Breakouts (PMs available for breakout groups on request)

12:30 pm Working Lunch

1:15 pm Committee Breakouts (PMs available for breakout groups on request)

2:30 pm Executive session: Discuss initial findings

4:30 pm Committee work or Meet with Program Managers, assign homework

6:30 pm Adjourn

7:30 pm Dinner

Wednesday, January 9

8:00 am Meet at DOE

8:30 am Report on Homework

9:30 am Executive session: Preparation of report

12:00 pm Executive Working Lunch

1:00 pm Executive session: Preparation of report

3:00 pm Meet with the Associate Director and Division Directors

3:30 pm Closeout

4:00 pm Adjourn

2013 COV Report – Preface

- NP is to be congratulated for its oversight of a distinguished nuclear science program that is world-leading in many aspects. With world-leading user facilities in
 - low-energy nuclear physics at ANL (ATLAS)
 - medium energy physics at Jefferson Lab (CEBAF) and
 - relativistic heavy ion physics at BNL (RHIC)In all of these areas the impact is also enhanced by a smaller complementary research program at facilities outside the U.S.
- The responsibility of the NP is vast, requiring a high level of effort from individuals in the Office. The goals of the Office are met through dedication and hard work of the staff.
- This is the first evaluation of the Isotopes Program within the NP, as it was transferred from the DOE Office of Nuclear Energy to the Office of Nuclear Physics just prior to the previous COV. The organization is established, with competent and motivated staff having been hired. NP is providing clear leadership on issues of national importance, and the process and community guidance have been improved. The Isotope Program office continues to play an important role in both national and international leadership for isotope production as well as isotope research and development. The COV views these interactions as critical and encourages their continued support.

2013 COV Report – Major Recommendations

The following are the major recommendations that will each be discussed in more detail in the following slides:

- The COV recommended in 2007 and stressed again in 2010 that it was imperative to develop and implement a database to track relevant proposal and grant information. We reiterate the critical need for the rapid implementation of such a database.
- We recommend that NP track the participation of under-represented groups and make the information available. The COV urges that the necessary authorization be obtained, consistent with Federal requirements, to track diversity and demographic information through the PAMS system.
- The COV recommends an increased focus on timely delivery of reports, and development of a set of written guidelines for Laboratory Review Reports to streamline the process.
- We recommend the creation of detailed guidelines (defining roles, responsibilities, authorities and accountability) for both the research and facilities program managers. Such guidelines across the NP portfolio would help to consolidate best practices throughout.

2013 COV Report Major Recommendation 1

- The COV recommended in 2007 and stressed again in 2010 that it was imperative to develop and implement a database to track relevant proposal and grant information. We reiterate the critical need for the rapid implementation of such a database.

FINDINGS:

- Grants still handled by the traditional office operational method, large folders with grant paperwork, passing between PMs.
- The level and quality of documentation varied significantly between PMs. Lack of uniformity, especially in the memo justifying the funding decision and in the PM comments.
- This variation made it difficult to review and compare grant files. Interviews of PMs confirmed that handling grants during renewal process involves much repetitive work, with ad hoc non-uniform spreadsheets generated by individual.

COMMENTS:

- SC has been developing the PAMS system to address database issue, & expected to begin phased operations by the end of 2013.
- PAMS should impact positively the ability of NP to process, evaluate, monitor, & make decisions on grants and its portfolio.
- PAMS should decrease workload and paperwork, enabling the PMs to focus more on decision-making & grant-monitoring.
- PAMS should also allow NP to access and provide information to the COV in the future, making the visits more effective.

2013 COV Report Major Recommendation 2

- We recommend that NP track the participation of under-represented groups and make the information available. The COV urges that the necessary authorization be obtained, consistent with Federal requirements, to track diversity and demographic information through the PAMS system.

FINDINGS:

- The COV recognizes the field is under-represented by women & minority groups relative to the population by a large margin.

COMMENTS:

- Considerations of excellence mandate that the field attracts and retains talent from as diverse a pool as possible.
- We encourage NP to collect statistical data to document the progress of under-represented groups throughout all activities, including participation in research activities at undergraduate, graduate, and postdoctoral levels, and at the PI level.
- Monitoring of activities should include awarding and reviewing of grants, and funds granted. Such information may help to develop approaches (e.g. in solicitations and programs) to encourage under-represented groups to enter the field.
- The COV notes that with the PAMS system it will be possible to track diversity and other demographic information once the correct authorizations are in place. The information in this regard that the COV finds to be pertinent includes gender, race, and nature of the institution (PhD granting or not, HBC).

2013 COV Report Major Recommendation 3

- The COV recommends an increased focus on timely delivery of reports, and development of a set of written guidelines for Laboratory Review Reports to streamline the process.

FINDINGS:

- The program reviews during the reporting period were Medium Energy and Low Energy. The committee also examined material from the Theory and Heavy Ion reviews from the previous review period. The reviews follow the same overall pattern from proposal formats, panel selection, review process, and scoring guidelines.
- In the cases of Medium Energy and Theory (where reports were issued) funding decisions could be related to the results of the reviews. In the case where the report was not yet issued, the PM told the COV that he had informally communicated the results to the Laboratory groups and used these results in his budget decisions in FY11.
- The reports from the laboratory reviews are not being issued in a timely fashion. The stated policy of the Directorate is to issue these reports within 4 months. The Medium Energy report was released 20 months after it occurred. In this case there are understandable reasons for the delay. However, the issuing of the Low Energy review report is still outstanding after 17 months.

2013 COV Report Major Recommendation 3

- The COV recommends an increased focus on timely delivery of reports, and development of a set of written guidelines for Laboratory Review Reports to streamline the process.

COMMENTS:

- The annual laboratory management budget briefings and the rotating program reviews at the laboratories provide significant feedback both to and from the DOE.
- The reviews have followed the same overall pattern from proposal formats, panel selection, review process, and scoring guidelines. This consistent approach has certainly been of value to the COV in evaluating these processes.
- It is important for the Directorate to devote an increased effort to the production of timely review reports. They are important to Laboratory management in making their own decisions on discretionary funding and management of people. Transparency in the review process is important to achieving buy-in and support from the broader community. The relevance of the report decreases quickly with time, whereas the effort required to generate the report increases. The AD needs to have timely information with which to make decisions impacting overall program balance.

2013 COV Report Major Recommendation 4

- We recommend the creation of detailed guidelines (defining roles, responsibilities, authorities and accountability) for both the research and facilities program managers. Such guidelines across the NP portfolio would help to consolidate best practices throughout.

A consistent approach to proposal formats, panel selection, review process, and scoring guidelines is beneficial to maintaining a quality review process.

We specifically recommend consideration of the following aspects in developing these guidelines:

- Define clearly tasks and responsibilities for the PMs, specifying their roles as stewards of their programs based on office strategic directions and peer review input.
- Use a common template for the PM reports.
- Streamline reports to make the job more manageable for the PMs.
- Promote the Theory review of 2009 as an effective example of good practice.

Process-specific Recommendations

Soliciting and reviewing proposals:

1. The NP should work with the community to enhance the peer review process for university grants such that, while continuing to be fair, it is even more discriminating in the evaluation process. The NP could consider the implementation of a quantitative component into the grant evaluation process.

FINDINGS:

- The lack of any quantitative measure for the quality of regular grant applications makes it difficult to rank applications with respect to each other.
- It is difficult for the Program Managers to make tough decisions objectively in times of tight budgets.
- The NP presently relies on sporadic comparative reviews of the entire research program – a mammoth undertaking – to obtain an across-the-board assessment of the quality of the grant portfolio.
- A comparative review of all university and laboratory groups in the subfields supported by NP is planned in the Spring of 2013.

Process-specific Recommendations

Soliciting and reviewing proposals:

1. The NP should work with the community to enhance the peer review process for university grants such that, while continuing to be fair, it is even more discriminating in the evaluation process. The NP could consider the implementation of a quantitative component into the grant evaluation process.

COMMENTS:

- Some quantitative evaluation, or ranking, of the quality of grant applications at renewal time (using appropriate review criteria) would permit NP to continually assess the quality of its grant portfolio.
- The introduction of structured reviews of grants in PAMS would allow PMs to better compare the quality of grant applications, allow for more uniform implementation of the decision criteria, and simplify the process of generating the documentation underpinning the grant decision.
- The introduction of PAMS should increase the effectiveness of the research division by reducing the workload and the amount of rote paperwork, thereby reducing the time to a funding decision. If properly constructed, PAMS should also help make the feedback to the PIs more informative and uniform.

Process-specific Recommendations

Soliciting and reviewing proposals:

2. The NP should provide direct feedback to the Early Career Award applicants regarding the relative competitiveness of their proposals, relevance to the priorities of the NP program, and potential alternative routes for funding for the declined proposals.

FINDINGS:

- To support new investigators, the NP participates in the Early Career Award (ECA) Program. We commend NP for this effort, noting an exceptional quality of funded proposals and investigators.
- The criteria used to assess and approve ECAs appear not to be disseminated effectively.
- The ECA is highly competitive: many compelling proposals cannot be funded, & the success rate is dramatically lower than for other parts of the program.
- For some strong, but unfunded, ECA proposals there is little constructive criticism in the redacted reviews that would help in preparing improved proposals in the future. These proposals cannot be considered by the NP outside the ECA program, however we strongly urge NP to advocate for the standard use of panel reviews in the ECA process.

Process-specific Recommendations

Soliciting and reviewing proposals:

2. The NP should provide direct feedback to the Early Career Award applicants regarding the relative competitiveness of their proposals, relevance to the priorities of the NP program, and potential alternative routes for funding for the declined proposals.

COMMENTS:

- Receipt of the ECA (or lack thereof) has become an important factor in some academic departments in consideration of promotion and tenure.
- Feedback from the panel regarding factors such as relative competitiveness of the proposal and its relevance to the priorities of the NP program may help improve the quality of future submissions.
- Recognition, i.e. naming a set of proposals as "finalists," may encourage and benefit strong young scientists.
- NP should advocate for improvements & a commitment to panel reviews for the ECA decision process.
- There's a need for planning to support deserving new investigators beyond the scope of the ECA.
- The NP should continue to be mindful of creating opportunities outside the ECA program and making young investigators aware of such opportunities.

Process-specific Recommendations

Monitoring projects and programs:

1. It is essential that the NP complete the filling of the Research Division Director and Medium Energy Program Manager positions.

FINDINGS:

- The AD has been the Acting Research Director. As a new AD this allowed evaluation of the functioning of the division in light of changing directions of the field.
- This has increased the workload on the AD, with possibly reduced oversight and day-to-day management of the PMs in the research division.
- Interviews are progressing and a new Research Director is expected in place imminently. Similarly, the position of PM for medium energy programs is being filled.
- The present solicitation and hiring process in the NP is highly limited by procedures of SC, potentially impacting negatively the ability to recruit top-notch candidates. The short time between solicitation and closing dates negatively impacts recruiting of quality applicants.
- The nuclear physics facilities manager has been temporarily reassigned to manage the HI portfolio in the research division. We believe this has been beneficial to the HI program.

Process-specific Recommendations

Monitoring projects and programs:

1. It is essential that the NP complete the filling of the Research Division Director and Medium Energy Program Manager positions.

RELATED FINDINGS:

- The COV noted that the Facilities and Project Management Division has recruited and effectively utilized detailees to support the activities of the division during the review period. This has reduced the workload on the permanent staff and brought in new expertise and ideas. This has been less true in the research division.
- The COV notes that a healthy balance of detailees and IPAs (temporarily assigned personnel) is beneficial to both the Office and the community by promoting communication and helping to share expertise and experience.

COMMENTS:

- The COV strongly supports the deployment of detailees where appropriate. This is beneficial both to the office and to educating the scientific community about how decisions are made when detailees return to their home institutions.

Process-specific Recommendations

Monitoring projects and programs:

2. The COV recommends that NP define the process and timeframes for the major reviews including the 2013 Comparative Review and communicate this to the field as soon as possible. It is important to provide the guidance to the PIs of the groups and to the panel as soon as possible.

FINDINGS:

- A comparative review of all university and laboratory groups in the subfields supported by NP is planned in the Spring of 2013.

COMMENTS:

- We note that the metrics of success, e.g., numbers of publications and citation rates, can vary considerably across the subfields supported by the NP and should be considered in comparing activity in different subfields. These considerations also operate within subfields and are associated, e.g., with the nature of the work or investigation, the phase of the project, and the size of the group.

Process-specific Recommendations

Monitoring projects and programs:

3. The NP should perform further analysis of the workforce data and develop plans as needed to mitigate the impact of potentially constrained budgets on the workforce.

FINDINGS:

- The Nuclear Physics Workforce Survey Report provided by NP shows appreciable growth since 2009: 12% in permanent staff, 19% in temporary staff, and 7% in graduate students.
- Contributing factors for this apparent growth may be the real growth in the NP budget through FY12, the injection of ARRA funding, and new initiatives such as the 12 GeV upgrade at CEBAF and FRIB development.
- It is not understood to what degree the increase reflects real growth rather than better reporting, the underlying stimulus, and the demographics of the increase (e.g. university vs. laboratory).

Process-specific Recommendations

Monitoring projects and programs:

3. The NP should perform further analysis of the workforce data and develop plans as needed to mitigate the impact of potentially constrained budgets on the workforce.

COMMENTS:

- The impact on the workforce of significantly constrained future budgets in light of the recent appreciable growth since 2009 is a cause for concern.
- The NP should work to mitigate budgetary impacts to the degree possible. The committee feels it would be valuable to perform a more in-depth analysis of the workforce survey to better understand the nature of the recent increases in the workforce (e.g. fraction supported by ARRA funds, university vs. national lab, increased group size vs. new awards, etc.).
- A better understanding of the demographics of the workforce should help in developing plans to manage constrained budgets to lessen the impact on the workforce, especially in light of the recent growth.

Process-specific Recommendations

Monitoring projects and programs:

4. We recommend continued engagement with the User Facilities to establish facility performance metrics that more directly measure the scientific productivity of those facilities.

FINDINGS:

- NP monitors and reports operational metrics from the operating facilities (such as operating hours, downtime hours, availability and reliability, and other facility specific performance measures).
- NP also utilizes performance measures for Accelerator Improvement Programs (AIPs) and other activities, all of which are reviewed and assessed at Science and Technology reviews and site visits, and in other forums.

COMMENTS (part 1):

- RHIC continues to be under-utilized, as measured by the Program's optimum utilization hours, which are established through discussion with the user facility management.
- It seems clear that the scientific productivity and impact of RHIC and its operation remains high.

Process-specific Recommendations

Monitoring projects and programs:

4. We recommend continued engagement with the User Facilities to establish facility performance metrics that more directly measure the scientific productivity of those facilities.

COMMENTS (part 2):

- This chronic under-utilization highlights the missed opportunities imposed by the present and recent fiscal climate, wherein the facility operations costs cannot be maintained to allow full utilization.
- One might be led to the wrong conclusion that RHIC's 33% utilization means that only 33% of the science is getting done, which is not the case.
- We learned that beginning in FY14, OMB will no longer utilize beam performance metrics for the accelerator user facilities.
- We expect that NP will continue to monitor performance of its facilities. We appreciate the three user facilities cannot be assessed by a common set of beam performance parameters, as they are very different accelerator facilities.
- This change in OMB focus opens the possibility of establishing performance measures that may be more closely tied to the physics output.

Process-specific Recommendations

Monitoring projects and programs:

5. The COV recommends that the coordination and the information exchange of accelerator R&D activities between SC offices be strengthened.

FINDINGS:

- In addition to the competitive accelerator R&D program, the facilities (RHIC, CEBAF, ATLAS, HRIBF) carry out R&D activities supported from their base operations funding. These R&D efforts cover both short term commissioning and performance-improving activities at the facility as well as R&D for next generation NP facilities. Over the last three years the total effort at the four facilities was about \$12-13M of which about \$3M are spent on short-term accelerator R&D.
- Accelerator R&D is routinely assessed during S&T reviews and in formal and informal presentations, discussions, and meetings with NP program management. A first in-depth assessment of the complete Accelerator R&D program was carried out in December 2011 in a review of BNL's C-AD R&D activities. An in-depth review of the TJNAF Accelerator R&D program is in the planning stages for 2013.

Process-specific Recommendations

Monitoring projects and programs:

5. The COV recommends that the coordination and the information exchange of accelerator R&D activities between SC offices be strengthened.

COMMENTS:

- The accelerator R&D program at all NP facilities is well focused on maximizing the facility performance and on future NP facilities, for the most part a future Electron Ion Collider (EIC). The next generation facility accelerator R&D for the EIC accelerator of both the competitively funded and the part funded from the operations base are guided by an integrated R&D plan for EIC accelerator R&D as recommended in the 2007 NP LRP.
- Maintaining the present level of accelerator R&D is important for the present and future health of accelerator-based nuclear physics research.
- Although targeted towards the NP facilities the NP supported accelerator R&D has applications beyond the NP needs. It is also the case that NP benefits from the Accelerator R&D performed in other SC offices. Good communication and even coordination between the SC offices of accelerator R&D activities is highly beneficial.

Process-specific Recommendations

Portfolio for the future

1. We recommend a systematic assessment of computational needs across all theoretical and experimental subfields, especially for the smaller-scale projects in the Medium and Low Energy programs to see if further coordinated efforts within NP are needed.

FINDINGS:

- Scientific research in many fields of nuclear physics relies heavily on the available computing resources. Also, experimental data collected by medium- to large-scale experiments require event-by-event reconstruction, processing, and inevitably matching Monte-Carlo simulations.
- This need is recognized by NP for the large experiments of the Heavy Ion program and is addressed via establishment and support of major computing facilities (RCF/BNL, NERSC/LBNL, CMS-Tier-II/Vanderbilt, CMS-Tier-III/MIT).
- We praise NP for leading these efforts and suggest continuing to monitor closely the developments, as computational constraints are known to influence the shape of experimental programs since constant growth of the experimental data volume leads to an increasing pressure on these facilities.

Process-specific Recommendations

Portfolio for the future

1. We recommend a systematic assessment of computational needs across all theoretical and experimental subfields, especially for the smaller-scale projects in the Medium and Low Energy programs to see if further coordinated efforts within NP are needed.

FINDINGS:

- Dedicated computing resources are also provided for the Theory program via SciDAC projects and CPU time buy-out at NERSC/LBNL. These resources provide high-performance parallel computing capabilities ideally suited for large-scale calculations used in LQCD and general many-body problems. The needs of “capability-computing” appear to be well taken care of by NP.
- We note that other types of theoretical calculations and computer simulations for smaller-scale projects or for problems that do not fit into a highly-parallel scheme seem to be left out of NP strategic planning.
- We find that no specific provisions exist at present for researchers who work on projects in the Medium and Low Energy programs to address the computational needs in theory and experiment. This is especially challenging for groups not directly affiliated with National Labs.

Process-specific Recommendations

Portfolio for the future

2. The COV endorses the creation of a distinct neutrino, neutron, and fundamental symmetries portfolio within the office.

FINDINGS:

- The COV heard from the AD that a new portfolio being considered to bring together neutrino, neutron, and fundamental symmetries (FS&N) research.
- Currently, the FS research efforts are located in three portfolios, with the majority in LE.
- The FS area has undergone growth following from significant successes and has been identified in the LRP as one of the four major strategic directions of the field. Experiments in this area typically require significant R&D and dedicated instrumentation. Establishing a new portfolio will provide coherence and more opportunities for strategic planning.

COV-specific Recommendations

- The COV recommends that the NP prepare a written response to the COV recommendations within 30 days of receiving them from NSAC as per guidance from the Office of Science. This response should contain a plan of action to address the recommendations in this report. A report card that details the progress on the COV recommendations should be sent to NSAC at the time of charging the next COV committee. We note that such a report card was not presented to NSAC in 2012 at the receipt of the current charge.
- The response to the 2010 COV Report was transmitted approximately nine months after receipt of the report from NSAC.

Other Comments to Note

Alternate and Backup Slides

Process-specific Recommendations

Monitoring projects and programs:

1. It is essential that the NP complete the filling of the Research Division Director and Medium Energy Program Manager positions.
2. The COV recommends that NP define the process and timeframes for the major reviews including the 2013 Comparative Review and communicate this to the field as soon as possible. It is important to provide the guidance to the PIs of the groups and to the panel as soon as possible.
3. The NP should perform further analysis of the workforce data and develop plans as needed to mitigate the impact of potentially constrained budgets on the workforce.
4. We recommend continued engagement with the User Facilities to establish facility performance metrics that more directly measure the scientific productivity of those facilities.
5. The COV recommends that the coordination and the information exchange of accelerator R&D activities between SC offices be strengthened.