National Synchrotron Light Source II (NSLS-II)
Science Advisory Committee

Meeting Report – March 23-24, 2017

Attending: Harald Reichert (Chair), Jingguang Chen, Bruce Gates, John Hemminger, Franz Hennies, Robert Hettel, Eugene Lavely, Ingrid Pickering, Soichi Wakatsuki, Jean Jordan-Sweet (representing UEC)

Regrets: Stephen Kevan, Janet Smith

Preamble

The Science Advisory Committee (SAC) met at Brookhaven National Laboratory (BNL) on March 23-24, 2017. The SAC members appreciated the welcome from management and staff. The committee congratulates staff and management on the achievements of the last six months, which have been accomplished as a result of the efforts of the entire NSLS-II team. In particular, the SAC is very pleased to have received the draft 5-year Strategic Plan.

The SAC was provided with a charge by the management and was asked to provide feedback on three major aspects of the facility development, which are detailed in Sections 1-3 of the report, as well as to comment on the development and operations of four specific beamlines (Section 4). Suggestions for future SAC meetings are listed in Section 5.

1. Strategic Planning

1.1. Is the new strategic plan actionable and appropriate for the facility at this point in its development?

Overall, the SAC agrees that the strategic plan is actionable and is pleased with its comprehensive and ambitious scope.

Additional specific remarks:

- The document in its present form is in fact more than a strategic plan as it also contains a working plan with concrete actions. For the next update, it might be worthwhile separating the two parts more clearly to make it easier for the reader (for example, stakeholder, staff member, user) to find the specific section of interest.
- One item that appears far down in the list is industrial research (p. 108), which is also not mentioned explicitly in the executive summary. It might be worthwhile to give it a prominent place for the benefit of high-level decision makers in particular.
- References are scarce throughout the document. Making additional reference to existing DOE and other reports might better highlight the match between the NSLS-II's strategy and the global goals defined by DOE/BES.

1.2. Is the balance in planned effort between the different areas; accelerator development, beamline operations and beamline development appropriate?

The NSLS-II is presently in a phase that emphasizes bringing beamlines on-line. The current priority for accelerator physics and operations is thus to commission new insertion devices and to provide beam conditions commensurate with the commissioning of each new ID, dipole or 3-pole wiggler beamline. Although a relatively small fraction of time is devoted to pure accelerator studies and development, this work has already produced some improvement in performance and material for several publications. As this beamline commissioning phase starts to wind down, more emphasis should be given to machine studies and development, which should lead to a continual improvement of source quality and performance, as has been demonstrated in other light source facilities. It is noted that the accelerator physics group is already receiving funding to study ways to reduce emittance; ongoing support for this type of work is encouraged both for the benefit of machine performance and for maintaining a vibrant and interesting work environment for physicists and engineers. This intention should be included in the strategic plan.

Regarding technological developments in general, the SAC recommends that each development be connected to scientific goals (for example, why is a segmented undulator useful?) and that these connections be clearly articulated in plans, reports, etc.

1.3. Are there areas that we are pursuing that we should not be?

The SAC had questions about the impact on electron beam quality – emittance and energy spread – of the high-field wiggler for the HEX beamline that is planned be sited at the NSLS-II. We subsequently learned after the meeting that this issue has been studied and there is very little negative impact. Nevertheless, given that high photon energy beamlines are more aptly matched with high electron energy storage rings like the APS, the committee asks if there may be other needs of the State of New York that would better use the NSLS-II potential, for example B-CDI for micro-electronics research?

1.4. Are there opportunities we have missed that we should be addressing?

Similar to our comments regarding technological developments in 1.2, the SAC recommends that specific beamline implementations at the NSLS-II be more closely tied to the overall scientific goals articulated in the strategic plan. For example, the description of each beamline in the strategic plan could include a sentence identifying Grand Challenges that will be addressed with that beamline. In addition, the SAC recommends that the executive summary of the Strategic Plan include a matrix showing the connection of the DOE mission and grand challenges of science to the beamline portfolio.

In future versions, the SAC recommends that each chapter in the plan have a “What you need to know” box to help it be more accessible to the non-specialist.

2. Operations and Beamline Development

The SAC was impressed by the continued rapid ramp-up of operations; less than three years after the first stored beam 19 beamlines are taking light, of which 12 are receiving general users and 4 more have progressed into science commissioning. The facility already has been rewarded by a substantial number of publications (51) based on measurements at NSLS-II beamlines and is accommodating a large number of users. This progress has only been possible by the extraordinary commitment of a very talented team at the NSLS-II. The SAC deems that, based on the achievements so far, it is timely for the facility to fine-tune its continued development strategy. In particular, a sole focus on the number of

unique users might bear the risk of leaning towards capabilities guaranteeing safe results at the beamlines at the cost of exploring more advanced and demanding methods.

Talking to beamline staff, the SAC sensed some frustration of not having enough room to develop more risky, cutting-edge capabilities. Staff would particularly want to be able to use BDT for this, which is in some cases giving just too few shifts to make such a development possible. It was expressed that portions of the BDT were chipped away in favor of increasing the number of new unique users. Staff expressed uncertainty about the standing of in-house research and expressed concerns about their career paths as scientists, having already spent several years solely on the construction of beamlines. Improving the standing of in-house research could be a way of rewarding staff and creating additional stimulus for further developments. Staff members perceive pressure to seek external funding while facing limited external funding opportunities. There is a desire by staff to gain more insight into how LDRD proposals are evaluated. The SAC invites NSLS-II management to give an account of its definition and valuation of in-house research at the next SAC meeting.

In the context of developing (even) more advanced capabilities at beamlines, it is the SAC's understanding that science commissioning time is intended for this purpose and wants to support the management and beamline staff in making sure that science commissioning time will be used as such.

2.1. Within accelerator operations, is the balance between maintenance, studies and operations appropriate? Are the plans for accelerator development appropriate and achievable?

The teams have developed an apparently very efficient process to bring new beamlines into operation within only a small number of dedicated shifts. However, with the large number of beamlines coming into operation this still amounts to quite some time devoted to start-up, which comes at the expense of temporarily reduced accelerator improvement and development. At the same time, and quite naturally, there is still room for further improvement of the accelerator performance. The SAC noted the limitations in vertical beam size due to the need to run with limited coupling caused by imperfections in some ID magnetic fields. The committee also noted observations of a long-term drift of the beam over a few hours by some microns as seen by the XBPM at IXS.

The SAC would welcome a more specific account of accelerator performance issues observed at beamlines (such as stability, beam size) and mitigation strategies at the next meeting.

The SAC has been made aware in this context by the user community of the technical difficulties at CSX1 and CSX2. The interference between these two beamlines continues to be a serious problem, imposing unacceptable limitations onto the spectroscopy experiments performed at CSX2. The SAC missed an adequate account of these issues at this meeting, although it was peripherally mentioned in the accelerator discussions. While such technical challenges are not unexpected when a new state-of-the-art facility is stood up, addressing the issues quickly, and with public disclosure, is essential. The SAC welcomes a specific detailed plan to address the issue, with a time line for *implementation*, as soon as possible.

However, the SAC deems prioritizing time to beamlines that are developing their user capabilities the right choice right now, and is of the view that in the near future, with fewer new beamlines to construct, a larger share of study time will and should become available for accelerator improvements.

The SAC thus encourages the accelerator division and the NSLS-II management to outline mid- and long-term goals for accelerator upgrades, in order to maintain a high standard of accelerator development and to satisfy existing intellectual resources, but also in order to make sure that future beamline developments are prepared for a possible significant improvement in the accelerator performance. The SAC puts forward a suggestion to team up with accelerator research groups at universities in the region in order to involve students in such studies. The NSLS-II, being the only new

green-field facility in the US for some significant time, and having the youngest suite of beamlines, is in a pole-position for a significant accelerator upgrade towards the end of the next decade.

2.2. Is the data acquisition, management and analysis strategy appropriate? Are we on the right path? Are the priorities right? Are there opportunities we have missed?

The SAC is pleased to see that the new Data Acquisition, Management and Analysis (DAMA) group has started out with an ambitious set of goals in a very short amount of time. The SAC endorses DAMA's holistic approach of a suite of tools to be used broadly for software development, also noting that beamline teams are looking forward to getting better access to such standardized solutions. Currently, however, there is an acute shortage of support on beamline and end-station controls on almost every beamline. Beamline scientists have to spend a substantial fraction of their time on control issues in order to make each user experiment a success, to the extent of affecting their morale in pursuing their science careers. This is especially notable at beamlines that have gone into "user operation", after which the focus of support group engineers and technicians shifts to the other beamlines in commissioning phase. In many cases, some sub-optimal solutions are used at beamlines, for example, using traditional data acquisition software such as SPEC, or local storage / local analysis capacities, due to the necessity of getting operational with very tight timelines and limited resources. Therefore, there is a strong need to develop a workable action plan for systematic replacement of those with more central and standardized infrastructure leading to better options for maintenance, improved capabilities and higher reliability. The presented collaborations within DOE facilities and others, the use of open source, and the intent to contribute to open source are examples of specifically valuable strategies pursued by the DAMA group.

There are many open positions that are currently being filled in the DAMA group. Once more resources are available, the development will certainly gain momentum. This is an opportunity to evaluate centralized versus distributed personnel resources, as well as to rethink pathways for communication and contact points between DAMA and beamlines. The many beamlines coming online are feeling pressure to provide adequate services in this area for users, while still lacking a clear picture of how much support to expect. While the SAC is strongly in favor of a good dialogue between different controls system and data acquisition functions, in order to make a best overall use of resources and leverage synergies, the SAC registered with slight concern a danger that DAMA resources could be drained towards general control system problem solving.

2.3. Are the plans outlined to further develop beamlines appropriate, given the current funding situation? Are there opportunities we have missed; to reduce costs, to obtain funding or to leverage other resources?

The SAC congratulates the team on the rapid advance of capabilities at many beamlines in parallel so far, and is pleased to see many good examples of improvements at beamlines, such as developments in advanced sample environments, data analysis workflow, etc. The strategic plans for many of the beamlines outline very specific and appropriate development plans for the near future, and can serve as a reference agreement between the management and beamline teams. The SAC encourages all the beamlines to update their strategic plans with vision and actionable development tasks as were presented for HXN and SMI beamlines in the 5-year NSLS-II Strategic Plan. Moreover, such task lists should be prioritized to help optimize improvements facility-wide.

The multimodal approach has significant potential to increase capabilities at many beamlines in a cost-effective way. Sample preparation needs should be met both with appropriate equipment and with expert support staff to ensure successful experiments. The SAC endorses the establishment of the Multimodal Taskforce and encourages the science staff to engage in these activities across the board.

The SAC listened carefully to the presented "value engineering approach" for construction of new beamlines and applauds the systematic evaluation of experiences at NSLS-II and other facilities in order both to make future projects more cost-effective and to explore the potential for streamlining operations support and maintenance. In particular, it was noted that the NSLS-II is now communicating lab standards and procedures more clearly when entering into new beamline and instrumentation partnerships. It is ultimately of huge benefit for both the facility and the external partners if instrumentation at the NSLS-II, regardless of funding sources, adheres to the same (high) standards and can be operated and maintained within the same framework. The SAC is pleased to understand that this "value engineering" differs from a standard industry approach such that it will not compromise a cutting-edge opportunity and is curious to learn more specific examples of the outcome of this exercise.

3. User Program

3.1. Is the user program making appropriate progress?

The facility is commended on the impressive ramp-up of the user program. In most cases, the user program is doing very well and growing impressively. It is clear that many potential users are aware of the capabilities that have emerged and currently are emerging at NSLS-II. The SAC is impressed with management's decision to form the User Experience and Multimodal Taskforces, since these will solicit useful input and place proper importance on addressing these aspects of the User Program. Multimodal access is a logical step in the evolution of how synchrotron facilities should be used to solve scientific and technological problems, rather than to emphasize techniques.

3.2. Does the proposal review and allocation produce the appropriate balance between new users and experienced users?

The SAC recognizes the need, both of the facility and of the individual beamlines, to increase the overall number of new users on operational beamlines. Since new users with no experience in writing NSLS-II proposals tend to receive poorer scores, the facility has implemented a -0.2 improvement in scores of proposals that are denied beam time but are borderline in their first cycle, to increase their chance of success in obtaining beam time in the next cycle. The net result is that, in cycle 2017-2, the numbers of new proposals allocated exceeded returning proposals allocated through beam time requests on all but two beamlines (HXN and CHX). Thus, the goal to increase the number of new proposals is being realized.

However, the SAC cautions that having a greater proportion of new users on an operating beamline places additional stress on beamline personnel. New users almost certainly will need considerable support from beamline staff in executing their experiments. Moreover, in the early stage of operations, all users are "new", even if the group has run on beamlines elsewhere for years. Thus, the staff of more mature beamlines have spent a considerable amount of time to date supporting all users, while simultaneously pushing ahead with development and commissioning of other aspects of the beamline.

In contrast, returning experienced users are less likely to burden staff with user support needs and are more likely to produce publishable results quickly. Indeed, in cases in which more than one cycle is needed before a publication ensues, it is essential that the user groups have the opportunity to return. The SAC notes that, in the longer term, it is important to build a loyal core of expert users of each beamline. Such users not only run the beamline well and are productive in their scientific output including publications, but also contribute constructive feedback about the state of the beamline and drive beamline developments of their own, thereby providing inputs that are helpful to new users and increase their efficiency.

As stated in the Fall 2016 report, it will be important to monitor closely the number of repeat users as a strong metric of user satisfaction, since dissatisfied users are more likely to go elsewhere in the long run. While NSLS-II currently is at the forefront of synchrotron radiation facilities, in a few years there will be many alternatives coming on line, even in the USA. As the NSLS amply demonstrated, a strong core of dedicated, competent, and well-publishing users includes scientists who are much more likely to return to the facility even when newer facilities are available, if they feel that they have been well-served in their experience. It is important to be attentive to building up that loyal core of experienced and expert users even at this early stage.

Thus, there are many operational reasons why returning users may be preferred. These should be balanced carefully with the drive for increased user headcounts and institutions served (metrics of more questionable value from a scientific standpoint), and the new research opportunities and connections that new users bring.

3.3. Are there other beamtime access mechanisms we should implement?

The SAC judges that most eventualities are well covered by the access mechanisms currently in place. If anything, the facility risks making it too challenging for users to know their options. However, the SAC is of the opinion that the portfolio is appropriate currently.

The SAC commends the creation of the joint SAXS / SANS proposal mechanism and strongly encourages the implementation of the equivalent for powder diffraction. The mechanism for joint NSLS-II / CFN proposals is another important direction to leverage multiple BNL capabilities. The SAC is pleased that proposals for multiple beamlines within the NSLS-II itself are in the planning stage and strongly endorses this capability. Proper cooperation between beamlines should include such aspects as common sample mounts and compatibility of data output, which are already under consideration in some cases. The SAC looks forward to seeing publications that acknowledge results from multiple NSLS-II beamlines and complementary BNL facilities.

The SAC is pleased to hear that the Block Allocation Group (BAG) proposals have had good uptake on the structural biology beamlines, with 15 participating institutions and 17 allocated proposals from cycles 2017-1 and 2017-2. Indeed, this mechanism is so popular that 50% of the user time, the maximum allowable, is already allocated. This may have the consequence that there will need to be a BAG application season (2019-1) on these beamlines, during which the established BAGs will compete with new BAG proposals; given the interest, competition may be fierce at that time. Following the popularity of the structural biology BAGs, the SAC encourages the extension of the BAG mechanism to other suitable beamlines. However, the SAC cautions that while beam time assignment to BAGs is efficient, it must be carefully monitored to ensure that BAGs do not create a disadvantage to research groups from institutions that either are smaller or have only one research group working in the BAG-able field.

3.4. Additional comments on the user program

The SAC heard with concern the trend that several user groups are showing up with few individuals, or even just one person, to carry out their experiments. This situation is unfortunate and inefficient, since this puts more strain on the beamline personnel and inevitably makes the group less productive. It is exacerbated, presumably, because NSLS-II beamlines are significantly faster in data collection than their counterparts elsewhere, which may catch users out. The SAC heard of at least one beamline that routinely telephones users ahead of beamtime in order to make clear certain points about the experiment, especially when they may be different from those at beamlines elsewhere. While this takes time away from other important beamline tasks, the payback in terms of improved preparation and better execution of the experiment may make this procedure worth encouraging on other beamlines.

Noting the poor return statistics (below 10% in three successive years) for the end-of-run form, the SAC suggests making the completion of this form a requirement in some way. Possible ideas are requiring the form to be completed before a user logs out or transfers data, or before new beamtime requests can be submitted. Persistence in encouraging users to fill out the end-of-run forms might also help. The SAC also suggests regular review of the form to ensure it remains streamlined and relevant.

4. Focus on Specific Beamlines

The SAC heard brief presentations on four of the beamlines. For each the SAC was asked to comment on specific aspects of the beamlines.

4.1. IXS

The SAC congratulates the team on making the rather complex instrument operational quickly after the technical commissioning. Incremental improvements over time should bring the beamline to target performance, in particular with respect to the final energy resolution. The first results demonstrate that the instrument is capable of tackling its scientific mission, which was built mainly around investigations of low-energy excitations at small wavelengths (the original science case for the beamline). The team should now focus on developing a strong user community around mesoscopic/disordered materials. A point of concern is temperature instability. Since counting times are long and the instrument is very sensitive to temperature drifts, it is mandatory to achieve sufficient temperature stability in the hutch. The team should focus on improvements with moderate investments where a clear path is emerging. An upgrade of the source with a new ID seems more unrealistic in the current funding climate.

4.2. CHX

- *Is the beamline on track to develop world-leading programs? If not, what should be done?*

The technical capabilities are on track to support world leading research activities. Bottlenecks with controls currently delay the development of the full beamline potential. In the mid-term, support for research (including post-docs, PhD students) is needed to drive world-leading programs at the beamline and to provide these capabilities to the user community later on.

- *Does the beamline have the correct mix between commissioning new capabilities and running a user program?*

The distribution of beamtime is now well balanced between commissioning and the user program. Beamline development (for example, controls, kinoform lens development, etc.) is limited by resources other than the availability of beam for commissioning tasks. In the earlier days, too much emphasis was put on early science commissioning, resulting in a very significant effort to collect some data with a completely unfinished beamline. It seems that this time would have been better spent in furthering the completion status of the beamline. However, the current mix now appears well balanced.

- *Is the user program looking healthy for this point in its development?*

CHX received 20+ proposals for the last cycles, apparently about half of them receiving beamtime. The vast majority of proposals are from users outside of BNL and the quality is high (current cut-off score for beamtime is 1.7). Besides well-established X-ray Photon Correlation Spectroscopy (XPCS)

user groups, CHX is also attracting productive new user groups from a wide range of science backgrounds. It is noteworthy that there was no XPCS user community at NSLS.

- *Is the future plan for the beamline appropriate? Are there opportunities we are missing that we should go after? Conversely, is the beamline pursuing directions that it should not?*

The future development of the beamline should focus on pushing the time resolution in coherent scattering by improving focusing optics, build out of the pink beam option and staying at the cutting edge of fast pixel detector developments. The primary focus should remain on XPCS in wide and small angle scattering geometries.

4.3. LIX

- *Is the beamline on track to develop world-leading programs? If not, what should be done?*

The beamline commissioning has progressed well and there are already some exciting results, for example the SAXS/WAXS 2D mapping of a plant leaf. Tomography measurements with a user group are planned in 2017-3. These experiments will showcase the high brightness of the beamline.

- *Does the beamline have the correct mix between commissioning new capabilities and running a user program?*

The beamline started general user beamtime from 2017-1 with a healthy increase in 2017-2. The balance between science commissioning and general user beamtime is appropriate for the first year but will need to transition to slightly higher percentage of general user time in the next few years while keeping enough time for commissioning of the planned new capabilities.

- *Is the user program looking healthy for this point in its development?*

The user program of the LIX beamline commenced about a year ago and is in its early stage. So far, the numbers of proposals allocated beamtime are exactly the same as those submitted. This is understandable at the beginning but the SAC hopes to see a rapid increase in the numbers of proposal submissions and experiments. BAG allocation with FMX/AMX and rapid access mode will increase the productivity of the beamline but the rapid access mode will also mean that more resources will be required on the part of the beamline team. The SAC also notes the importance of a joint call for proposals with ORNL's SANS beamline, which will help address the DOE BER's vision of complementary use of DOE national facilities.

- *Is the future plan for the beamline appropriate? Are there opportunities we are missing that we should go after? Conversely, is the beamline pursuing directions that it should not?*

The SAC welcomes the LIX team's plan of staged installations of new capabilities such as the 6-axis robot (2017), detector (2018), and enhanced computing. The new L-shape WAXS detector is a very promising addition of capabilities, which will allow a much wider azimuthal coverage of WAXS data from oriented samples such as fiber and membranes. The details of the computation enhancement plan were not presented and the SAC encourages a presentation on computation challenges and a consolidated life science strategy at the next SAC meeting. The installation of a helium chamber for low x-ray energy anomalous scattering is quite challenging and recommended only after the successful installation and deployment for user experiments of the other new capabilities.

4.4. ISS

- *Is the beamline on track to develop world-leading programs? If not, what should be done?*

Yes. The beamline takes advantage of the high flux and provides a combination of high-resolution spectroscopies, high throughput capabilities, and measurements under in-situ conditions.

- *Does the beamline have the correct mix between commissioning new capabilities and running a user program?*

The push for new unique users over repeating users and for publishing in high-impact journals might hurt the user program at the early stage of commissioning.

- *Is the user program looking healthy for this point in its development?*

It is too early to tell. It is important to keep a proper balance between new unique users and repeating users in the near future.

- *Is the future plan for the beamline appropriate? Are there opportunities we are missing that we should go after? Conversely, is the beamline pursuing directions that it should not?*

The completion of a gas handling system and in-situ reaction cells should be high priorities because many users would need them for in situ measurements. The proposed high-throughput measurements should be very useful for the user community, although it is critical to develop in parallel capabilities for data analysis/storage and sample tracking of a large number of samples from different research groups.

5. Items for Future SAC Meetings

The SAC wishes to make the following recommendations for upcoming meetings:

5.1. The SAC welcomes NSLS-II management to give an account of its definition and valuation of in-house research at the next SAC meeting.

It would be of interest to learn if extraordinary individual effort is recognized and rewarded. Recognition for published research is obvious. However, there are many other factors essential for NSLS-II success, such as:

- the development of the beamlines and corresponding initiative and ingenuity for solving the difficult problems;
- the sheer time dedicated for setting up any capability, be it hardware or software;
- contributions to the team ethos or even people management;
- the hard and dedicated labor necessary for successful operations (and well beyond each individual's nominal job description);
- out-sized efforts in support of guest users to ensure successful experiment design, sample preparation, data collection, and post-experiment processing.

Therefore, consider "impact awards" and if something similar is already in place, consider elevating and enhancing the program. Many companies have such programs or use other means such as "bonuses". Discretionary funds available to management might be well-directed to such purposes. If such merit awards are not available to government employees, other options should be considered that will promote career development including "free time" for individual pursuits, larger fund-pools for individual research initiatives, more funds for conference attendance or for collaboration of any form, more latitude and more funds for applying for external funding, etc.

5.2. The SAC would welcome a more specific account of accelerator performance issues observed at beamlines (such as stability, beam size) and mitigation strategies at the next meeting. The SAC is curious to learn about and discuss the stability task force. The SAC would like to see a specific plan to address issues at canted beamlines (CXS) with a time plan.

It will be of interest to understand more fully the impact of beam stability for each beamline and technique. For example, what is the impact on throughput, duty cycle, and even guest user experiment success as a consequence of stability issues? Are set-up times and stability issues properly communicated to users so that they may request an appropriate or reasonable number of shifts in their proposals?

It is no doubt technique and/or end-station dependent, but is stability best mitigated at the beamline level or the accelerator level? Ideally it is addressed at the latter, and resolved once and for all. However, it may be worth asking if there are either post-processing techniques or in-line stage motions that can compensate for stability. Alternatively, if stability can somehow be measured via one beamline (or other means), can that information be communicated to other beamlines as input for technique- or station-dependent mitigation? These particular suggestions may not be reasonable, but the SAC encourages examination of the stability issue from multiple perspectives in order to increase the overall utility of the facility for in-house and guest user research.

5.3. The SAC is curious to learn more specific examples of outcomes of the "value engineering" exercise.

5.4. The SAC would like to discuss potential new opportunities for funding and collaboration.

5.5. The SAC encourages a presentation on the computation challenges associated with LIX and the consolidated life science strategy in the next SAC meeting.

5.6. Additional logistics.

Visits with beamline personnel at the next SAC meeting could combine beamline tours with roundtable discussions, ideally in that order. Tours give staff a chance to show off their beamlines, and resonate with committee members' interests. Roundtable discussions are more conducive to hearing staff concerns. Interactions could be maximized by more SAC sub-groups having fewer members. The SAC stresses the continued value of meeting with staff in absence of management, as has been done for several meetings.