

**U.S. Environmental Protection Agency
Office of Research and Development**

**BOARD OF SCIENTIFIC COUNSELORS
EXECUTIVE COMMITTEE MEETING**

**Washington, DC
May 30-31, 2000**

Tuesday—May 30, 2000

Introduction and Overview of the Meeting

Dr. Costel Denson (University of Delaware), Chair of the Board of Scientific Counselors (BOSC), called the meeting to order at 1:08 p.m. He noted that this would be his last meeting as Chair of the BOSC. He welcomed everyone to the meeting and asked the Executive Committee members and others in the room to introduce themselves. Dr. Denson pointed out that one of the primary goals of the meeting was to finalize the reports on the review of the particulate matter (PM_{2.5}) research program. Other topics on the agenda that will be addressed at this meeting include future directions for the BOSC and the process for nominating new Board members. He asked for comments on the agenda. Dr. Michael Kavanaugh (Malcolm Pirnie, Inc.) asked if there would be time to discuss the PM_{2.5} reports. He suggested limiting the BOSC Nominating Committee discussion to allow more time to complete those reports. Dr. Denson agreed that additional time should be allocated to completing the reports and suggested that some time could be taken from the session on unfinished business.

Approval of February Meeting Minutes

Dr. Denson asked for comments on the minutes from the February meeting. Dr. Marilyn Brown (Oak Ridge National Laboratory) had several comments regarding the minutes. Ms. Beverly Campbell (SCG) made note of those changes and agreed to provide corrected minutes in the morning. Dr. Denson asked for a motion to approve the minutes with the specified changes. Dr. Brown made a motion to approve the minutes and Dr. Kavanaugh seconded the motion. The minutes from the February meeting were approved unanimously.

Discussion of Final Science to Achieve Results (STAR) Program Review Report

Dr. Brown highlighted the changes that were incorporated into the STAR Program review report following the discussion at the February meeting. She indicated that much of the passive language in the earlier draft had been converted to active language to make the report more conclusive. Dr. Brown noted that there was some contentious discussion regarding the 10 percent success rate for the STAR Program. She reported that the Subcommittee members objected to the suggestion of tightening the scopes of the grants. Instead, they suggested that the Agency refine its research goals and provide additional information to potential grantees with regard to budgets and relevancy criteria. They stressed that this should be accomplished without sacrificing the creativity of the Principal Investigators (PIs).

Dr. Brown pointed out that the Research Strategies Advisory Committee (RSAC) did not agree with the suggestion to accelerate the availability of research results through peer-reviewed conference proceedings. Therefore, reference to such proceedings was removed from the primary recommendations in the Executive Summary of the report. Dr. James Bus (Dow) commented that although the quality of proceedings could never reach that of peer-reviewed journals, he thought this approach would be useful in disseminating research results faster. Dr. Brown noted that some specifics were added on the timeframe for full evaluation of the STAR Program's impacts. The report also recommends that procedures be in place within the next 2 years so that the full evaluation can be initiated.

As part of the review, the Subcommittee wanted to conduct a Project Officer work load analysis, but Dr. Brown pointed out that there was inadequate time for such an analysis. Therefore, the report recommends that an in-depth analysis of the Project Officer work load be conducted in the future. In response to Dr. Ann Bostrom's (Georgia Institute of Technology) previous comment regarding the communication plan, the Subcommittee included a recommendation to formalize communication efforts. With regard to Dr. Bus' previous comment concerning the participation of not-for-profits in the STAR Program, Dr. Brown noted that the final report includes a statement that there is no reason for the STAR Program to limit applicability to academia.

Dr. Denson commented that the Science Advisory Board (SAB) was uncomfortable with the speed of the process of this review effort. He thought that the experience gained in participating in the STAR Program review will be helpful to the BOSC in conducting joint reviews with the SAB in the future. He described the basic process for the STAR Program review. The BOSC developed a number of questions for the STAR Program review; these questions were merged with those of the RSAC and a charge to the Subcommittee was developed in November 1999. The Subcommittee (which included members of the RSAC and BOSC) met in December 1999 to discuss the charge and develop a plan of action. The full Subcommittee met in January 2000, and soon after produced a working document that subsequently was shared with the BOSC Executive Committee. At the February meeting, the BOSC members discussed the draft report and provided comments to Dr. Brown, who agreed to report them to the STAR Review Subcommittee. Shortly after the February BOSC meeting, the Subcommittee met to discuss the review comments.

Dr. Denson noted that the SAB liked the use of the self-study questions and plans to adopt this approach for future reviews. He suggested that the BOSC develop guidelines for joint reviews. Dr. Brown mentioned that the report has received greater visibility because it was the product of two advisory boards. She added that the roles of the Designated Federal Officers (DFOs) should be defined from the outset of a joint review. Should one of the DFOs be assigned responsibility for the joint review? Dr. Brown asked Dr. Peter Preuss (ORD/NCER) to comment on the impact of the report.

Dr. Preuss indicated that the report has been well received. He noted that the Chair of the RSAC referred to the information in the report during his testimony before Congress. Based on the recommendations/findings in the report, Dr. Norine Noonan (Assistant Administrator, ORD) has approved the hiring of additional staff to help administer the STAR Program. Dr. Preuss reported that one of the new hires will focus on communications. He also mentioned that EPA has initiated discussions with the National Academy of Sciences (NAS) regarding evaluation of the STAR Program. This long-term effort will include the development of metrics, gathering of data with regard to the metrics, and substantive review of the STAR Program. Dr. Preuss asked if the BOSC would like to be involved with this effort if EPA decides to involve NAS in the evaluation. Several members of the Board indicated their interest in continued involvement with the STAR Program evaluation. Dr. Denson asked if the BOSC will receive a response to the STAR review report from EPA. Dr. Preuss replied that a response will be provided by the Assistant Administrator for the Office of Research and Development (AA/ORD).

Particulate Matter Review Draft Report Discussions

Dr. Denson pointed out that most of the PM Subcommittees failed to meet the deadline for revising the reports identified at the last meeting. He stressed the importance of completing these reports in a timely manner and agreed to work on the Integration section (which had not been drafted). Four of the six sections were discussed at the February BOSC meeting and specific comments were included in the minutes from that meeting. Dr. Denson reminded the Board that the Epidemiology report was not discussed previously because the Subcommittee Chair and Vice Chair were not present at the February meeting. (The Integration report was not discussed because it had not been drafted.) Only two reports were revised following the February meeting—the Exposure report and the Risk Management report. Dr. Denson suggested that the Board come to agreement about the various sections and finalize the reports within the next several weeks. Ms. Shirley Hamilton (ORD/NCER) mentioned that Dr. John Vandenberg (ORD/NHEERL) has requested a copy of the final report. She stressed the importance of completing this task before August 2000.

Exposure Subcommittee Report

Dr. Bostrom, Vice-Chair of the Exposure Subcommittee, reported that she had revised the report to address the comments that were included in the minutes from the February meeting. The introduction section was added, which very briefly describes the exposure program. She noted that information from the self-study responses is included (often verbatim) in the report. The recommendations have been identified in bold type in the text of the report and listed in the last section. Dr. Bostrom pointed out that the material on page 5 should be included in the Integration section. She noted that the list of recommendations is almost exactly the same as the bolded sentences in the text; however, they have been rearranged into a logical order. Dr. Denson asked about the Subcommittee's conclusions. Dr. Bostrom replied that she thought the conclusions were to be identified and discussed in the Integration section. The Board members agreed that recommendations would be accompanied by conclusions and findings in the text of the sections; however, only the recommendations should be in bold type.

Dr. Bostrom indicated that she revised the report to address the lack of social science expertise within ORD. She asked if EPA could provide information regarding the Atlanta study to address the reviewer's comment regarding clarification of that study (i.e., is the Atlanta study the ARIES study?). Dr. Preuss agreed to provide that information. Dr. Bostrom pointed out that the word "guidance" has been replaced with "coordination." The revised report also acknowledges that the STAR Program is relatively new, justifying the limited number of publications. She reported that the paragraph on working with the Office of Air Quality Planning and Standards (OAQPS) has been rewritten to better explain the importance of this collaboration. Dr. Bostrom noted that she did not add more on metrics as was suggested at the February meeting.

Dr. Preuss pointed out that the hiring freeze mentioned in the report has been lifted; therefore, the Subcommittee may want to change the text. He also noted that the report states that the National Exposure Research Laboratory (NERL) responded to the self-study questions; however, it was actually Dr. Gary Foley who responded to the questions on behalf of ORD (not just NERL). Dr. Bostrom agreed to address Dr. Preuss' comments.

Dr. Brown suggested that the self-study question responses be included in the report to enable the reader to validate the recommendations and conclusions. The Board members agreed that the responses would be appended to each section of the report.

Atmospheric Sciences Subcommittee Report

Dr. Mitchell Small (Carnegie-Mellon University), Chair of the Atmospheric Sciences Subcommittee, indicated that there were a number of comments from the last meeting that he had not addressed. He agreed to prepare an introduction section and to revise the format of the report as was suggested during the February meeting. One of the comments from Dr. Vandenberg concerned the 1:10 ratio mentioned in the report. Dr. Small agreed to discuss Dr. Vandenberg's comment with the other members of the Subcommittee and revise the report to provide EPA more guidance on this issue, if possible. Dr. Brown expressed some concern about recommending a specific ratio in the report. She suggested that the Subcommittee recommend that more resources be made available for data analysis. Dr. Small replied that if the Subcommittee members cannot validate the ratio then it will not be included in the report.

One Board member pointed out that the items listed in the second recommendation under the second question (regarding new science development and science integration) need not be sequential. Also, the role of local versus nonlocal universities should be clarified (mentioned on page 3 under Question 4). It was suggested that this recommendation be reworded. Dr. Small agreed to insert a list of the recommendations at the end of the report. He also agreed to include Dr. Vandenberg's comment regarding EPA's limitation of international travel in the text under Question 5. Dr. Denson recommended that the wording and the specificity (in terms of what needs to be done) of the recommendations be strengthened throughout the report. He asked if there was any text to be moved to the Integration section. Dr. Small replied that he had prepared a list of recommendations for inclusion in the Integration section, which he would provide to Dr. Denson.

Epidemiology Subcommittee Report

The Chair and Vice-Chair of the Epidemiology Subcommittee were not present at the meeting; therefore, Dr. Denson agreed to contact Dr. Thomas Burke (Johns Hopkins University) by telephone that evening to discuss the report and to request that it be revised in accordance with the approved format.

Toxicology Subcommittee Report

Dr. Bus, Chair of the Toxicology Subcommittee, pointed out that the Toxicology report was organized around the self-study questions. Dr. Brown suggested that the self-study questions be identified in the Introduction and then used as the headings for the various sections of the report. Because the members did not agree on this suggestion, Dr. Denson decided that the Subcommittee Chair should determine the most appropriate section headings for the report. It was agreed that the Subcommittee reports would address the self-study questions and the Integration section would address the charge questions.

Dr. Preuss mentioned that the recommendation regarding increased flexibility in money allocation was not clear. He asked for clarification of the term "contingency event." Could it be a volcanic eruption? Dr. Bus replied that it refers to a major environmental event (like a volcanic eruption or forest fire), and having the funds available to respond to such an event. Dr. Bus agreed to add some examples to the text. Dr. Preuss also questioned one of the recommendations under Charge No. 6 regarding the reluctance of ORD management to approach Congress to request a reallocation of monies. He asked if the wording of that recommendation conveyed the intent of the Subcommittee members. Dr. Bus pointed out that the statement will be reviewed by those working on the Integration section. Dr. Brown suggested that the recommendation be reworded; for example, "It is difficult to acquire additional fiscal resources during a fiscal year ..." Dr. Bus replied that the Subcommittee wanted to make the point that, unlike the private sector, a federal agency does not seem to be able to change its budget allocation midstream. Dr. Bostrom suggested that the recommendation could be reworded to encourage EPA to seek funds for contingency events. Dr. Bus indicated that he is willing to reword the recommendation, but wanted to retain the general idea. Dr. Preuss pointed out that budget reallocations should occur within ORD and not involve

Congress. Dr. Bus noted that some of the ORD staff interviewed by the Subcommittee indicated that ORD management was reluctant to reallocate resources. Dr. Denson agreed that including the reference to Congress in the recommendation is inappropriate. He suggested that the Subcommittee recommend that ORD management be more flexible with regard to resource allocation to enable responses to contingency events. He also mentioned that there may be a communication problem between ORD management and the staff with regard to budget allocation. Dr. Preuss commented that ORD management can make some changes in budget allocation; however, it may require Congressional approval to, for example, move resources from water to PM. He also mentioned that ORD goes to Congress regularly to make changes in the budget allocation. Dr. Preuss suggested that it may indeed be a communication problem. Dr. Bus agreed to revise the report based on these comments.

Assessment Subcommittee Report

Dr. Rae Zimmerman (New York University), Chair of the Assessment Subcommittee, asked if the Assessment report was too long relative to the other reports. The Board agreed that the report's length was appropriate. She noted that the section headings correspond to the self-study questions, but are not phrased as questions. Dr. Denson responded that the format and headings in the report were acceptable. Dr. Brown suggested that the self-study questions be included in the introduction of the report. Dr. Zimmerman noted that the recommendations are in bold type in the text and listed at the end of the report. Dr. Bus asked if the some of the steps in the process described in "Research Inputs to AQCD" and "AQCD Development" are out of sequence. Dr. Preuss asked Dr. Zimmerman to clarify the point of those paragraphs. She replied that they are intended to focus on the process of interaction during the development of a criteria document. Dr. Bus commented that interaction is positive and necessary, but needs to be strengthened. He suggested that the two sections be combined. Dr. Brown wanted to retain the first paragraph under "Research Inputs to AQCD." It was suggested that the first sentence of the second paragraph in that section be deleted. Dr. Zimmerman agreed to combine the two sections and drop the confusing sentence. Dr. Jerald Schnoor (University of Iowa) commented that the main point is that ORD must incorporate the science into the criteria document, despite the tight time constraints. Therefore, interaction is extremely important.

Dr. Zimmerman quickly reviewed Dr. Vandenberg's comments and noted that the report includes both strengths and recommendations. Dr. Bus asked if there was anything in the report that should be moved to the Integration section. Dr. Brown replied that the Subcommittee had prepared and submitted a list of bullets for inclusion in the Integration report during the October meeting in Raleigh, NC. Dr. Denson asked Drs. Zimmerman and Brown to review that list of bullets to ensure it is complete.

Risk Management Subcommittee Report

Dr. Kavanaugh, Chair of the Risk Management Subcommittee, mentioned that Dr. Bonnie McCay (Rutgers University) had presented the report during the February meeting, and he added that the suggestions made by the Board members at that meeting had not been incorporated. He agreed to rework the introduction based on suggestions from the Board and to reformat the report and organize it around the self-study questions. Dr. Kavanaugh pointed out that the Subcommittee had provided a list of bullets for the Integration section during the October meeting; those bullets, which are included in Section IV of the report, will be moved to the Integration section. Section IV will be replaced by the Summary and Recommendations section to be prepared by Dr. Kavanaugh. He also agreed to modify the wording on incentives (see February meeting minutes) and to rewrite the recommendations so that they are clear. Dr. Kavanaugh asked for a copy of Dr. Vandenberg's comments and Ms. Campbell agreed to send him the comments by e-mail that evening.

Dr. Schnoor reminded the Board of Dr. McCay's earlier comment that the Subcommittee viewed risk management differently than ORD's National Risk Management Research Laboratory (NRMRL). He

added that NRMRL viewed risk management from an engineering perspective (e.g., emission control); the Subcommittee viewed risk management as a tool for managing risk.

Dr. Kavanaugh noted that the Subcommittee members thought the “what if” scenarios prepared by NRMRL were useful in developing alternative engineering strategies for managing components of particulates. The Subcommittee members believe this direction is promising for NRMRL.

Dr. Kavanaugh reported that the Subcommittee members believe that NRMRL has a role to play in the particulate matter research program, despite that fact that the National Research Council (NRC) report neglected to include risk management as a priority. He indicated that the Subcommittee members want to convey the message that it is important for NRMRL to be involved. Dr. Denson commented that this is an opportunity for the BOSC to point out NRC’s oversight and to recognize that NRMRL should be brought into the program as an equal partner. Dr. Small suggested that NRMRL’s role be focused on control strategies, not just control technologies; NRMRL should be conducting research to determine the best strategies for managing particulate matter. Dr. Kavanaugh pointed out that the NRC report mentioned control strategies but not risk management. Dr. Small indicated that NRMRL should be investigating whether we will be able to manage the risk and at what cost to the nation. Dr. Preuss mentioned that the Program Offices are doing those types of analyses. Dr. Small asked who was doing the research to support those analyses. He believes that the BOSC should support such a role for NRMRL and recognize the fact that NRMRL may not have the expertise required. Dr. Zimmerman suggested that the report identify the expertise required for the research. Dr. Brown pointed out that some of the required expertise may reside in the Program Offices.

The Subcommittee members agreed that risk management research can be conducted in parallel with the other research efforts. The results of the risk management research could help focus/modify future research efforts. One member suggested including the comment that ORD has lost some opportunity by not conducting risk management assessments early in the process to establish research priorities. It is important to develop the capability to analyze risk management strategies. Dr. Brown suggested an increase in interaction between the policy staff examining projected benefits and the NRMRL staff conducting risk management research. Dr. Small commented that the report should emphasize feedback from the risk management research efforts for future research prioritization. Dr. Kavanaugh agreed to rewrite the report to incorporate these suggestions and ideas. He indicated that a revised report would be available by June 14, 2000.

Dr. Preuss mentioned that there are two products that result from this process—the staff paper that follows the air quality criteria document (AQCD) and the regulatory impact analysis. There clearly is a role for risk management research to support the regulatory impact analysis, which examines the costs and benefits of different scenarios and how they can be achieved. Dr. Preuss agreed to provide copies of these two documents to the BOSC members. He also agreed to send Web addresses so that the Board members can access the information produced by the Office of Air and Radiation (OAR). Dr. Preuss pointed out that there are some errors in the report. For example, the Office of Exploratory Research has not existed for the past 5 years. He agreed to provide his comments to Dr. Kavanaugh.

Dr. Schnoor asked if EPA was as well integrated as ORD with regard to research. Dr. Denson replied that Dr. Dorothy Patton (ORD) made a presentation to the SAB on the research that is being conducted throughout the Agency (not just ORD). Dr. Zimmerman asked if this information was available on the Web. Dr. Preuss agreed to provide the BOSC with copies of the report/presentation.

Session Wrap-Up

In closing the day's session, Dr. Denson indicated that he will discuss the Epidemiology report with Dr. Burke and convey to him the need to clearly identify recommendations and to reformat the report. The Board members agreed that the current draft includes findings rather than recommendations.

Wednesday—May 31, 2000

Dr. Denson called the meeting to order at 9:00 a.m., and quickly reviewed the day's agenda, which included an address by Dr. Noonan on the budget and presentation of plaques to the departing BOSC members, appointment of the new BOSC Chair, discussion of future directions and the Nominating Committee process, and discussion of the Integration section of the particulate matter report. The Board members agreed that additional time may be required for discussion of the Integration report and the recommendations to be included in that section.

Budget Update

Dr. Noonan reported that EPA's budget went through the House Subcommittee markup about 1 week ago. She noted that the Subcommittee received \$400 million less than the President's request. Therefore, EPA's budget was reduced below the President's request; however, the S&T account was actually above the President's request with essentially no earmarks. She anticipates there will be about five earmarks (most associated with drinking water), compared to the 40 earmarks last year. If there are fewer earmarks than last year, ORD may actually get more funding (compared to last year) for its research programs. Dr. Noonan pointed out that the full Committee will be marking up the bill in the next week or so. The Senate will probably initiate their process in late June, and she expects that the Senate will identify additional earmarks.

The Operation Plan has been approved and, although EPA had some reductions, the Agency has initiated Coastal 2000 and the Western Pilot (an extrapolation of EMAP into the Midwest). In addition, EPA has begun working on the solicitation for the ninth (and final) children's environmental health center. The RFA is expected to be issued shortly. Dr. Noonan reported that the solicitation for the Hazardous Substance Research Centers closed about 6 weeks ago. The Agency received 27 proposals for the five (maximum) centers to be funded. She indicated that the solicitation requested that the Centers provide EPA with a plan for becoming self-sufficient. For now, the Centers will be funded by ORD as well as the Office of Solid Waste and Emergency Response (OSWER), which co-funds the effort because of its interest in outreach and communication of technological innovation.

Dr. Noonan indicated that ORD's planning efforts for FY 2002 have been completed. The process that was implemented last year was replicated (i.e., input from the Research Coordination Teams). Dr. Noonan indicated that the budget process went very smoothly this year because the Program and Regional Offices are comfortable with the process. She reported that ORD is evaluating that process again because of its high overhead—an inordinate amount of time is spent on \$80K projects. ORD is trying to combine areas so that the deliberations can focus on larger portions of the budget.

Dr. Noonan reported that ORD has revamped the regional scientist program. The purpose of this program was to provide scientists from ORD to the Regional Offices for a period of 1-2 years. The regional scientists would gain an understanding of the regional issues and come back after 2 years with knowledge that would enrich ORD. However, the program never quite worked that way. It was very difficult to get regional scientists to go to certain Regions; for other Regions, the regional scientists did not want to return to ORD after their time at the Region, and the Regional Offices did not want the scientists to leave. After trying unsuccessfully to make this program work, ORD decided to completely

redesign the program. Dr. Noonan stated that ORD will now provide 1 FTE and funding to the Regional Offices to create a regional scientist program in their respective Regions. The Regions can recruit who they want to fill this position. ORD also is providing grant money to allow the Regions to address issues of interest to them.

ORD has committed to conducting three workshops, similar to the asthma workshop that was held about 18 months ago. That workshop was enormously successful and the Regions found it very beneficial, probably because they were involved in crafting the workshop. The topics for the three workshops to be conducted will be selected by the regional scientists. Dr. Noonan noted that it is much easier to get ORD experts to do the workshop than to move to the Region for 1-2 years. She added that Dr. Patton and her staff are meeting with each Region to obtain input on workshop topics. Dr. Patton has reported that the Regions are very positive about the change in the regional scientist program and these workshops. Dr. Noonan pointed out that the regional scientists can serve as points of contact in the Regions for science planning. She also mentioned that ORD is working on six multi-year research plans—particulate matter, drinking water, global change, endocrine disruptors, EMAP, and pollution prevention. Dr. Noonan indicated that a Program Manager has been assigned to each of these areas with the exception of pollution prevention. Dr. Brown asked if ORD is involving stakeholders in its multi-year planning process. Dr. Noonan replied that stakeholder involvement varied with each plan; stakeholders have been most involved with the drinking water plan. She indicated that she would like to discuss the multi-year plans later with the BOSC.

Presentations to Departing BOSC Members

Dr. Noonan expressed her sincere appreciation on behalf of the BOSC and ORD for the outstanding work that Drs. Denson and Kavanaugh had done since the Board's inception. She presented to each departing member a plaque of appreciation and thanked them for their significant contributions.

Dr. Noonan announced that Dr. Schnoor has agreed to serve as the next Chair of the BOSC. She indicated that she views the BOSC as a partner working with ORD to help improve the science and management of science at the Agency. She stressed the importance of continuity among the Board members and expressed her gratitude to those members who agreed to serve for another term.

Departing BOSC Member Remarks

Dr. Kavanaugh pointed out that the Board struggled in its first few months of existence to get focused. Now that the BOSC has several successful reviews behind it, there is an opportunity for the Board to focus on how to be more effective in the future. He suggested that it might be useful for the new Board members to be briefed on ORD's organization. They need to understand how the money is allocated and they need to be able to identify the key managers early in their tenure as Board members. Dr. Kavanaugh commented that he had learned a great deal about ORD and that he very much enjoyed serving on the Board.

Dr. Denson noted that when he was asked to serve as the BOSC Chair 4 years ago, he knew very little about EPA. His level of appreciation for the Agency, and ORD in particular, has grown by orders of magnitude. Prior to his stint as BOSC Chair, he had little experience with the federal government and he expressed his gratitude for the opportunity to expand his experience base. Dr. Denson indicated that he enjoyed breaking new ground with the BOSC members and would miss interacting with such a stimulating group.

Future Directions for the BOSC

Dr. Preuss reported that ORD has had some discussions about future directions for the BOSC. He would like the BOSC members to participate in a general discussion of this topic today and cover it in more detail at the next meeting, which will be attended by the new Board members. Dr. Preuss indicated that there has been a round of e-mail exchanges within ORD regarding the types of activities that ORD would like the BOSC to undertake. Two major areas that have been identified for future focus are: (1) laboratory science management and operations, and (2) multi-year research plans. He noted that the Board already has been involved in the first area. How does the BOSC want to followup on the original Laboratory/Center evaluation that was conducted 2 years ago? Should a standing subcommittee be established to work with the Laboratories/Centers? Dr. Preuss pointed out that the Laboratories/Centers would like to see that happen. He noted that one Laboratory has continued discussions with some of the individuals who served on the subcommittee that reviewed that Laboratory. With regard to multi-year research plans, would the Board like to be involved in reviewing the plans? Should experts beyond the Executive Committee be brought in for the review? What should the research plans look like? How long should they be and how much detail should be included? Dr. Preuss noted that the Board's advice on these questions would be very helpful.

Dr. Noonan commented that if the multi-year planning process for the six areas is successful, they hope to use it for ORD's entire budget. She initiated this multi-year planning process because she is convinced that ORD should take a broader view and focus on longer term issues. The plans should be structured so that they are useful and flexible enough to respond to changes. They should be designed to provide ORD a roadmap and some idea about how to deal with budget changes in the long term. She indicated that ORD is trying to develop a model for these plans. How many years should be included? Should they contain budgetary information? Should the plans be outcome driven? Dr. Preuss noted that ORD is moving forward with plans for the six areas identified earlier and he expects that those will be completed soon. He would like the BOSC to review those plans.

Dr. Preuss identified two additional areas for future focus by the BOSC—staff and research strategies/plans. The BOSC could provide input to ORD with regard to work force planning. In addition to the multi-year plans, ORD is developing a significant number of research strategies and plans. These plans identify the science gaps that need to be addressed, the questions that need to be answered, and a program to accomplish this. Dr. Preuss mentioned that a number of plans are nearing completion, and it is anticipated that the plans will be subjected to external review. The BOSC could review each plan to determine if ORD is taking an integrated approach to address the issue. Dr. Noonan indicated that she would like the plans to be consistent; she also would like to ensure that they do not create conflicts with work ORD is doing in other areas. Although these plans are highly collaborative efforts, she would like some assistance with integration. Dr. Noonan noted that most internal stakeholders are not interested in integration, and the level of interest in integration of external stakeholders is quite variable. She commented on the importance of recognizing that EPA is not the only agency conducting environmental research. Dr. Zimmerman asked about the level of detail in the plans. Dr. Noonan responded that they are quite detailed—just a step or two above the project level. They include a timeline and general strategy. She noted that the level of detail often depends on the stakeholders' needs (how much detail they need about what ORD plans to implement). As more of these plans are prepared, integration becomes more important and challenging. Dr. Preuss added that the multi-year plans are being derived, to some extent, from the research plans.

Two additional areas for consideration by the BOSC include portfolio turnover and communication. How do we know when something is completed? How can we take advantage of extreme events and move into new areas? How effective are communications within ORD, with Program and Regional Offices, with Congress, with academia, and with other stakeholders? ORD is working on improving communications and could benefit from input by the BOSC. Dr. Noonan pointed out that ORD is the

only organization within EPA that opened its annual planning process and made it transparent. Because this transparency has been well received, the Program Offices would like more robust interactions as the research progresses. They also want quick, easy access to the results. The Program Offices are not content with peer-reviewed publications resulting from the research. They are looking for communications that synthesize the information as it becomes available. It was noted that the National Institute of Environmental Health Sciences (NIEHS) does considerable synthesis of research results (contractors write summaries of research). In what form should information/results be delivered? Who is going to synthesize the information? How do we balance the effort expended on research and the effort expended on communicating the results? Dr. Noonan indicated that ORD is struggling with these questions and how to improve the flow of information both internally and externally. Dr. Preuss noted that communication of results also is an issue with the STAR Program.

Dr. Preuss mentioned that little has been done within ORD in regard to metrics. Could the BOSC help identify metrics for evaluating ORD's research efforts? As he receives ideas from ORD staff concerning how the BOSC could benefit ORD, Dr. Preuss agreed to share them with the Board members.

Dr. Noonan identified two additional areas for consideration as future directions—effectiveness and quality of science. She noted that the National Science Foundation uses Committees of Visitors (COVs) to evaluate the quality of its research portfolio. The members of the COVs are drawn from academia and one member is assigned responsibility for ensuring that the evaluation is fair. COV reports are submitted to the Advisory Committee for acceptance and they become part of NSF's evidence that it is meeting GPRA goals. COVs address the quality of the portfolio and the management of the program (e.g., Are NSF leaders providing the right management for entering new research areas and involving new investigators?). COVs evaluate both the scientific merit and the impact of the program; however, assessing impact has been very difficult. ORD is trying to do this for the STAR grants to ensure that they meet both the science and mission goals. Dr. Noonan indicated that this should be done for other ORD programs. NSF does not permit public access to COV reports; however, efforts are underway to publish excerpts of the reports. Dr. Noonan mentioned that it is important to evaluate 5-10 years of a program; 3 years is not sufficient. She noted that some Laboratories have adopted a COV approach, but it is not consistent, formalized, or systematic. ORD needs a formal approach for assessing the quality of science and the management of science. She pointed out that the choice of metrics will be critical when evaluating the research. Dr. Zimmerman mentioned that most organizations are following the academic model. Dr. Noonan replied that it is important that ORD move away from the university mind set—publications should not be the only measure of success. She mentioned that ORD has a Technical Qualifications Board (TQB), which has the authority to promote a GS-13 outside of the GS-14/15 ceiling if such a promotion is justified. In conducting its evaluations, the TQB takes into consideration effectiveness and impact on decision making in the Agency as well as publications. Evidence of impact requires a letter from the Program Office (Officer Director level or higher) describing the person's contribution. Dr. Noonan indicated this change has been well received by ORD staff.

Dr. Brown expressed her interest in prospective reviews rather than the retrospective reviews that the BOSC has been conducting. She liked the idea of reviewing the research plans. She also suggested that the BOSC examine the GPRA process and how it is related to multi-year planning. Is EPA identifying the right metrics for GPRA? No one knows. Dr. Noonan noted that it is very difficult to change anything associated with GPRA. She attributed this to its newness and suggested that much more flexibility will be required if it is to be useful. She pointed out that agencies have been criticized by Congress because of the vagueness of their GPRA reports. Dr. Schnoor asked if ORD had specific metrics in GPRA. Dr. Noonan responded that EPA adopted a 10-goal model. ORD does not have specific metrics, but has primary responsibility for the sound science goal and some responsibility for several of the other goals (e.g., clean air, clean water). She added that the Agency senior management meeting focused on whether the Offices were achieving their objectives and ways to improve if they were not.

With regard to reviewing research plans and the GPRA process, Dr. Brown asked if the BOSC review would focus on management issues. She asked if the SAB has expressed an interest in reviewing the multi-year plans. Dr. Noonan responded that the SAB has expressed interest in the multi-year research plans but not GPRA. Dr. Brown suggested that GPRA could be the primary focus of the BOSC review. Because things do not always work as predicted, Dr. Small suggested that ORD involve some systems thinking in this review. Dr. Noonan pointed out that EPA and other agencies are being driven toward large collaborative programs like the PM research program. It is the direction of the future and ORD must be prepared to adopt this approach.

Dr. Noonan asked the BOSC members to share their thoughts and ideas regarding the issues discussed today as well as other areas of interest. She invited them to call, e-mail, or write to her or Dr. Preuss regarding future directions.

Nominating Subcommittee Process

Dr. Preuss reminded the Board members that the BOSC charter calls for 15 members. The Board has been operating with approximately 12 members for the past several years. Eight of the current members will remain on the Board for an additional term. Dr. William Cooper (Michigan State University) and Drs. Small and Zimmerman have agreed to serve for an additional 1-year term. Five of the existing members—Drs. Bostrom, Brown, Bus, McCay, and Schnoor—have agreed to serve for an additional 2-year term. Therefore, seven new members can be appointed to the Board. To fill these vacancies, ORD conducted a substantial outreach effort, which included a Federal Register notice and letters to professional societies requesting nominations. In addition, the information gathered earlier by Dr. Small was used to identify minority candidates. Self-nominations were accepted and ORD received a number of those. Each nominee received a letter from Dr. Preuss informing him/her of the nomination and requesting submission of a curriculum vitae (CV) if he/she is interested in serving on the BOSC. Although some did not respond to the letter, approximately 110 CVs were submitted for consideration. A list of the nominees was prepared and sorted by area of expertise.

Dr. Preuss suggested that the next step in the process would be to establish a Nominating Subcommittee to screen the CVs that have been submitted for consideration. If the Subcommittee could winnow the list down to 25-30 nominees for further consideration, that list could be submitted to the full BOSC for review. The BOSC could winnow the list to approximately 15 names and then submit it to Dr. Noonan, who will identify the 7 individuals she would like to have appointed to the BOSC. Dr. Noonan would then submit that list to the Deputy Administrator for final approval and appointment. Dr. Preuss explained that this is the process he envisions for nominating the new members. In terms of timing, he did not think the new members could be appointed before the next BOSC meeting, which is tentatively scheduled for August. Is it necessary to meet in August? Could the nominations be reviewed and discussed via a conference call and the next meeting postponed until September/October when the new members have been appointed?

Dr. Denson noted that the only standing subcommittee recognized by the BOSC is the Nominating Subcommittee; however, a new Subcommittee Chair must be appointed (the former Chair, Dr. William Pierson, is no longer a BOSC member). Dr. Brown asked if there was an adequate number of minorities among the list of nominees. Dr. Preuss replied that ORD had made an effort to solicit minority nominations and that there are a number of African Americans, several Hispanics, and possibly one Native American. Dr. Bus asked if additional nominees could be added during the review process. Dr. Preuss responded that nominees should be added only if a specific area of expertise required for the BOSC cannot be addressed with the current list of nominees.

Dr. Denson asked Dr. Small to serve as the Chair of the Nominating Subcommittee for a period of 1 year. Drs. Brown and Bus agreed to serve on the Subcommittee. Dr. Schnoor, as the new BOSC Chair, will

oversee the process. Dr. Preuss asked if each member of the Nominating Committee would like to receive all of the CVs or if Subcommittee members should be assigned to review a certain group of experts. He asked that a process be identified before the end of today's meeting. Dr. Small liked the idea of dividing up the CVs by area of expertise, but he wanted the list and CVs of all nominees sent to each Subcommittee member. Because some of the CVs are quite lengthy, Dr. Preuss agreed to provide the first 5 pages of each CV. Dr. Denson suggested that the Nominating Subcommittee determine how to divide up the CVs for review. Dr. Small commented that each CV should be reviewed by at least two members of the Subcommittee. Dr. Denson suggested that the Subcommittee develop a rating scale or criteria for review. Dr. Small suggested several review criteria, including the quality of the nominee's science, whether his/her expertise fits with the needs of the Board, and the contribution of the nominee to the diversity of the Board. Dr. Bus added demonstrated evidence of program leadership and management experience to Dr. Small's list of criteria. Dr. Schnoor suggested that the next formal meeting be postponed until the new Board members have been appointed. Conference calls should be scheduled to discuss the winnowed list of nominees as well as to finalize the PM reports. Dr. Denson agreed that the PM reports could be finalized through a conference call. Ms. Hamilton reminded the BOSC members that the call concerning the nominees would have to be closed to the public; therefore, a notice must be placed in the Federal Register 30 days prior to the call.

Dr. Preuss asked how long the Subcommittee will need to winnow the list to 30 nominees. Dr. Small replied that it should take about 4 weeks. If the Nominating Subcommittee completes this initial winnowing process before the second week of July, ORD will send out the 30 CVs to the entire Board, allowing them 2 weeks for review. A conference call to discuss the nominees could be held in late July or early August. Dr. Preuss estimated that EPA will need approximately 1 month for Dr. Noonan to identify the nominees and to obtain the approval of the Deputy Administrator. The new members could be appointed in August; however, they would need about 1 month to work the next meeting into their schedules. Therefore, the next BOSC meeting should be held in October. It was agreed that the tentative dates for the next meeting would be October 16-17, 2000. Dr. Preuss asked if the Board could identify tentative dates for the conference calls. It was agreed that a closed call to discuss the winnowed list of nominees would take place on July 24, 2000, from 10:00 a.m. - 12:00 noon EDT. Dr. Schnoor agreed to notify Dr. Cooper that he will not be serving on the Nominating Subcommittee. The call to discuss the PM reports was tentatively scheduled for July 14, 2000, from 8:30 a.m. - 11:00 a.m. EDT. Dr. Preuss indicated that the list of nominees would be sent to the members of the Nominating Subcommittee within the next few days.

Integration Report Discussion

During the February meeting, the Board members combined and eliminated a number of the recommendations that were included in the draft document prepared by Dr. Joe Elder (EPA/ORD). These suggestions were captured in the minutes from that meeting. Dr. Bostrom volunteered to incorporate those changes into the document prepared by Dr. Elder. This revised draft was distributed to the Board members following the lunch break (see Attachment 1). Dr. Denson indicated that this version should be e-mailed to Dr. Elder, and Ms. Campbell agreed to send the file following the meeting.

During the afternoon's discussion, which was facilitated by Dr. Denson, the following recommendations (organized by the charge questions) for the Integration section were identified:

Risk Paradigm

- ✧ Risk-risk tradeoffs should be given a larger role in priority setting and decisions.
- ✧ Avoid fragmentation of the research program based on the elements of the risk paradigm (e.g., integrate human epidemiology and animal toxicological research).

- ✧ Promote PM colloquia, STAR grant recipient interactions, and expanding post doc rotations.

Priorities

- ✧ Identify priorities using value of information (VOI) analysis.
- ✧ Support research on integrated assessment models and analyses.
- ✧ Coordinate the priorities of ORD with outside agencies/organizations (epidemiology mainly).
- ✧ Balance data collection efforts with greater emphasis on data analysis/modeling.
- ✧ Emphasize chemical speciation measurements to support health effects research.

Communication of Activities/Results

- ✧ Interact with other programs to a greater extent (Global Change Program, Risk Assessment Forum, etc.).
- ✧ Coordinate and communicate at the staff and grant recipient levels.

Communication to Broader Scientific and Regulatory Community

- ✧ Continue to coordinate and publicize conferences with professional societies and focus on basic science as well as program overviews. (Dr. Preuss noted that EPA holds the world's foremost conference on PM. There may be people in other disciplines—who are not working on PM—who might be exposed to PM issues through such professional society meetings/workshops.)
- ✧ Ensure coordination and communication of research with professional societies, selected industries, and other critical stakeholder groups.
- ✧ Develop a comprehensive ORD Web site for PM (the Health Effects Institute has a comprehensive list of all PM research on its Web site).

Leadership (scientific within and without)

- ✧ Continue to hire early career scientists and post docs to sustain scientific leadership.
- ✧ Obtain more staff and technical support to ensure productivity of bench-level scientists (Laboratory/Center Directors need to ensure that this occurs).
- ✧ Ensure that the promotion process reflects flexibility and responsiveness of scientists to PM program and integration across disciplines.

Management Changes

- ✧ Encourage development of multi-year research plans.
- ✧ Encourage flexibility in budgets to take advantage of events and unforeseen opportunities.

Following the discussion, Dr. Denson asked for a motion to adjourn the meeting. Dr. Schnoor moved to adjourn and Dr. Bostrom seconded the motion.

Action Items

The following action items were identified during the meeting discussions:

- ✧ The BOSC should develop guidelines for joint reviews (e.g., joint SAB-BOSC reviews such as the STAR Program review).
- ✧ Dr. Preuss agreed to provide information concerning the Atlanta study to Dr. Bostrom (i.e., determine if the Atlanta study is the ARIES study) to clarify this reference in the Exposure report.
- ✧ Dr. Bostrom agreed to revise the Exposure report based on the review comments discussed at this meeting. She provided several changes to Ms. Campbell who agreed to incorporate them into the final draft.
- ✧ Dr. Bus agreed to revise the Toxicology report based on suggestions provided by the BOSC members.
- ✧ Dr. Small agreed to revise the Atmospheric Sciences report based on suggestions from the BOSC members. He also agreed to discuss the 1:10 ratio reference with the other Subcommittee members.
- ✧ Ms. Campbell agreed to e-mail the most current version of the Atmospheric Sciences report to Dr. Small following the meeting.
- ✧ Ms. Campbell agreed to e-mail Dr. John Vandenberg's comments on the Risk Management report to Dr. Kavanaugh following the first day of the meeting.
- ✧ Ms. Campbell agreed to revise the Assessment report based on comments from the Board members and notes from the Subcommittee members and send it to Dr. Zimmerman.
- ✧ Dr. Preuss agreed to provide Dr. Kavanaugh several changes to the report to correct erroneous statements (e.g., the Office of Exploratory Research was mentioned in the report, but this Office has not existed for the past 5 years).
- ✧ Dr. Kavanaugh agreed to revise the Risk Management report based on comments from the Board members and Drs. Vandenberg and Preuss.
- ✧ Dr. Denson volunteered to contact Dr. Burke to discuss the Epidemiology report and request that it be revised based on the suggestions provided by the Board.
- ✧ Dr. Denson agreed to work with the other members of the Integration Subcommittee as well as Dr. Elder to complete the Integration section of the PM report.
- ✧ Dr. Preuss agreed to send to the BOSC members copies of the staff paper and regulatory impact analysis. He also agreed to provide Web addresses for OAR's products.
- ✧ Dr. Preuss agreed to provide the BOSC members copies of the presentation/report prepared by Dr. Dorothy Patton on the research conducted throughout the Agency. (This was presented to the SAB recently.) Dr. Preuss will provide the Web address if the report is available on the Web.

- ✧ Ms. Hamilton will prepare a Federal Register notice for the closed conference call scheduled for July 24, 2000, from 10:00 a.m. - 12:00 noon EDT. She also will schedule the call and notify the Board members of the call-in information.
- ✧ Dr. Schnoor agreed to notify Dr. Cooper that he will not be serving on the Nominating Subcommittee.
- ✧ Ms. Hamilton will schedule the conference call to discuss the PM report and notify the Board members of the call-in information. This call has been scheduled tentatively for July 14, 2000, from 8:30 a.m. - 11:00 a.m. EDT.
- ✧ Dr. Preuss agreed to provide the list of nominees and CVs to the members of the Nominating Subcommittee.
- ✧ Ms. Campbell agreed to provide an electronic copy of the CVs (a small percentage of CVs are available electronically) to the Nominating Subcommittee members who request it.
- ✧ Ms. Campbell agreed to e-mail the revised draft of recommendations for the Integration section to Dr. Joe Elder.
- ✧ Ms. Campbell agreed to format the revised reports as they are received, consolidate them into a final report, and submit it to the Chair and other Board members for a final review.

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ATTACHMENT 1:
Revised Version of Dr. Joe Elder's Handout
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