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

BOARD OF SCIENTIFIC COUNSELORS EXECUTIVE COMMITTEE MEETING

Washington, DC
September 22-23, 2004

Wednesday, September 22, 2004

Welcome, Introductions, and Overview

Dr. James H. Johnson, Jr. (Howard University), Chair of the Board of Scientific Counselors (BOSC), called the meeting to order at 9:30 a.m. He quickly reviewed the agenda and proposed two minor changes—the first was to move the presentation from the Assistant Administrator for Research and Development (AA/ORD) up to 9:35 a.m., and the second was to add a briefing on ethics to be presented by Lorelei Kowalski, the Designated Federal Officer (DFO) for the BOSC. Dr. Johnson said that during this meeting the BOSC will develop a plan for conducting additional program reviews, approve the letter report on the biotechnology research program, and receive briefings on ORD's nanotechnology research program and Environmental Monitoring and Assessment Program (EMAP).

Dr. Johnson asked each of the attendees to introduce themselves. Following the introductions, Dr. Johnson explained that he had to attend another meeting just before lunch time, but promised he would return by 1:00 p.m. Dr. Rogene Henderson (Lovelace Respiratory Research Institute) agreed to serve as the chair in his absence.

Remarks from the AA/ORD

Dr. Paul Gilman thanked the Board members for their vital input and service on behalf of ORD. He announced that Dr. Henderson has been asked and has agreed to serve as the Vice-Chair of the BOSC. He mentioned that ORD is continuing to put into place a matrix management system with the addition of the National Program Directors (NPDs). The NPD solicitation was published in April 2004, and these positions probably will be filled by early 2005. Candidates have been selected for a number of the NPD positions and the Agency is in final negotiations with these individuals. Dr. Gilman hopes to be able to announce the names of some of the new NPDs before the next BOSC meeting in January. He also mentioned that ORD is working to fill numerous senior positions now staffed by individuals who are acting in those management positions.

Dr. Gilman reported that the National Homeland Security Research Center (NHSRC) will be extended beyond its initial 3-year charter. The Center has established considerable credibility for the Agency, as evidenced by EPA's lead in the President's new homeland security initiative, particularly for building decontamination and water infrastructure protection. EPA recently presented its preliminary long-term vision of what is needed to protect our Nation's water infrastructure to the White House. The Department of Homeland Security and the intelligence agencies all agree that EPA's NHSRC is on the right track and should continue the excellent work it has begun.

With regard to the computational toxicology research program, ORD is considering the creation of a center on computational toxicology. A core staff for the new center could be drawn from the existing

Laboratories and Centers. Dr. Gilman noted that there is considerable industry participation in the Agency's comptox activities, and there are a number of potential commercial applications that could benefit EPA. He mentioned the recent Science To Achieve Results (STAR) solicitation focused on computational toxicology. These awards are intended to bolster the Agency's bioinformatics base. Dr. Gilman asked the BOSC to provide input concerning the possible creation of a computational toxicology center.

In July, ORD released a progress report on EPA's particulate matter (PM) research program. The report entitled "Particulate Matter Research Program: Five Years of Progress," describes early results of EPA's substantial investment in PM research by EPA scientists and grantees. The report also includes an indepth examination of the health effects, exposure, and prevention and mitigation of $PM_{2.5}$. The Agency also published an executive summary that highlights the progress by research topic and articulates the program's key accomplishments. Dr. Gilman commented on the popularity of the PM report, stating that it already has been downloaded from the EPA Web Site more than 17,000 times. He added that the Clean Air Scientific Advisory Committee (CASAC) has reviewed ORD's PM program and approved its direction and focus. (The press release on the report, the Web Site posting, and a copy of the Executive Summary were distributed at the BOSC meeting.)

In September, the National Academies published online an article on gene flow from genetically modified creeping bentgrass, which was co-authored by several Corvallis researchers. The study documents gene flow on a landscape level from creeping bentgrass. Most of the gene flow occurred within 2 km in the direction of prevailing winds. The maximum gene flow distances observed were 21 km and 14 km in sentinel and resident plants, respectively, that were located in primarily nonagronomic habitats. Dr. Gilman stated that the transfer observed was at a higher rate and greater distance than expected. He reported that ORD made a concerted effort to quickly conduct internal and external reviews of the paper so that the results of this research could be communicated to the scientific community and the public in a timely manner. Although the science in the study is being criticized by some, ORD believes that the science is sound.

Dr. Gilman said that EPA is initiating efforts to make Agency facilities available to outside researchers, similar to the approach employed by the Department of Energy's national laboratories. EPA has been exploring ways to enter into agreements with outside researchers, and there has been considerable interest in using Agency facilities. EPA currently is working with Pfizer at the Research Triangle Park (RTP) facility, and EPA soon may be announcing a collaboration on the topic of homeland security. There is general agreement that more shoulder-to-shoulder interaction with outside researchers would be beneficial. As Dr. Gilman mentioned in his report at the January BOSC meeting, EPA has been negotiating to purchase an NMR for the laboratory in Athens, GA. To allow for excess capacity to accommodate outside users, EPA actually negotiated the purchase of two NMR instruments for the Athens laboratory.

Dr. Johnson asked about the location of the NHSRC. Dr. Gilman replied that the Center's core staff of 20 are located in the Cincinnati facility, but additional staff from other locations are associated with the Center. The individual leading the safe buildings effort, for example, is located in RTP. Dr. Gilman mentioned that additional staff may be assigned to the Center in Cincinnati. Dr. Johnson asked if the BOSC should review the Center's strategy. Dr. Bill Farland, ORD BOSC Liaison, replied that this topic probably will be revisited at the January 2005 BOSC meeting. He noted that the Board may want to examine the management and communications of the NHSRC.

Dr. Johnson asked if it would be appropriate for Dr. George Daston (P&G), Chair of the Computational Toxicology Subcommittee, to review and provide feedback on ORD's proposal for the creation of a computational toxicology center. Dr. Gilman thought such feedback would be very helpful. Dr. Herb

Windom (Skidaway Institute of Oceanography) asked about the policy for reviewing EPA's publications. Dr. Gilman replied that EPA investigators average approximately 1,000 publications/year in journals. These publications are in addition to the reports and other documents prepared by the Agency. The publication rate for the approximately 170 postdocs employed by EPA is about 1,400 publications/year. Dr. Gilman stated that all publications are subjected to internal EPA review, but some publications, like the gene flow article, are subjected to external review. Because of the unexpected results, EPA thought an external review of the gene flow paper was necessary. He said that the Division Directors have the authority to approve publications unless they are associated with policy. Publications with significant implications often are approved at the Laboratory/Center Director level or by Drs. Farland or Gilman.

Drs. Johnson and Daston did not think there was a need to revise the letter report on the biotechnology research program in response to Dr. Gilman's comments about the gene flow publication.

Dr. Gilman thanked the Board for the report of the Communications Ad Hoc Subcommittee. He said that ORD did not wait to receive the report to begin its efforts to improve communications. The lessons learned and best practices presented at the workshop were very helpful and ORD began implementing a number of ideas immediately following that meeting.

Ms. Kowalski indicated that the BOSC is a federal advisory committee and its meetings must be conducted in accordance with the Federal Advisory Committee Act (FACA). BOSC meetings are open to the public and there will be an opportunity for public comment at this meeting from 1:00 to 1:15 p.m. on Thursday, September 23. The minutes of the BOSC meetings are posted on the BOSC Web site, along with the reports generated by the BOSC (e.g., the letter report on the biotechnology research program and the report of the Communications Ad Hoc Subcommittee). Copies of all BOSC reports are sent to the Library of Congress as well as the EPA Library.

Ms. Kowalski asked that the Board members notify her regarding potential conflicts of interest. She also asked members to submit their travel vouchers and timesheets before they depart from the meeting. In addition, Ms. Kowalski asked the BOSC members to send her their updated Curricula Vitae (CVs) so that she can update them on the BOSC Web site. The members' CVs should be updated on an annual basis. Confidential disclosure forms should be completed and sent to Ms. Kowalski by mail. Because these forms contain confidential information, they should not be submitted via fax. She also mentioned that SATO Travel has been inconsistent in sending itineraries to the BOSC members. Members who do not receive an itinerary for their travel should contact Ms. Kowalski. Any changes in contact information also should be sent to Ms. Kowalski.

Risk Assessment Workshop Proposal

Dr. Rogene Henderson stated that the members of the Risk Assessment Workshop Subcommittee include herself, George Daston, Clifford Duke (Ecological Society of America), and John Giesy (Michigan State University). The Subcommittee is working with the National Academy of Sciences (NAS) to organize the workshop. The workshop will be held February 2-3, 2005, in the large auditorium at the NAS building in Washington, DC. The workshop will address the issues related to the methods described in Chapter 4 of the white paper entitled "Use of Default and Extrapolation Assumptions." This white paper is available on the Web at http://epa.gov/osa/ratf-final.pdf.

The workshop will cover three topics: (1) use of default assumptions and uncertainty factors, (2) extrapolation from high to low doses, and (3) extrapolation between species. An EPA representative will present the current practices and this presentation will be followed by three persons who will offer thoughtful suggestions for refinements or alternative approaches. Drs. Lauren Zeise, Rory Conolly, and Tom Starr have agreed to address the issue of high to low dose extrapolation, and Susan Sumner, Mel

Anderson, and Bruce Hope will be addressing the interspecies extrapolation issue. The Subcommittee currently is recruiting speakers to address the use of uncertainty factors and default parameters. In addition to the workshop sponsored by the BOSC, there will be: (1) a session on probabilistic methods in risk assessment (as described in the white paper) at the annual meeting of the Society of Toxicology (SOT); (2) a session at the annual meeting of the Society for Risk Analysis (SRA) that addresses methods of uncertainty analysis; and (3) a session on the chapter on ecology of risk assessment at the Society of Environmental Toxicology and Chemistry (SETAC) meeting.

Dr. Henderson said that the Subcommittee requires logistical support for the workshop. In addition, a notetaker will be needed to capture the presentations and discussions and prepare a proceedings of the workshop. She hopes that the proceedings will be published by the NAS or in a risk assessment journal. Dr. Farland said that it is unlikely that the NAS will publish the proceedings. Dr. Giesy mentioned that NAS uses the term Chair's Summary to describe a summary that is not a consensus document of the group. The Subcommittee may want to consider producing a Chair's summary, which can be used to prepare an article for publication in a risk assessment journal.

Dr. Gary Sayler (University of Tennessee) commented that it would be helpful if the workshop could address how to transfer the protocols for chemical risk assessment to biological and radiological risk assessment. Dr. Henderson replied that the focus of the workshop is limited to the white paper, and the paper does not address biological and radiological risk assessment. Dr. Farland said that the paper references these other risk assessments but does not address them.

Dr. Peter Preuss (ORD/NCEA) asked that the Subcommittee make an effort to ensure that the workshop does not become an opportunity to criticize EPA; it should be focused on the science and how to improve the Agency's risk assessment practices. Dr. Preuss added that EPA has been doing a considerable amount of work on uncertainty factors and physiologically-based pharmacokinetic (PBPK) modeling. He asked that the workshop agenda include an opportunity for EPA to present what it is doing to address issues raised in the white paper. Dr. Henderson responded that the EPA presenters should include the new efforts in their presentations. Dr. Farland stressed the importance of including time for interactive dialog; it will be important to discuss different views on the issues. Dr. Preuss asked that the speakers focus their presentations on how to improve rather than what is wrong with EPA's current practices. Dr. Henderson said that each Subcommittee member has been assigned to a workshop topic; she has emphasized that this is to be a constructive process to the three speakers who will be addressing her assigned topic. She will ask the other Subcommittee members to do the same with their speakers.

Dr. Daston stated that the EPA presenter will open each session. That individual should be prepared to cover the content of the white paper as well as what EPA is doing now to address concerns in the paper. Then, three individuals who are representative of the consumers of the information from EPA will present their different viewpoints. Each topic will be covered in a half-day session; that should leave about 90 to 120 minutes for discussion. Should we invite specific individuals to attend to participate in the discussion? Dr. Preuss commented that the challenge will be to structure the discussion to achieve the desired endpoint. Dr. Giesy asked how the workshop is being advertised to the target audience groups. Dr. Henderson said that there is a flyer announcing the workshop that can be distributed at upcoming professional society meetings (the SETAC and SRA meetings are in November). The workshop also will be advertised on the BOSC Web site. The flyer, agenda, logistical information, and other items will be posted on that site. Online registration for the workshop will be through the BOSC Web site. Dr. Farland suggested advertising the meeting in *Environmental Health Perspectives*. Dr. Duke said that it also should be advertised in the SETAC and SRA bulletins, which are used by the societies to communicate with their members. Dr. Henderson also suggested placing advertisements in the *ACS Journal* and *Environmental Science & Technology*. Dr. Anna Harding (Oregon State University) asked if

the EPA Regional Offices will be notified about the workshop. Could the Regions notify the states about the workshop?

Biotechnology Research Program Letter Report

Dr. Daston stated that Dr. Jerry Schnoor, former Chair of the BOSC and the Biotechnology Research Program Subcommittee, prepared the first draft of the letter report on the biotechnology research program. It was reviewed by the Subcommittee members—Drs. Jim Johnson, Jim Clark (Exxon-Mobil), Rogene Henderson, Gary Sayler, and George Daston. The comments were discussed during a Subcommittee conference call held on August 20, 2004. Dr. Daston, who succeeded Dr. Schnoor as the subcommittee Chair, revised the letter in response to the comments and is submitting it to the Executive Committee for approval. He noted that the report indicates the research program is well focused and the five areas of research are on target. The report suggests some small modifications that will enhance the program. Dr. Daston said that there was only one public comment submitted on the draft report. Dr. Richard Goodman, University of Nebraska, expressed some concern about the risk to humans and potential allergenicity. He did not think it was appropriate to focus exclusively on the digestibility of proteins. Dr. Daston assured him that the BOSC did not endorse such an exclusive focus. Although Dr. Goodman would have preferred a change in the wording of the report, he was satisfied with Dr. Daston's explanation regarding his concerns.

Dr. Harding thought the letter was very good; she asked if references could be added. Dr. Windom expressed some concern about adding references. He thought it might open the report to criticism with regard to what references were omitted. Dr. Windom asked if the letter report will be posted on the Web and Ms. Kowalski replied that it would be posted on the BOSC Web Site. Dr. Farland asked if Dr. Harding was concerned about the reference to the ORD Biotechnology Framework in the report. Dr. Harding answered in the affirmative and asked that the report at least include a reference to a document that contains the details of the program. Dr. Daston replied that he could add a reference to the plan itself. It could be added at the end of the report along with the Web address for the report. Dr. Farland said that the plan could be posted on the BOSC Web Site with the letter report, or the site could include a link to the research plan at its current location on the Web. Dr. Juarine Stewart (Morgan State University) asked if the statement about gene flow is still adequate given the information presented to the Board today. Dr. Daston responded that he believes the comments are still adequate.

Dr. Harding made a motion to approve the Biotechnology Research Program Letter Report, and Dr. Windom seconded the motion. The Chair called for a vote on the report and it was unanimously approved by the BOSC. Dr. Johnson agreed to send an e-mail to Dr. Schnoor to thank him for his efforts on the letter report and inform him that the report was approved by the Executive Committee.

Program Reviews

Dr. Farland stated that there has been considerable discussion about the program reviews since the May BOSC meeting. He wanted to explain to the BOSC ORD's expectations for the program reviews. The BOSC has agreed to undertake two pilot reviews—one on global change and the other on endocrine disruptors. Drs. Farland and Gilman would like the BOSC to conduct additional program reviews beyond these two pilots. He noted that these reviews are extremely important to ORD, and an institutional approach for the program reviews is needed. Dr. Farland said that ORD would like the BOSC to conduct three to four program reviews each year. The reviews will provide needed feedback for program development and hold the programs accountable for achieving their intended goals.

The NAS has recommended independent expert review for evaluating federal research programs, and the Office of Management and Budget (OMB) Performance Assessment Rating Tool (PART) highlights the

value of recommendations from independent expert review in guidance to federal agencies. Dr. Farland stated that ORD is strongly committed to independent expert review for the objective evaluation of research at the program level and to establish "best practices" in federal research program design, management, and evaluation.

The objective of the BOSC program reviews is to prospectively and retrospectively evaluate the relevance, quality, performance, and leadership of ORD research at the program level. Evaluation of the research programs every 4-5 years will help ORD respond to multiple internal and external needs. For example, these reviews will strengthen research accountability, communicate research progress and results, and incorporate information that responds to the growing emphasis on evaluating federal research.

The recommendations from BOSC program reviews will provide guidance to ORD to help: (1) implement and strengthen the research program, (2) verify when clients have applied research to strengthen environmental decisions, (3) compare the program with programs designed to achieve similar outcomes in other parts of EPA and in other federal agencies, (4) make decisions about research investments/disinvestments over the next 5 years, and (5) prepare EPA's performance and accountability reports to Congress under the Government Performance and Reporting Act (GPRA).

The program reviews also will help ORD communicate how its research helps achieve EPA's goals, solve environmental problems, and contribute to outcomes. The reviews will help ORD communicate research progress and results. ORD programs can be held accountable for research contributions that strengthen environmental decisions and enable clients to achieve short-term outcomes. Dr. Farland provided the addresses of two Web sites that provide information on OMB's PART and the R&D Investment Criteria (www.omb.gov/part and www.gao.gov). He also distributed a handout that described OMB's PART.

The Office of Science and Technology Policy (OSTP) R&D Investment Criteria states that R&D investments must be planned to be relevant to national priorities, agency missions, and customer needs. Programs must maximize the quality of the research in which they invest, and R&D programs must demonstrate performance by setting annual and long-term goals and demonstrating progress toward outcomes. OMB and OSTP encourage federal research managers to characterize the program's scientific leadership as well.

At the May 14-15, 2004, BOSC meeting, the Board agreed to conduct pilot reviews for ORD's endocrine disruptor (EDC) and global change (GC) research programs. The EDC Subcommittee has been formed and the first face-to-face meeting will be held December 13-15, 2004, in Research Triangle Park, NC. Dr. Farland commented that the Subcommittee's recommendations will help ORD respond to OMB's PART feedback. The GC Subcommittee is being formed and its first face-to-face meeting hopefully will be held in January 2005, before the next Executive Committee meeting. Dr. Farland noted that the GC Subcommittee's recommendations will help guide the ORD program and prepare for the future OMB PART review. He stated that the results of these two pilots will guide the future BOSC program reviews.

Dr. Farland outlined the roles and responsibilities of the groups involved in the program reviews. The Subcommittee Chair will assist the DFO in identifying and selecting candidates for the Subcommittee. The Subcommittee members will: (1) review and finalize the draft program charge prepared by ORD, (2) request and review ORD program materials, (3) participate in conference calls and a face-to-face meeting, and (4) prepare a report. The ORD DFO will work with the Subcommittee Chair to constitute a Subcommittee. ORD will be responsible for: (1) preparing a draft program review charge, (2) preparing background materials and providing the Subcommittee with all requested materials, (3) and participating in conference calls and a face-to-face meeting with the Subcommittee members.

The background materials for the Subcommittees include program documentation, presentations about the program (during conference calls and the face-to-face meeting), and poster presentations that describe research progress (at the face-to-face meeting). Collectively, the background materials will describe the program's progress and respond to the R&D Investment Criteria. Dr. Farland provided an example of some of the measures of relevance, quality, performance, and leadership that could be employed by the Subcommittees. Is there a conceptual framework for the program that integrates priority research questions for topics with environmental decisions and outcomes for specific clients? Does the program ensure high quality extramural research through merit-based competitive solicitations and awards? Has EPA adopted or applied the methods, guidelines, protocols, or models developed by the research program? Do program researchers provide scientific or technical advice for state, local, Tribal, and international governments?

Dr. Farland asked the BOSC to consider conducting four more program reviews by spring 2005: Ecological Research Program, Human Health Research Program, Drinking Water Research Program, and Particulate Matter Research Program. The timing of these reviews is critical to inform ORD as the staff prepare PART materials that will be submitted to OMB in May 2005. To incorporate the BOSC's program review feedback into the PART materials for OMB, the BOSC reports must be completed by May 2005.

Dr. Farland presented a tentative schedule for the EDC program review. The entire process from the Executive Committee's decision to establish a subcommittee (May 2004) to submission of the report to the BOSC Executive Committee for review (January 2005) will take 9 months. The timetable allows 4 months for forming the Subcommittee. The face-to-face meeting will be held in December and a draft report will be available at the end of that meeting. The report will be completed by January and submitted to the BOSC Executive Committee for review and approval at the January meeting.

In closing his presentation, Dr. Farland provided an overview of the OSTP R&D Investment Criteria, covering the four areas—relevance, quality, performance, and leadership.

In response to Dr. Elaine Dorward-King's (Rio Tinto) concern about the proposed 9-month schedule, Dr. Farland mentioned that the GC research program will not undergo a PART review in the summer of 2005; therefore, there is less urgency to complete this pilot program review by January 2005. However, if the review is delayed much longer, it will make it difficult for the BOSC to complete four additional program reviews by May 2005. Dr. Clark asked about the length of time required for a PART review. Dr. Farland replied that PART reviews are conducted by one individual over a period of 2-3 months. Dr. Daston asked if the time required to form the subcommittee could be shortened. Dr. Farland thought it might be possible to shorten the time required to form a subcommittee; however, ORD may need the 4 months to draft the charge and prepare the background materials in response to the charge. He asked that the pilot program reviews be conducted using this 9-month time frame to determine if it can be used for the other program reviews.

Dr. Sayler asked about the difference between the Drinking Water Multi-Year Plan (MYP) Review and the Drinking Water Research Program Review. Dr. Farland replied that the MYP review is not retrospective, so it does not provide any feedback on the effectiveness of the program to date. The MYP reviews also are limited to the document; the program reviews examine the entire program both retrospectively and prospectively. Dr. Harding asked if the program reviews will be helpful with regard to the PART reviews. She noted that the PM research program appears to be the model program but the PART review concluded that the program is failing to achieve the desired results. Dr. Farland replied that EPA must make considerable improvements in communicating the results and impacts of its research programs. He added that EPA treated the PART review of the PM program more as a budgetary process rather than a technical review of the achievement of outcomes. He believes that EPA has learned some

difficult lessons on how to better prepare for a PART review. He acknowledged, however, that it is difficult to demonstrate the achievement of outcomes for most ORD programs. Jennifer Robbins (ORD), who coordinates PART reviews with OMB, said that she expected the PM program to do well in the PART review. The measures for the goals, however, were not accurate. The Agency needs to qualitatively assess the progress made toward achieving those goals. Outside experts should confirm that the goals are appropriate and that they are being met. Dr. Dale Pahl (ORD) said that in discussions with the NAS, senior representatives from OMB acknowledged that the opinions of outside experts may be the most appropriate way to assess the achievement of goals and progress toward outcomes.

Dr. George Lambert (University of Medicine and Dentistry of New Jersey) asked how many members are needed for a subcommittee. Dr. Farland responded that the members must cover the critical disciplines required to review the program. The EDC Subcommittee, for example, has eight members. Eight to 10 members is probably appropriate for most program reviews.

Dr. Clark asked if the PART reviews look at ORD's program separately or as part of the program across the entire Agency. Dr. Farland replied that, for EDCs, the review covered the work of ORD and the program offices. This can be problematic if ORD has made progress but the program offices have not. Dr. Clark commented that ORD must show it is impacting the achievement of the Agency's goals. Dr. Farland said that there will be presentations at the face-to-face meetings by program office staff to explain how ORD's work influences that of the program offices. Dr. Giesy expressed some concern about the time required by scientists to respond to the many reviews (e.g., BOSC program reviews, PART). Is there some way to integrate the reviews and improve efficiency? Dr. Farland agreed that it does take the scientists away from the bench, but the scientists are becoming much better at explaining their research in terms of the questions it addresses and in relation to the risk paradigm. Dr. Elaine Francis (ORD/NCER), who joined the meeting via conference call, stated that ORD is trying to be more efficient with regard to reviews. For example, the BOSC EDC program review is being combined with the EDC laboratory review. She worked with the Laboratory Director and Division Director to combine the two reviews.

Update on GC Subcommittee

Dr. Dorward-King said that it has been very difficult to recruit members for the subcommittee. Twelve people have been invited to serve on the subcommittee, two have accepted, two have not responded, and eight have declined. Experts in a number of disciplines are still needed, including: atmospheric fate and transport, climate modeling, and ecosystem assessment and fate. She noted that many people are too busy to serve and a number have been excluded because they have STAR grants. Others have refused to be involved because they believe the issue is too political. Dr. Dorward-King expressed serious concerns about completing the pilot review by January 2005. She thought it might be possible to complete a report by April. She noted that she has received the names of some additional experts and she will work with the DFO to recruit the needed subcommittee members. It might be helpful if Dr. Farland or Dr. Johnson called the individuals to invite them to serve on the subcommittee. Dr. Farland responded that the initial contact must be made by the DFO, but the Subcommittee Chair or Co-Chair could call them to followup on the initial contact. Dr. Giesy asked if subcommittee membership is restricted to U.S. citizens. Dr. Neil Stiber (ORD) replied that individuals who serve on FACA committees cannot be employed by a foreign government. Dr. Windom asked if it is appropriate for the Subcommittee Chair to call individuals to solicit the names of appropriate experts. Ms. Kowalski responded that such contact would be appropriate. Dr. Clark asked if the list of Science Advisory Board (SAB) consultants had been screened for appropriate experts, and Ms. Kowalski said that they already had mined the SAB database. Dr. Farland said that the DFO can do more to assist in finding members, but this will require better communication between the Subcommittee Chair and the DFO. Dr. Stiber said that he identified potential members for the EDC Subcommittee and submitted the names and qualifications to Dr. Harding for review. They both agreed that this process seemed to work well for the EDC Subcommittee.

Dr. Dorward-King asked if there would be any consequences if the report was not completed by January. Dr. Farland replied that there would be no consequences other than subsequent reviews would not be able to benefit from this pilot and a delay may hinder the progress of the next set of program reviews. Dr. Johnson asked the BOSC members to provide names of potential subcommittee members to Dr. Dorward-King and he deferred further discussion of the path forward until tomorrow morning.

Update on EDC Subcommittee

Dr. Harding reported that the EDC Subcommittee has been formed. Dr. Harding is the Chair and Dr. Daston is the Vice Chair of this subcommittee. The third BOSC member serving on the subcommittee is Dr. Stewart. The external members are Drs. Glen Boyd (Tulane University), George Lucier (retired from NIEHS), Steve Safe (Texas A&M), Don Tillett (USGS), and Glenn Van der Kraak (University of Guelph). Dr. Stiber is in the process of scheduling conference calls to discuss the charge questions to ensure that they are clear and of adequate specificity. Dr. Johnson suggested that, rather than spending time discussing the charge questions, the subcommittee should accept them as they are and offer comments on the questions in the report so that any concerns can be addressed in future reviews. Dr. Henderson suggested that the subcommittee members discuss their preferences with regard to which questions they would like to cover. Dr. Harding expressed some concern about the tight deadline; Dr. Johnson suggested that the subcommittee document the causes of delays and the barriers they encounter during the review process as part of the pilot. These notations will be helpful to future subcommittees conducting program reviews. Dr. Daston said that the pilots will be more difficult because there is no template for the process or the report. He thought the 9-month time frame will be more reasonable for future program reviews. Dr. Henderson commented that, based on her experience with an MYP review, the key to meeting the tight deadline is for the members to be prepared for the face-to-face meeting (i.e., review the materials and prepare their comments before the meeting). If the members are prepared with their comments, then the Chair's job is to coalesce the comments into a coherent report. Dr. Farland commented that, although the report is important, the feedback at the meeting will be a tremendous help to ORD. Dr. Johnson said that, at a minimum, the subcommittee should develop a list of recommendations before departing the face-to-face meeting. Dr. Harding asked Dr. Stiber if the subcommittee members had agreed to the schedule; Dr. Stiber replied that he informed them of the schedule when he contacted them about serving on the subcommittee.

Dr. Clark noted that one of the charge questions concerns other agency programs. Therefore, it will be important for at least one subcommittee member to be knowledgeable of programs outside of EPA. He commented that this should be considered when recruiting subcommittee members. Dr. Farland said that the subcommittee members also should be able to contact other agencies to obtain opinions on their interaction with EPA.

Update on Computational Toxicology (CompTox) Subcommittee

Dr. Daston reported that the CompTox Subcommittee has been formed. He is the Chair of the subcommittee and the other members are Drs. Jim Clark, Michael Clegg (University of California), Rich DiGuilio (Duke University), and Ken Ramos (University of Louisville). The subcommittee has not met yet, but Dr. Daston intends to hold an initial meeting to define the mission of the subcommittee. As reported by Dr. Gilman, computational toxicology is coalescing into a program and may become a center. Dr. Daston supports the creation of a Computational Toxicology Center. He noted that once the computational toxicology grants have been awarded it will be easier for the subcommittee to outline its path forward. They cover a wide range of topics of interest to ORD. Computational toxicology will allow the Agency to use state-of-the-art computing power to handle and analyze large data sets in ways that it has never been able to do before.

The CompTox Subcommittee will assist EPA in establishing objectives for the program, collaborations with other organizations, and connections with other research areas that can be aided by a computational toxicology approach. Dr. Daston stated that the subcommittee will meet in fall 2004; that meeting will include a detailed presentation from Bob Kavlock and others in ORD. Dr. Johnson asked that the subcommittee consider whether the computational toxicology activities should be consolidated into a center. He also suggested that the subcommittee consider a letter report to provide quick feedback to ORD on the center concept.

Update on Mercury Subcommittee

Dr. Windom said that they are trying to recruit someone with control technology expertise to complete the subcommittee. Dr. Windom is the Chair of the Mercury Subcommittee and Dr. Rogene Henderson also has agreed to serve on the subcommittee. Dr. Windom said that the subcommittee will review the Mercury MYP, which is about 30 pages, and do a letter report on the review. He expressed some concern that it has taken nearly a year to move forward with this review; however, he noted that the input will be helpful when ORD updates the MYP. The subcommittee will meet this fall to determine a strategy and develop questions for ORD. Dr. Windom hopes to provide ORD an oral report on the review at the January 2005 meeting; however, the letter report may not be completed until after that meeting.

Update on the Coastal Health Work Group

Dr. Clark reported that the work group had been formed. He is the Chair of the work group and its other members are Drs. Herb Windom and Clifford Duke. No outside expertise was sought for this group because the BOSC members covered the required areas of expertise. Dr. Clark said that the work group plans to complete a letter report of the document by the end of January 2005. The work group has not met yet, but they will be meeting soon to develop charge questions for ORD. Dr. Sayler asked about the new National Research Council (NRC) report on oceans. Is there any relation between coastal health and that report? Dr. Clark said that the work group will consider the NRC report in the review.

Dr. Johnson distributed a table that depicted the progress of the various BOSC projects (see Figure 1). He indicated that the Mercury Subcommittee should complete its report in early 2005; therefore, the BOSC Executive Committee will vote on approving the report at the May 2005 meeting. The Computational Toxicology Subcommittee should complete its letter report by the May 2005 meeting. The EDC Subcommittee is on target and moving forward. The GC Subcommittee is behind schedule, but a few strategies have been identified to accelerate formation of the subcommittee. The Risk Assessment Workshop Subcommittee and the Coastal Health Subcommittee are on schedule. He asked Dr. Clark to provide a date for completion of the Coastal Health Subcommittee report. The Nomination Subcommittee is behind schedule; Dr. Johnson hopes to have air pollution candidates identified by the January meeting. There has been no progress with regard to the National Homeland Security Research Center (NHSRC) because this effort was put on hold until the decision to continue the NHSRC was made by ORD. Dr. Johnson expects a briefing on homeland security at the January meeting. Dr. Johnson said that he will update this chart for each BOSC meeting so that the Board can track progress and see how long it takes to complete projects.

Dr. Anna Harding asked about adding evaluation expertise to the BOSC Executive Committee. Dr. Johnson agreed that the Board is in need of an individual with such expertise.

Figure 1. FY 2004-2005 Projects of the EPA Board of Scientific Counselors

Subcommittee/ Work Group	Project Title	Types of Advice	Status	Project Completion Date
Mercury MYP Subcommittee	Mercury MYP Review	Letter Report	Subcommittee formed, subcommittee to meet in fall 2004, oral report to BOSC at January 2005 meeting.	April 2005
Computational Toxicology Subcommittee	Computational Toxicology Research Program Review	Review	Subcommittee formed, subcommittee to meet in fall 2004. Considering letter report to provide ORD feedback on creating comptox research center.	Continuous
Endocrine Disrupting Chemicals (EDC) Subcommittee	EDC Research Program Review	Program Review	Subcommittee formed and meeting scheduled for December 13-15, 2004 in RTP, NC. Draft report to be submitted for Executive Committee review at January meeting.	January 2005
Global Change (GC) Subcommittee	GC Research Program Review	Program Review	Subcommittee not yet formed. Meeting may be held in January, and oral report may be presented to BOSC at January meeting.	January 2005
Risk Assessment Work Group	Risk Assessment Workshop	Workshop and Proceedings	Workshop to be held February 2-3, 2005 in Washington, DC. Most of the speakers have been recruited.	May 2005
Biotechnology Subcommittee	Biotechnology Research Program Review	Letter Report	Completed	September 2004
Coastal Health Work Group	National Coastal Condition Report Review	Letter Report	Subcommittee formed and draft report to be submitted for Executive Committee review at January meeting.	January 2005

Subcommittee/ Work Group	Project Title	Types of Advice	Status	Project Completion Date
Homeland Security Subcommittee	National Homeland Security Research Center (NHSRC) Review	Undetermined	Project was placed on hold pending EPA decision to continue the NHSRC. BOSC to be briefed on NHSRC activities at January meeting.	Continuous
Nomination Subcommittee	Nomination of BOSC Candidates	List of Candidates	List of air pollution/atmospheric sciences candidates being compiled and list will be presented to BOSC for consideration at January meeting. Two new members should be appointed by May 2005 meeting and third vacancy filled by September 2005 meeting.	Continuous
Ecological Research Subcommittee	Ecological Research Program Review	Program Review	Subcommittee Chair identified and subcommittee is being formed. Draft charge expected from ORD by December 1.	May 2005
Human Health Subcommittee	Human Health Research Program Review	Program Review	Subcommittee Chair identified and subcommittee is being formed. Draft charge expected from ORD by December 1.	May 2005
Drinking Water Subcommittee	Drinking Water Research Program Review	Program Review	Subcommittee Chair identified and subcommittee is being formed. Draft charge expected from ORD by December 1.	May 2005
Particulate Matter Subcommittee	Particulate Matter Research Program Review	Program Review	Subcommittee Chair identified and subcommittee is being formed. Draft charge expected from ORD by December 1.	May 2005

Approval of the May 2004 BOSC Meeting Minutes

Dr. Johnson asked for comments on the May 2004 meeting minutes. Dr. Johnson pointed out that the words "ecological research" in the ninth line of the third paragraph on page 3 of the summary did not make sense with regard to pollution prevention. He asked that "ecological research" be deleted and the sentence be changed to read "...a reduction in funding for this research." He also requested that "acroecosystem" in the fourth line of the third paragraph on page 6 of the summary be changed to "agroecosystem." Dr. Johnson asked that the second line in the third complete paragraph on page 9 be changed to read "...emerging information technology to transform environmental decision making." No other changes were requested. Dr. Windom made a motion to approve the minutes with the requested changes and Dr. Sayler seconded the motion. The minutes were approved unanimously with the stated changes.

New Areas for the BOSC and Future Meeting Dates

Dr. Johnson identified three new areas for consideration by the BOSC, including: Regional Vulnerability Assessment (ReVA), public health outcomes, and grid computing. He said that the BOSC may decide to postpone these projects until next year given the number of projects already underway.

Dr. Johnson asked the members to check their calendars and availability for the weeks of January 17 and 24, and the week of May 16 to schedule the upcoming BOSC meetings. He also asked the members to think about whether they would like to meet in a location other than Washington, DC.

Nanotechnology and the Environment

Steve Lingle (ORD/NCER) provided an overview of the research areas related to nanotechnology that may affect EPA's mission and how the Agency will address its statutory responsibilities relative to nanotechnology.

Federal nanoscale science and technology work began in 1996, and in 1998, an Interagency Working Group on Nanotechnology (IWGN) was formed under the National Science and Technology Council. In 1999, the IWGN completed its first draft of a plan for nanoscale science and technology. The Clinton administration raised nanoscale science and technology to a federal initiative, creating the National Nanotechnology Initiative (NNI) with 20 participating agencies in 2001. In 2003, the 21st Century Nanotechnology Research and Development Act was passed. Mr. Lingle stated that government R&D expenditures for nanotechnology have risen significantly and totaled about $750 million in 2003.

The goals of the NNI are to: (1) conduct R&D to realize the full potential of this revolutionary technology; (2) develop the skilled workforce and supporting infrastructure needed to advance R&D; (3) better understand the social, ethical, health, and environmental implications of the technology; and (4) facilitate transfer of the new technologies into commercial products.

EPA has the lead for "Nanoscale Processes for Environmental Improvement," one of the nine challenge research areas of the NNI. The potential beneficial environmental applications include monitoring, remediation, treatment, detection; waste minimization; and pollution prevention. Mr. Lingle pointed out that the ecological and human health effects of nanomaterials are largely unknown, and products with nanomaterials are commercially available in widely-used consumer products.

EPA's role is to: (1) provide leadership in identifying the environmental applications and implications of nanotechnology, (2) support research directly and in collaboration with other agencies, (3) help build a research community with knowledge in nanotechnology and the environment, and (4) support EPA

programs as they build knowledge to inform decision making. Mr. Lingle explained that applications address existing environmental problems or prevent future problems, and implications address the interactions of nanomaterials with the environment and any possible risk that may be posed by nanotechnology.

In 1999, EPA funded a project on the health effects of ultrafine particles at the University of Rochester Particulate Matter (PM) Research Center ($1.5 million) through the STAR program. In 2001, 16 awards totaling $5.6 million were made in response to the Environmental Applications of Nanotechnology STAR solicitation. In 2002, 16 awards totaling $5 million were made in response to the Environmental Applications/Implications of Nanotechnology STAR solicitation. Twelve awards are pending for the 2003 Health and Environmental Effects of Manufactured Nanoparticles STAR solicitation (toxicity–6 awards, $2 million; fate, transport, and transformation–5 awards, $1.7 million; and exposure and bioaccumulation–1 award, $.35 million).

The 2004 STAR solicitation Environmental and Human Health Effects of Nanomaterials was issued jointly with the National Science Foundation (NSF) and the National Institute for Occupational Safety and Health (NIOSH). It was announced in September/October 2004, and EPA expects to award a total of $7 million in grants in response to this solicitation. The Research in Nanoscale Science Engineering and Technology STAR solicitation closes on October 14, and the new solicitation for the PM Centers closed on August 31, 2004.

Nanomaterials and clean technology research also is funded under EPA's Small Business Innovation Research (SBIR) program. These projects involve the development of nanotechnology to eliminate/minimize harmful emissions and wastes, nanoporous filters and membranes, sensors, nanoparticulate catalysts, and nonocoatings and materials.

Mr. Lingle identified a number of research needs and challenges related to nanotechnology. The first challenge is the lack of ecological and human toxicological information. Another is the lack of standard nomenclature. Additional needs are metrology and benign applications (green chemistry and manufacturing).

EPA has led a number of workshops on nanotechnology and the environment, including the Nanotechnology and the Environment STAR Grantees Meeting, the Symposia on Nanotechnology Implications for the Environment at American Chemical Society National Meetings, the NNI Grand Challenge in the Environment Meeting, and the Interagency Meeting on Applications and Implications of Nanotechnology and the Environment. EPA also has been involved with a number of events that addressed nanotechnology research challenges, including Nanotechnology and the Environment: Next Steps (8/16/04), Nanotechnology and the Environment: Applications and Implications (8/18/04), Nanotechnology Research Directions II (9/7-8/04), ANSI-NSP Meeting on Nomenclature and Terminology (9/29-30/04), and Developing Experimental Approaches for Evaluation of Toxicological Interactions of Nanoscale Materials (11/3-4/04).

Mr. Lingle indicated that EPA will continue working with its partners to encourage consideration of environmental applications and implications in R&D. ORD will continue to work with EPA's program offices, other agencies, and stakeholders to help build a knowledge base for informed decision making. Additional information on EPA's nanotechnology research is available on the Web at http://www.epa.gov/ncer.

Dr. Sayler asked if EPA is an equal player in the nanotechnology area. Mr. Lingle responded that the other agencies want to hear what EPA has to say on the issues and the Agency has the lead for nanoscale processes for environmental improvement. Although there are several EPA authorities that might apply

to nanotechnology, the Toxic Substances Control Act (TSCA) has received the most attention, particularly in the press. Under TSCA, companies submit Premanufacturing Notices (PMNs) for new chemicals, but it is not clear whether nanoparticles are considered new chemicals or existing chemicals. For example, some argue that because carbon is not a new chemical, carbon nanotubes should not be considered a new chemical. Mr. Lingle noted that most nanomaterials currently produced in the greatest volumes, such as carbon nanotubes, are on the TSCA Inventory, so no PMN is required. EPA has not taken a position on this yet, but it is clear that the nanoscale materials may have very different properties than the same chemicals listed on the TSCA Inventory. Mr. Lingle noted that EPA's nanotechnology research initially focused on applications, primarily through the STAR program. In 2003, however, the Agency began making an effort to include research on the health and environmental implications of nanotechnology. Dr. Harding asked about the implications research. Mr. Lingle replied that EPA was conducting/funding inhalation and dermal exposure studies. He mentioned that nonoparticles are readily absorbed through the skin and some initial research (not by EPA) suggests that certain nanomaterials may produce carcinomas in the lungs of animals. NIOSH is concerned about occupational exposure, but there has not been much research on exposure routes for the general population.

Dr. Sayler asked if EPA was engaged with the center at Rice University. Mr. Lingle responded that EPA is very familiar with their research and has been trying to develop a relationship between that center and the work of the health effects researchers at EPA. He noted that NSF recently announced six new centers for nanoscale research. The new centers are located at University of California–Berkeley, Stanford University, University of Wisconsin, Ohio State University, University of Pennsylvania, and Northeastern University in Massachusetts.

Dr. Daston asked if the National Health and Environmental Effects Research Laboratory (NHEERL) is conducting any nanotechnology research. Mr. Lingle replied that there is very little intramural nanotechnology research at EPA; most of the current program is extramural research. Dr. Johnson asked if EPA has determined what areas of research are not being covered by other organizations. Mr. Lingle replied that there is a limited amount of research being done in the health and environmental effects area, but EPA's new solicitation will increase the health and environmental effects research and NSF's new centers may conduct such research as well. Dr. Lambert asked if EPA is working to direct industrial research toward environmental applications. Mr. Lingle replied that EPA is participating on two industry groups to advocate collaboration on applications and implications research. EPA also met recently with the American Chemistry Council, which formed a group to focus on health and environmental effects of nanotechnology. Dr. Daston commented that the public is very interested in the possible health effects of nanotechnology. Has EPA initiated a campaign to keep the public informed? He added that the Agency needs to be open about this research, but should not alarm people unnecessarily. Mr. Lingle responded that a work group has been developing a set of questions and answers on nanotechnology that will help educate the public, and the Wilson Center is trying to stimulate a public dialog on this topic. In addition, NSF has supported some research on the societal implications of nanotechnology, but more work is needed in this area. Dr. Henderson asked about the elements involved in nanotechnology. Mr. Lingle replied that the spectrum of elements is potentially broad, but currently includes carbon, cadmium, gallium, and silicon, among others. There also are benign materials such as nanoclays. The potential range is great but only a few are currently in production.

Dr. Johnson asked how the BOSC could help ORD with regard to its nanotechnology research program. Mr. Lingle responded that he will discuss this with Dr. Farland and develop some suggestions for the Board. Dr. Johnson said the BOSC could do a consultation on nanotechnology, prepare a letter report, or review a document. Dr. Sayler volunteered to followup on this topic with ORD and to chair the Board's efforts on nanotechnology.

Ethics Update

Ms. Kowalski distributed a table that summarized the political activities EPA employees can and cannot do based on their appointment. These activities are regulated by the Hatch Act, which was enacted in 1939 and amended in 1993. Dr. Johnson pointed out that these restrictions apply to the BOSC members only on the days they are Special Government Employees (SGEs). Ms. Kowalski stated that all SGEs must complete annual ethics training. This training can be completed online and the certificate received upon completion must be mailed or faxed to Ms. Kowalski. Dr. Harding asked if the disclosure forms had been revised so that the changes can be saved and later updated. Ms. Kowalski was uncertain if the forms had been revised. She will be distributing the forms to the BOSC members soon and asked that they be completed and returned to her before the January meeting. The meeting was recessed at 5:10 p.m.

Thursday, September 23, 2004

Dr. Johnson reconvened the meeting at 8:36 a.m. He announced that the next meeting of the BOSC will be held January 27-28, 2005, in Washington, DC (full day on the 27th and half day on the 28th). The following BOSC meeting will be held May 17-18, 2005, at a location to be determined (full day on the 17th and half day on the 18th). Because the BOSC DFO had a medical emergency on Thursday, Dr. Stiber served as the DFO for the remainder of the BOSC meeting.

BOSC Issues

Dr. Farland thanked the BOSC members for the work that they are doing and the value of their input. Dr. Gilman was pleased to receive the report of the Communications Ad Hoc Subcommittee and ORD will respond to that report before the next BOSC meeting. EPA has been working to improve communications. ORD has hired a communications director, who will be working to coordinate communications within ORD and to highlight the Agency's research. Dr. Gilman also was pleased to receive the Biotechnology Research Program Letter Report. That review was very efficient and provided timely input to the Agency regarding this program.

Currently, there are eight BOSC members up for reappointment, and reappointment letters have been sent to these members. Also, there are several vacancies on the Board. The Nomination Subcommittee is working to identify qualified candidates to fill these vacancies. Dr. Farland commended Ms. Kowalski on her work as the DFO for the BOSC. She has done a very good job taking over these responsibilities from Shirley Hamilton, the former DFO. If there are any questions regarding travel arrangements or reimbursements, they should be directed to Ms. Kowalski.

As mentioned at previous BOSC meetings, ORD has been recruiting nine NPDs. An EPA panel was formed to vet the candidates who were interviewed by the panel, senior managers, and Laboratory/Center Directors. Dr. Gilman conducted individual interviews with more than 20 candidates. Candidates have been selected for most of the NPD positions; however, the Agency has decided to do a more focused recruitment for the Ecological and Health NPD positions. Current EPA employees have agreed to serve as Acting NPDs in these two positions until the second round of recruitment is completed. Dr. Farland noted that these individuals are eligible to apply for the positions. Several NPDs may be appointed by January 2005. The NPDs will be strong advocates for science and will work with the Laboratory and Center Directors to facilitate a balance between organizational and program issues. Dr. Farland asked if the BOSC would like to be involved in the focused recruitment for the Ecological and Health NPD positions. Perhaps the Board members could help identify candidates and encourage them to apply for the positions.

Dr. Farland stated that EPA had 10 fellows from the Association of Schools of Public Health. They worked in the Laboratories and Centers for 1 year in an effort to strengthen the connection between public health and environmental issues. EPA hired 5 of the 10 fellows into permanent positions and extended the fellowships for 1-2 years for several others. This year, there are 12 fellows and they represent a broader range of schools. The Laboratories and Centers have been very positive about the perspectives these fellows bring to ORD and they are anxious to bring in other types of fellows. Dr. Farland asked if the BOSC had any suggestions of other associations with which EPA should establish a relationship. He indicated that these fellows are Masters and Doctoral students.

Dr. Farland stated that the EDC STAR grantees meeting will be held in October. ORD sponsors a number of these types of meetings throughout the year. He suggested that some of the BOSC members may be interested in attending some of these meetings to hear the discussions among the researchers. He noted that the PM Research Centers Directors Meeting will be held on September 27. Drs. Henderson and Johnson were invited to that meeting. EPA will be announcing a new set of extramural grants on cardiovascular effects of PM. These grants will be jointly funded by the National Institute of Environmental Health Sciences (NIEHS). Dr. Farland agreed to circulate information on these awards to the BOSC.

FY 2005 Work Agenda—Program Reviews

Dr. Farland stated that ORD would like the BOSC to conduct four additional program reviews—Ecological, Human Health, Drinking Water, and PM—by spring 2005. Dr. Johnson asked the Board members to identify the topics in which they were interested. Drs. Giesy and Duke expressed interest in the Ecological Research Program Review; Dr. Sayler volunteered to work on the Drinking Water Research Program Review; Dr. Henderson agreed to lead the PM Research Program Review; and Dr. Lambert said that he would head the Human Health Research Program Review. Dr. Johnson suggested that the list of candidates assembled by the Nomination Subcommittee be used to assist in forming these subcommittees. Dr. Farland said that these programs may undergo a PART review in 2005, so timely BOSC input is critical.

The Future of EMAP

Dr. Rochelle Araujo, Acting Associate Director for Ecology, National Exposure Research Laboratory (NERL), provided an overview of EPA's EMAP program and where the program is expected to go in the future. EMAP is a research program designed to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources.

There are a number of needs that could be addressed by EMAP. The Congress and the public want to know the effectiveness of protection and restoration programs and policies. Also, there are legislative mandates under the Clean Water Act (CWA), requiring states to assess the condition of all state waters and to identify the locations and causes of impaired waters. EMAP addresses a number of program and policy questions, including:

- ✧ What are the current conditions of our ecosytems?
- ✧ Where are the conditions improving or declining?
- ✧ What stresses are associated with declines?
- ✧ Are management programs and policies working?

EMAP was designed to answer national and regional assessment questions and to detect trends. It also is being applied by some states for water quality reporting.

The EMAP program includes both intramural and extramural research and it is a highly integrated program. EMAP is integrated with academic scientists through ORD's STAR program. The STAR grants are integrated with and complementary to EMAP to derive maximum benefits from academic research. The STAR grants include both multidisciplinary research and topical research. EMAP uses a probabilistic design framework—randomized statistical designs allow interpretation of monitoring data with known uncertainty, extrapolation to the entire population with a small sample size, and statistical aggregation of like data to larger geographic areas. EMAP uses biological indicators—direct measures of aquatic ecosystem condition that are sensitive and integrate stressors. Dr. Araujo presented data from the states of Delaware and Nebraska that demonstrated the effectiveness of EMAP's design. She stated that the EMAP approach is being applied in the Acid Rain Assessment, the Mid-Atlantic Integrated Assessment (MAIA), and the National Coastal Condition Assessment. With regard to acid rain , EMAP data indicate regional "recovery" in lakes in two regions with the largest proportions of acidic surface waters and a large regional decline in surface water sulfate attributed to the Clean Air Act Amendments (CAAA). The MAIA is the first regional-scale study of environmental condition. It is EMAP's proof of concept for large-scale monitoring (i.e., indicator development and testing, feasibility of probabilistic sampling, and scientific basis for selecting reference sites). According to data from the Mid-Atlantic Highlands Program (MAHA), 17 percent of the streams are in good condition (as measured by the fish Index of Biotic Integrity or IBI), 36 percent are in fair condition, 31 percent are in poor condition, and there are insufficient data to determine the condition of 17 percent of the streams. The potential stressors for these streams (in order of percent of stream length impacted) include sedimentation, riparian habitat, mine drainage, acidic deposition, tissue contamination, phosphorus, nitrogen, and acid mine drainage.

Using the benthic invertebrate IBI, approximately 82 percent of estuaries in the MAIA are undegraded and 18 percent are degraded; 49 percent of the estuaries have low dissolved oxygen, 10 percent have contaminants, 2 percent have both low dissolved oxygen and contaminants, and for 39 percent of the estuaries, there are insufficient data. Dr. Araujo stated that there has been an increase (greater than 20%) in the area of the Chesapeake Bay with impaired benthic community from 1991-1993 to 1997-1998. In comparing estuarine benthic invertebrate IBI, the Louisianian Province is 70 percent undegraded and 30 percent degraded and the Virginian Province is 82 percent undegraded and 18 percent degraded. The stressors associated with the degraded condition in the Louisianian Province included metals (42 %), contaminants (28%), habitat (14%), unknown (10%), toxicity (4%), and low dissolved oxygen (2%). The stressors associated with the degraded condition in the Virginian Province included low dissolved oxygen (49%), unknown (39%), contaminants (10%), and low dissolved oxygen and contaminants (2%).

In EMAP's National Coastal Assessment, 24 marine coastal states (i.e., Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, New Jersey, New York, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, California, Oregon, Washington, Alaska, and Hawaii) and Puerto Rico, are monitoring with core EMAP design and indicators. These states include and Puerto Rico. The draft National Coastal Condition Report II is available on the Web at http://www.epa.gov/owow/oceans/nccr2/. Like the first Coastal Condition Report released in 2001, this report rates the overall condition of U.S. coastal waters as fair to poor, varying from region to region. It represents a coordinated effort among EPA, the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS), the U.S. Fish and Wildlife Service and coastal states. EPA expects to release the final report in the fall of 2004.

EPA is extending the EMAP process to additional resources and regions. These expansions include Regional EMAP, Western EMAP, and the Great Rivers Project. Regional EMAP (REMAP) was initiated to test the applicability of the EMAP approach to answer questions about ecological conditions at regional

and local scales. Using EMAP's statistical design and indicator concepts, REMAP conducts projects at smaller geographic scales and in shorter time frames than the national EMAP program. The objectives of REMAP are to: (1) evaluate and improve EMAP concepts for state and local use, (2) assess the applicability of EMAP indicators at differing spatial scales, and (3) demonstrate the utility of EMAP for resolving issues of importance to EPA regions and states.

The purpose of Western EMAP (EMAP-West) is to demonstrate the value of the EMAP approach by applying it to environmental problems across a large and diverse geographical region, and to advance the science of ecosystem monitoring. This will be accomplished by applying EMAP designs to urgent and practical problems facing the western EPA regional offices. The Western Pilot Streams project will develop the science for state-based probabilistic condition assessments of Western streams. Samples of Western state streams are collected at 900 total locations plus 15 percent revisits. These streams are located in 12 states and 18 ecologically distinct western regions.

The Great Rivers Project involves one of the most comprehensive scientific surveys ever to be conducted on three great rivers and it will provide the tools needed to help states better manage and protect these important national resources. This survey will provide the information needed to check the health status of the Missouri, Mississippi, and Ohio Rivers, three major waterways that link the upland streams of the Central Basin to the Gulf of Mexico. The Great Rivers Project is developing the scientific basis for assessing the condition of large rivers.

Dr. Araujo identified a number of coastal observation systems that are being used or will be used in the future to monitor coastal conditions. These include moored and drifting buoys, meteorological towers and stations, bottom-moored instruments, stand-alone instruments, ship survey cruises, satellite imagery, and remotely and autonomously operated vehicles. She noted that EPA has an agreement with Sandia National Laboratories to investigate direct remote sensing of rivers.

Numerous reports have cited the problems associated with a national assessment of water quality. In 2000, the General Accounting Office (GAO) stated that EPA and the states cannot make statistically valid inferences about water quality and lack the data to support management decisions. In 2001, the National Research Council found that a uniform, consistent approach to ambient monitoring and data collection is necessary to support core water quality programs. In 2002, the National Academy of Public Administration stated that improved water quality monitoring information is necessary to help states make more effective use of limited resources. In 2002, the Heinz Center report indicated that there is inadequate data for national reporting on fresh water, coastal, and ocean water quality indicators. EPA's recent State of the Environment Report concluded that there is no current way to develop a national picture of water quality.

A number of states have adopted the use of probability survey designs for streams and estuaries. These include Delaware, Maryland, Virginia, West Virginia, Kentucky, South Carolina, Florida, Alabama, Mississippi, Oregon, Idaho, and Minnesota. Other states are evaluating the adoption or have expressed interest in adopting the approach. Only four states have indicated that they have no interest in adopting the approach. Under the CWA, states must establish state Water Quality Standards (WQS) for all waters and report water quality status for all waters. The states must submit a list of waters that do not meet WQS and need a total maximum daily load (TMDL). The states must develop watershed plans for all waters. The states issue permits to point sources to meet WQS and manage nonpoint sources to meet WQS. The states ensure point source compliance with permits and implement adequate state monitoring programs.

For EPA to conduct a national assessment of water quality, the states must report data on water quality and there needs to be consistency of standards and criteria across state boundaries. One of the Agency's

long-term goals for conditions research is for states and tribes to apply scientifically defensible monitoring designs and sensitive ecological indicators to determine the status and trends of their aquatic resources. The identification of patterns of contamination across state boundaries requires consistent approaches to CWA Section 305b and 303d reporting.

EPA is working with the states to conduct an ecological assessment of wadeable streams throughout the United States. This Wadeable Streams Assessment uses a stratified, statistically valid sample survey design that will allow extrapolation of stream condition throughout each ecological region of the United States. State participants are using a common biologically based protocol and are following a comprehensive quality assurance program and standardized data management system. The goals of the Wadeable Stream Assessment are to provide a status report on the condition and health of the wadeable streams of the United States; help build state capacity for monitoring and assessment; and improve the comparability and integration of state monitoring and assessment methods. The Wadeable Stream Assessment focuses on a basic set of core indicators—benthic macroinvertebrates, physical habitat, and water chemistry. It complements EPA's efforts in the Western states and the regions. Sampling for the assessment should be completed in 2004, and a report will be released by December 2005.

To support national assessments, EPA is conducting pilots in New England and the Mid-Atlantic. The Agency is surveying state methodology for 305b reports for the New England and Mid-Atlantic states, and identifying robust indicators of condition and aggregating reference population data across states. Dr. Araujo stated that the EMAP approach could be used by states to set standards and criteria; identify impaired waters; develop priorities for monitoring, protection, and restoration; and establish TMDLs and watershed planning. The states need to use scientifically defensible reference conditions as a benchmark and identify a threshold for biological impact. They need to do targeted monitoring and integrated reporting. Condition information will be combined with land cover data to predict probability of impairment.

There is a joint effort by EPA's Office of Water (OW) and ORD, and the USGS to investigate approaches for integrating monitoring. This effort is focused on EMAP, the National Water Quality Assessment Program (NAQWA), states, and models for clean water. The Agency also is working with the National Water Quality Monitoring Council. The purpose of the council is to provide a national forum for coordination of consistent and scientifically defensible methods and strategies to improve water quality monitoring, assessment, and reporting. The council promotes partnerships to foster collaboration, advance the science, and improve management within all elements of the water quality monitoring community.

In closing her presentation, Dr. Araujo left the BOSC with the following issues to ponder:

- ✧ Given that EMAP currently has "brand" identification and is being increasingly adopted by states for 305(b) reporting, should EMAP extend that "brand" into new areas (e.g., targeted monitoring, TMDLs, BMP effectiveness, and new approaches and technologies)? Will it dilute the strength of the original approach ("EMAP Classic")?

- ✧ Alternatively, should EMAP continue to extend into additional regions and resources and be integrally linked with additional uses of observation data?

Dr. Windom commented that the USGS has been collecting data on streams for years, but the quality of the older data is questionable. Dr. Araujo added that the data were collected very differently from state to state. Dr. Farland mentioned that the Report on the Environment really stressed this problem—our inability to use state data to indicate the condition of the environment. Dr. Henderson asked if the states monitor for chemicals in the water. Dr. Araujo replied that they do monitor for chemicals, noting that bioaccumulative chemicals are in tissues.

Dr. Windom asked if EPA plans to use state data for the national assessment. Dr. Araujo replied that EPA is working with the states to collect data; she noted that this effort is separate from the state monitoring efforts in those states that have not adopted the EMAP approach. Dr. Windom asked if EPA is working with the states to ensure they are using the same quality objectives. Dr. Araujo responded that for this collection effort, the states are using consistent approaches for sampling and analysis. Dr. Farland commented that OW is encouraging the states to adopt the EMAP approach and the states are willing, but they do not have the funding needed to implement the adoption. Dr. Johnson stated that the adoption of the EMAP approach should actually decrease the cost of monitoring. Dr. Farland said that the data from the coastal program showed considerable cost savings for the states that used the EMAP approach. Dr. Araujo mentioned that states could reduce costs associated with 305(b) reporting and compliance monitoring by using the EMAP approach, which allows them to target their funds to address specific problems. She noted that the EMAP approach does not yet address the state's full suite of needs and that will be essential to ensure its adoption by the states.

Dr. Harding asked if EMAP has been working with tribal organizations. Dr. Araujo responded that there are high levels of participation by the tribes and the tribes are adopting the EMAP approach at a faster rate than the states. Dr. Farland explained that a number of tribes have received STAR grants to collaborate with EPA on the adoption of the EMAP approach. Dr. Farland commented that the EMAP concept has been presented at a number of international meetings. There is international interest in EMAP approaches and EPA's experience with EMAP, but no international organization has yet taken on the project of trying to integrate data across boundaries. The Organization for Economic Cooperation and Development (OECD), however, is looking at mechanisms for integrating data from different countries.

Dr. Windom asked if the EMAP reports include NOAA data. Dr. Araujo replied that NOAA data are included and EPA is conducting a couple of pilots with NOAA looking at coastal watersheds/coastal conditions and trying to address the consistency of data for open waters and coastal areas. Dr. Windom asked if EPA was looking at new sensor technologies and how to integrate those into the approach. He noted that EPA has been lagging behind the state-of-the-art with regard to analytical methods. He said that NOAA has been slow to adopt new approaches because the regulators want to comply with EPA standards and methods. Dr. Araujo mentioned that EPA is working with the National Aeronautics and Space Administration (NASA) on direct observation of resources as well as secondary observation.

Dr. Johnson asked about the next steps for EMAP. Dr. Farland responded that he thought that the presentation would be helpful in determining the BOSC's interest with regard to EMAP. Dr. Araujo identified several issues for the Board members to ponder concerning EMAP. Should EMAP continue to develop tools or should the program focus on applying the tools to meeting the needs of the states and to collect the data needed for national assessments?

Dr. Daston said that it would be reasonable to include EMAP in the Ecological Research Program Review. He commented that EMAP has been and continues to be a lightening rod. The program has been criticized because it has been difficult for people to understand its focus. The Board could address EMAP separately in the ecological report or prepare a letter report on EMAP. Dr. Clark suggested that the BOSC do a consultation on EMAP rather than a letter report.

FY 2005 Work Agenda—Program Reviews (Continued)

Dr. Johnson identified the following chairpersons for each of the new program review subcommittees:

Program Review	Chairperson(s)
Ecological Research	John Giesy
Human Health Research	George Lambert
Drinking Water Research	Gary Sayler
Particulate Matter Research	Rogene Henderson

Dr. Johnson asked that the draft charges for these four subcommittees be submitted to the BOSC by December. He asked that the subcommittee Chairs give some thought to the types of expertise that will be needed on their subcommittees. Dr. Farland agreed to provide input to the BOSC with regard to the types of expertise that will be needed for these subcommittees by October 8. He also agreed to submit the draft charges to the BOSC by December 1, 2004. For the January BOSC meeting, Dr. Farland will prepare a timetable for these program reviews. By that time, a list of candidates for subcommittee membership should be moving through the approval process. He indicated that a separate DFO will be assigned to each subcommittee; the Laboratories/Centers will provide the DFOs for these new subcommittees.

Dr. Johnson said that he would like to assign a member of the BOSC to lead the discussion for each review. Dr. Sayler asked if there was something that could be used to quickly educate the external subcommittee members about the PART process. Dr. Farland replied that the one-page factsheet on PART should be helpful in educating the subcommittee members. He also suggested that they review the information on PART that is posted on the OMB Web site (www.omb.gov/part).

Dr. Johnson asked Drs. Harding and Dorward-King to provide the Board feedback on the two pilot reviews. What should be given to the subcommittee members before the review? How can we avoid delays in future reviews? Dr. Johnson said that he will serve on the Drinking Water Research Subcommittee. Dr. Duke volunteered to serve on the Ecological Research Subcommittee. He asked Dr. Windom to consider working on the Ecological Research Subcommittee. Dr. Harding volunteered to serve on the Human Health Research Subcommittee, and Dr. Stewart agreed to serve on the Particulate Matter Research Subcommittee. Ms. Kowalski will send out an e-mail requesting candidates for the subcommittees. The DFO must make the initial contact with the candidate. Dr. Johnson asked the Chairs to review the list of candidates compiled by the Nomination Subcommittee for possible subcommittee members.

Dr. Johnson asked what can be done to accelerate the formation of the GC Research Subcommittee. Dr. Dorward-King stated that she had received 10 new names to consider for possible subcommittee membership. She recruited Dr. Duke as her Co-Chair to assist with the workload associated with leading the subcommittee. Dr. Dorward-King said that she plans to take a more direct approach to encourage individuals who have been contacted by the DFO to serve on the subcommittee. She thought it would be very difficult to draft a report by May 2005, but she agreed to try to stay ahead of the four new subcommittees. Given Dr. Duke's willingness to serve as the Co-Chair of the Global Change Research Subcommittee, Dr. Johnson asked Dr. Windom to replace Dr. Duke on the Ecological Research Subcommittee. Dr. Farland suggested holding the face-to-face Global Change Research Subcommittee meeting in January or February so that it will take place before the meetings of the four new subcommittees, which will probably take place in March or April.

In response to a question concerning the technical EPA contact for the new reviews, Dr. Farland said that the new NPD or the Acting Program Director will be the contact. He will designate a DFO for each

subcommittee by December 1, 2004, and Dr. Farland or the DFO will notify the Chair regarding the technical EPA contact for each subcommittee.

Interagency Collaboration

Dr. Lambert stated that collaboration with other federal agencies, states, and other organizations should be considered during each of the program reviews. The charge questions should include the topics of integration and collaboration. He stated that the following questions should be added to each program review:

- ✧ Are there important interagency collaborations that should and can be improved to advance the Agency's research agenda?

- ✧ To what extent has the EPA established and utilized other agencies (inside and outside the government) in advancing the EPA's research agenda?

If the subcommittee finds that EPA is not collaborating with other groups, it should determine the reasons and identify ways to improve collaboration. Dr. Lambert said the subcommittees also should determine the level of collaboration. Is the collaboration limited to discussions? Does the collaboration involve joint development of methods? Dr. Harding suggested that the collaboration questions should be added to Question 1c of the charge to the EDC Subcommittee. Dr. Windom said that the subcommittees also need to look at impediments to collaboration. He suggested adding the following question: What are the impediments to collaboration with other organizations? Dr. Farland pointed out that EPA does many things to support interagency collaboration that are not specific to a program. For example, EPA participates in many Committee on Environmental and Natural Resources (CENR) subcommittees helping to shape the common direction to be taken by the Federal Government. Dr. Farland asked if it would be helpful to have someone brief the BOSC on CENR activities as well as invite representatives from other agencies to discuss their collaboration with EPA. Dr. Johnson said such presentations would be helpful. He agreed that Dr. Windom's question about impediments should be added to the collaboration questions.

Dr. Johnson said that the BOSC has a full agenda for the next 6-9 months but the Board members should be proactive in identifying topics they would like to address in the future. He noted that the Board asked for the briefing on nanotechnology. Are there other topics that the Board should address? He asked the members to give some thought to future topics.

SAB Activities

Dr. Lambert distributed two tables to the BOSC that listed the advisory projects of the SAB in FY 2004 and FY 2005, respectively. He reported that the SAB met last week in Region 9, San Francisco, CA. On the first day of the meeting, Region 9 staff described their primary issues and concerns, e.g., perchlorate, and large cattle farms where the animals never leave their stalls (methane gas, sewage/sludge issues). On the second day of the meeting, the SAB reviewed and approved the 2003 Draft Report on the Environment, a report initiated by former EPA Administrator Whitman. The SAB reviewed the document knowing that it would not be revised but that the comments would be used to improve the 2006 report. Dr. Lambert said the SAB submitted a 2-page report to the EPA Administrator on the Report on the Environment.

The SAB also reviewed and approved the Multimedia, Multipathway, and Multireceptor Risk Assessment (3MRA) Modeling System. The SAB will meet December 2-3, 2004, in Washington, DC. One of the topics on the agenda is nanotechnology and Steve Lingle is scheduled to make the presentation. Dr.

Lambert mentioned that the SAB is instituting a review process for its reports. All reports prepared by a subcommittee will be reviewed to assess the quality of the report and if the report responds to the charge from EPA. Dr. Lambert stated that the SAB has a full agenda for the next year, and a number of the activities may be of interest to the BOSC.

Dr. Clark asked about the SAB consultation on computational toxicology. Dr. Johnson replied that the consultation is captured in the meeting minutes; he agreed to provide a copy of the minutes to Dr. Clark. Dr. Daston asked about the Ecological Benefits Strategic Plan to be reviewed by the SAB. Dr. Farland stated that Al McGartland, in the Office of Policy, Economics and Innovation (OPEI), is responsible for that report. He can be contacted for more information.

Dr. Sayler asked if he could attend the Evaluating EPA's Science Needs in a Rapidly Changing World—Lessons Learned From Nanomanufacturing Example meeting to be held December 1-2, 2004. Dr. Johnson asked members who have interest in any of the SAB projects/activities to notify him or Dr. Lambert. Dr. Clark noted that the SAB will be discussing ReVA at the October meeting. Dr. Sayler asked if the BOSC would pay for his travel to attend the nanotechnology workshop; Dr. Stiber replied that he would notify Ms. Kowalski and she would process the travel. Dr. Stiber said that Dr. Sayler would be required to report on the meeting to the BOSC if the travel is covered by EPA.

Dr. Johnson asked the members if they thought it was helpful to allow time for the subcommittees to meet in conjunction with the Executive Committee meetings. Dr. Harding said that she thought it worked very well and her subcommittee made good use of the time. Even if the entire subcommittee cannot be present, it allows time for the Board members who serve on the subcommittee to do some brainstorming and planning. Dr. Johnson indicated that the January meeting agenda also will provide time for subcommittee meetings. Other items to be considered for the January meeting include a presentation on modeling in a regulatory framework and the BOSC followup on the nanotechnology presentation. Dr. Daston mentioned that biomonitoring is another topic that has been proposed for BOSC consideration. He drafted a one-pager on the biomonitoring issues that may be of interest to the Board. Dr. Henderson mentioned the report on gene flow. Should that be addressed in January? Dr. Dorward-King asked for an update on the NPDs. How will they be organized and how will they interact with the Laboratory and Center Directors? Dr. Clark suggested that EMAP be addressed in the Ecological Research Program Review as a component of the ecological program. He wanted to know, however, how the NPD will integrate environmental monitoring in the ecological and water programs. Dr. Sayler mentioned microbial risk assessment as a topic of interest. How does the approach differ from classical chemical risk assessment? Homeland security is another potential topic for the January meeting. Dr. Johnson said that he will discuss this list of topics with Dr. Farland to develop the agenda for the January meeting. If the agenda includes a session on nanotechnology, Dr. Sayler will lead the discussion. Dr. Johnson asked that the member leading the discussion will be responsible for reviewing the minutes of his/her assigned session.

Nomination Subcommittee Update

Currently, there are three vacant positions on the BOSC. The Nomination Subcommittee has assembled a list of 14 candidates with expertise in air pollution/atmospheric sciences. Dr. Johnson reported that these individuals have expressed an interest in serving on the Board. The subcommittee also is seeking to identify candidates with behavioral science expertise. Another area of expertise that would be beneficial to the BOSC is value engineering or value science. Dr. Johnson stated that finding candidates with this expertise will require a focused search. Dr. Henderson expressed some concern about the list of 14 candidates with air pollution/atmospheric sciences expertise. She asked if additional names could be proposed for inclusion on the list. Dr. Johnson responded that several names could be added to the list. Dr. Duke asked if Dr. Johnson had the name of the individual he had suggested earlier, and Dr. Johnson

replied that he had that name. In January, the subcommittee will complete the work for two vacancies on the BOSC. Dr. Johnson hopes that two new members will be appointed to the Board before the May 2005 meeting. He thought the third vacancy may be filled before the September meeting. Dr. Harding asked if the evaluation expert had to be focused on the environmental field. If not, she has several names to submit for consideration. She also asked if the Board should add a communication question to the charges for the program reviews. Should the BOSC create a standing Communications Subcommittee? Dr. Giesy asked about the activities of a standing Communications Subcommittee. Dr. Harding responded that a standing subcommittee would highlight the importance of communications to ORD. Dr. Daston thought it would be more practical to incorporate communications into all BOSC reviews. The Board should continue to monitor ORD's progress in improving communications and ORD should be asked to update the BOSC on their progress since the workshop. They could provide an update at the January meeting.

Dr. Johnson said that no standing Communications Subcommittee will be formed until the BOSC has determined the role and activities of the subcommittee. Dr. Stewart pointed out that the workshop only addressed communication of research results. There are other types of communication that the subcommittee could address. Dr. Johnson suggested that the Board review the charge to the Ad Hoc Communications Subcommittee and determine what has been achieved and what remains to be accomplished.

Public Comments

At 1:00 p.m., Dr. Johnson asked if anyone from the public would like to make a comment. No public comments were presented. Following a motion to adjourn the meeting, Dr. Johnson adjourned the meeting at 1:02 p.m.

Action Items

- ✧ The Risk Assessment Workshop Subcommittee members will emphasize to the workshop speakers that the presentations are to be constructive and designed to improve risk assessment within EPA, rather than an opportunity to criticize the Agency.

- ✧ Dr. Henderson will investigate placing announcements for the Risk Assessment Workshop in *Environmental Health Perspectives*, *ACS Journal*, *Environmental Science & Technology*, and the SETAC and SRA bulletins.

- ✧ Ms. Kowalski will ensure that information on the Risk Assessment Workshop is posted on the BOSC Web Site and that a registration site is available.

- ✧ Dr. Daston will add a reference to the Biotechnology Research Program plan at the end of the Biotechnology Research Program Letter Report.

- ✧ Dr. Johnson will send an e-mail to Dr. Schnoor to thank him for his efforts on the Biotechnology Research Program Letter Report and to inform him that the report was approved by the Executive Committee.

- ✧ The BOSC members will provide names of potential members for the GC Subcommittee to Dr. Dorward-King.

- ✧ The CompTox Subcommittee should discuss the creation of a computational toxicology center and provide timely feedback to ORD on the center concept.

- ✧ Dr. Clark will provide a date for completion of the Coastal Health Subcommittee Letter Report to Dr. Johnson.

- ✧ Mr. Lingle will discuss with Dr. Farland the BOSC's role with regard to ORD's nanotechnology research program and develop some suggestions for the Board.

- ✧ Dr. Sayler will followup on the nanotechnology presentation and lead the Board's efforts on this program.

- ✧ Board members must complete annual ethics training, which can be completed online. The certificate received upon completion of the training must be mailed or faxed to Ms. Kowalski.

- ✧ Ms. Kowalski will distribute disclosure forms to the BOSC members. The Board members must complete these forms and return them to Ms. Kowalski before the January BOSC meeting.

- ✧ BOSC members should identify appropriate candidates for the Ecological and Health NPD positions and encourage them to apply for these openings.

- ✧ BOSC members should notify Dr. Farland if they have any suggestions regarding associations with which EPA should establish a relationship for recruiting fellows (as the Agency currently is doing with the Association of Schools of Public Health).

- ✧ Dr. Farland agreed to circulate information to the BOSC members on the grants awarded by EPA and NIEHS focused on the cardiovascular effects of PM.

- ✧ BOSC members should consider the Board's role with regard to EMAP, particularly the questions posed by Dr. Araujo at the conclusion of her presentation.

- ✧ Dr. Farland will provide input to the BOSC on the types of expertise that will be needed for the four new program reviews by October 8.

- ✧ Ms. Kowalski will distribute an e-mail to the BOSC members requesting them to identify candidates for membership on the four new program review subcommittees.

- ✧ Dr. Farland will provide draft charges to the BOSC for the four new program reviews by December 1.

- ✧ Drs. Harding and Dorward-King will provide feedback to the BOSC regarding the two pilot program reviews to help streamline the efforts of the new subcommittees that will be conducting program reviews.

- ✧ Ms. Beverly Campbell will distribute to the BOSC members the list of candidates compiled by the Nomination Subcommittee for BOSC membership as well as a CD of the resumes of these candidates.

- ✧ The Chairs of the four new program review subcommittees will review the list of candidates compiled by the Nomination Subcommittee to identify appropriate experts for the new subcommittees.

- ✧ Dr. Farland will designate the DFOs for the four new program review subcommittees by December 1. Dr. Farland or the designated DFO will send the name of the EPA technical contact for the program to the appropriate Chair of the four new program review subcommittees.

- ✧ The program review subcommittee Chairs should add the two interagency collaboration/integration questions to their respective charges. The following question also should be added to the charges: What are the impediments to collaboration with other organizations?

- ✧ The subcommittee chairs should ensure that communications is addressed in each review conducted by the BOSC.

- ✧ Dr. Johnson agreed to distribute the SAB meeting minutes that capture the SAB's consultation on computational toxicology to the BOSC members.

- ✧ BOSC members interested in attending an upcoming SAB activity should notify Drs. Johnson and Lambert.

- ✧ Ms. Kowalski will process Dr. Sayler's travel so that he can attend the SAB meeting Evaluation EPA's Science Needs in a Rapidly Changing World—Lessons Learned From Nanomanufacturing Example to be held December 1-2, 2004.

- ✧ Subcommittee Chairs should schedule subcommittee meetings in conjunction with the January BOSC meeting as time will be allotted for these meetings on the agenda.

- ✧ Dr. Henderson will provide to Dr. Johnson the names of additional candidates with air pollution/atmospheric sciences expertise for consideration by the Nomination Subcommittee.

Board of Scientific Counselors Executive Committee (Continued)

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