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

BOARD OF SCIENTIFIC COUNSELORS EXECUTIVE COMMITTEE MEETING

Washington, DC
September 11-12, 2003

Thursday, September 11, 2003

Welcome, Introductions, and Overview

Dr. Jerry Schnoor (University of Iowa), Chair of the Board of Scientific Counselors (BOSC), called the meeting to order at 8:45 a.m., and asked the members to observe a moment of silence in memory of those who lost their lives during the tragic events that took place 2 years ago. He then welcomed everyone to the September meeting and asked the members and visitors to introduce themselves. He noted the full agenda and provided a brief overview of the meeting.

Dr. Schnoor reported that Dr. Paul Gilman, Assistant Administrator for Research and Development (AA/ORD), has asked the BOSC to review three Multi-Year Plans (MYPs)—Mercury, Endocrine Disruptors, and Global Change. In addition, Dr. Gilman asked the Board to review ORD's computational toxicology plan. Four subcommittees will be formed to review these documents and Dr. Schnoor asked the members to indicate their preference with regard to these subcommittees (first and second choice).

Dr. Bill Farland (Acting Deputy AA for Science) indicated that the Administrator designee was spending his first day at EPA preparing for his confirmation hearings, which are scheduled for next week. He mentioned that, in addition to reviewing the three MYPs and the computational toxicology plan, Dr. Gilman would like the BOSC to review what the Agency is doing to improve its risk assessment methods. EPA has a substantial effort underway reviewing its risk assessment methods and trying to determine if the Agency should do anything differently. Dr. Farland suggested that the BOSC may want to consider convening a public workshop, similar to the one on communications, to discuss EPA's risk assessment methods. He noted that the Agency is preparing several white papers on risk assessment methods as well as a manuscript for publication. The internal review of these papers should be completed by November, so they should be available to the BOSC by late fall. Dr. George Daston (Proctor & Gamble) pointed out that there are many belief systems with respect to risk assessment methodology, making this a very difficult subject to tackle. He asked Dr. Farland to expand on the BOSC's role. Dr. Farland replied that Dr. Gilman would like to discuss the Board's role in this risk assessment review during tomorrow's session. Dr. Rogene Henderson (Lovelace Respiratory Research Institute) suggested that the BOSC-sponsored workshop focus on one or two particular aspects of risk assessment methodology, and Dr. Farland agreed.

Ethics Briefing for Special Government Employees

Peggy Love, an ethics attorney for EPA, covered a number of ethics issues of concern to Special Government Employees (SGEs). She noted that members of the BOSC are considered SGEs and she defined an SGE as a person who is retained, designated, appointed, or employed to perform, with or without compensation, temporary duties for the Federal Government either on a full-time or intermittent basis for a period not to exceed 130 days during any period of 365 consecutive calendar days. Ms. Love

pointed out that an SGE is subject to the Standards of Ethical Conduct that apply to federal employees and she described the statutes and regulations that apply to the BOSC members.

She explained that a conflict of interest is a personal interest or relationship, as defined by law or regulation, that conflicts with the faithful performance of official duty. Federal employees are prohibited from participating personally and substantially in an official capacity in any particular government matter that would have a direct and predictable effect on their own or their imputed financial interests. Ms. Love provided definitions of "participate," "personally," "substantially," "particular matter," "direct and predictable effect," and "financial interests" to further explain this statute. She indicated that BOSC members also need to be concerned about appearances under 5 C.F.R. 2635.502 and individuals with whom they have a covered relationship (i.e., household members, relatives, employer). Another concern is active participation in an outside organization.

Ms. Love noted three methods of resolving conflicts of interest. First, the member can recuse himself/herself and not participate in those activities. Second, the member can sell or divest his/her financial interest. Third, the member can receive a waiver. A waiver is granted only when the government's need for the member's services outweighs the conflict of interest created by the financial interest involved (18 U.S.C. 208(b)(3), 5 C.F.R. 2640.302). In addition, the waiver must be issued prior to the member taking any action in the matter.

Additional conflict of interest statutes that apply to the BOSC members concern bribery, representational services, and post employment. BOSC members are prohibited from corruptly seeking, accepting, or agreeing to receive anything of value for themselves or others, in return for being influenced: (1) in the performance of an official act, (2) to aid in the commission of a fraud on the United States, or (3) to do or omit any act in violation of official duty.

An SGE is prohibited from seeking, accepting, or agreeing to receive compensation for any representational services, rendered personally or by another, in relation to any particular matter involving a specific party or parties: (1) in which the SGE has at any time participated personally and substantially as a government employee, or (2) if the SGE has served in excess of 60 days during the immediate preceding 365 days, such matter is pending in the department or agency in which such employee is serving.

The post-employment restrictions prohibit communications by former employees made with the intent to influence the government. There is a lifetime ban that prohibits an SGE from switching sides to represent someone back to the government on a particular matter involving specific parties in which you were personally and substantially involved. There is a 2 year prohibition on matters that were under their official responsibility.

Ms. Love reviewed the standards of ethical conduct regulations (5 C.F.R. 2635), highlighting some of the provisions that are likely to be relevant to the BOSC. Board members cannot, directly or indirectly, solicit or accept a gift from a prohibited source or one that is given because of his/her official position. Ms. Love noted that coffee, donuts, and plaques are exceptions and these items can be paid for by the government. Additional exceptions are gifts of $20 or less given because of a personal friendship; discounts given to all government employees; gifts based on outside business or employment relationships; and widely attended gatherings.

BOSC members cannot use their positions with the government for their own private gain or for the private gain of friends, relatives, or persons with whom they are affiliated in a non-governmental capacity. BOSC members cannot use their public office (title) for the endorsement of any product, service, or enterprise unless permitted by statute or other authority. Board members cannot engage in a

financial transaction using nonpublic information, or allow the improper use of another whether through advice or recommendation, or by knowing unauthorized disclosure.

BOSC members have a duty to protect and conserve government property including computers, photocopiers, phones, and fax machines. EPA has a policy authorizing employees to use government equipment for personal use as long as it is limited, legal, and done on the individual's own time.

SGEs are subject to the financial disclosure provisions of the Ethics in Government Act and 5 C.F.R. 2634. If an SGE is reasonably expected to serve more than 60 days in any calendar year, they are required to file a disclosure report. Ms. Love noted that SGEs are covered by the Hatch Act only during the 24-hour period of any day in which they are actually performing government business.

Dr. Bill Chameides (Georgia Institute of Technology) pointed out that because BOSC meetings are open to the public, the members did not have access to nonpublic or insider information. Dr. Anna Harding (Oregon State University) asked if the financial disclosure forms could be filled out electronically and saved so that they can be updated next year. Ms. Love replied that she would e-mail to Shirley Hamilton (EPA/NCER) the link to the form that can be saved for future updates. Ms. Hamilton reminded the BOSC members that the forms have to be completed annually and must be submitted to her no later than October of each year. Dr. Dan Acosta (University of Cincinnati) asked why the disclosure form is not consistent across the government. Ms. Love responded that there are efforts underway to ensure that the forms are consistent, in terms of the information required and the standards to be met, across all government agencies; however, each agency prefers to use its own form. Ms. Love commented that the ethics group at EPA is undergoing an audit and one of the areas the auditors have decided to review is SGEs.

Dr. Daston asked if the travel of a Board member could be paid by a foreign government. Ms. Love did not think that payment of travel and accommodations by a foreign government would be prohibited; however, if a member has any doubts it would be better to contact her office for advice.

Communications Subcommittee Draft Report

Dr. Ann Bostrom (Georgia Institute of Technology) briefly described the history of the Communications *Ad Hoc* Subcommittee. Two years ago, the BOSC was asked by the AA/ORD to examine how ORD research results are communicated, both within and outside the Agency, and how they might be more effectively communicated. The BOSC formed the Communications *Ad Hoc* Subcommittee to conduct this review and report on its findings. The Subcommittee decided to employ an approach used successfully by previous BOSC subcommittees—to distribute a list of self-study questions to the ORD Laboratories and Centers. The Subcommittee also reviewed the Laboratory and Center responses to a communications question that was posed as part of the BOSC's second review of ORD's Laboratories and Centers. In addition, the Subcommittee members decided to hold a workshop in conjunction with the May 2003 BOSC meeting to discuss best communications practices within the ORD Laboratories and Centers as well as best practices in other organizations.

Following the May workshop, the Subcommittee drafted the reported entitled "Communicating Research Results," which was distributed to the BOSC Executive Committee members for review prior to the September 2003 meeting. Dr. Bostrom received comments from a number of Board members and incorporated them into the revised draft (included in the September meeting notebook). She noted that all of the members who submitted comments thought the workshop was very useful and that the Laboratories and Centers had made significant improvements in their communication efforts. Dr. Daston mentioned that, although each Laboratory and Center had implemented communications activities, there was no consistency among the Laboratories and Centers and no attempt to centralize the communication strategy,

techniques, or tactics. He thought ORD could benefit from some centralization without eliminating the flexibility currently enjoyed by the Laboratories and Centers. Dr. Bostrom indicated that other reviewers had similar comments, noting that there was no consistent strategy and that innovative ideas were not being shared among the Laboratories and Centers.

Dr. Farland said that this concern was mentioned in the draft report. He added that the workshop was a good step toward sharing innovative ideas among the Laboratories and Centers, and noted that Michael Brown (EPA/ORD) is working to make the communication processes more centralized within ORD. Dr. Bostrom pointed out that the approach of allowing the Laboratories and Centers to develop their own communications plans is supported by the Subcommittee. Dr. Herb Windom (Skidaway Institute of Oceanography) commented that the formative evaluation section was the most interesting section in the report. He noted that ORD's most significant communications problem is engaging the desired audience. Dr. Henderson expressed some concern about the failure of the report to address risk communication. Dr. Bostrom replied that the Subcommittee decided to focus the review on the communication of research results. The Subcommittee viewed risk communication as an Agency-wide issue and not one controlled by ORD. The Subcommittee members agreed that risk communication is an important issue and should be addressed in future reviews.

Dr. Jim Johnson (Howard University) expressed some concern about the recommendation that communications staff should report to the Laboratory or Center Director. Are there other ways to emphasize the importance of communications within the organization? Dr. Bostrom replied that the communications staff in a number of the Laboratories/Centers currently report to the Director and it was evident by the presentations when the staff did not report to the Director. Dr. Schnoor asked if it was common in industry for communications staff to report to senior management. Drs. Daston and Elaine Dorward-King (Rio Tinto) both replied that the communications staff in their respective companies reported to the Chief Executive Officer. Dr. Schnoor added that communications staff in academia usually report to the President. Dr. Dorward-King noted that it is important for the communications staff to have formal training in communications.

Dr. Johnson expressed some concern about the inability of the Laboratories and Centers to expand their communications staffs given the likelihood of budget cuts. Dr. Bostrom responded that several Laboratories/Centers indicated their intent to do so and she did not want to discourage such actions. Dr. Farland said that ORD recognizes the importance of good communication; it can help gain acceptance of research results and build support for ORD's budget. The Laboratory and Center Directors do not believe that the addition of resources is the only means to improving communications. Dr. Harding noted that although all Laboratories/Centers had communication goals, some were more sophisticated than others. Dr. Johnson asked if there is an ORD communications template that could be used by the Laboratories and Centers to improve consistency within ORD. Dr. Bostrom replied that there is an ORD template for press releases. She added that there are a number of common communications practices among the Laboratories and Centers (e.g., workshops, press releases, publications). Dr. Farland indicated that there now is a template for ORD presentations as well as a color pallette for ORD products. The presentation template includes several standard slides to describe ORD, and it will ensure consistency among ORD presentations. (Dr. Farland presented those slides during the morning break.)

Dr. Daston stated that ORD needs to develop a single mission/vision statement that describes ORD's purpose for communication. He suggested that this statement be developed by Michael Brown's office. The individual Laboratory/Center communication strategies may vary, but there should be a central mission and vision. Dr. Bostrom replied that the report discusses communication goals and their relation to ORD's mission. She noted that ORD has a central mission and vision and there is a common understanding of communication goals, but she acknowledged that the goals stated at the May workshop were not actually goals for communicating research results. Dr. Bostrom asked if a recommendation

should be added to the report. Dr. Dorward-King suggested adding language about ORD identifying a common mission and vision for communicating research results. Dr. Bostrom proposed adding "and in ORD" after the Laboratories and Centers in the last recommendation of the report. She did not want to recommend that the Laboratories and Centers develop communication plans. Dr. Windom commented that ORD should be concerned with public relations (PR) as well as the communication of research results. He recommended that PR be an integral part of ORD communications.

Dr. Schnoor expressed some concern about the paradox of praising the independence of the Laboratory and Center communication strategies and the recommendation to centralize components of ORD communications. Dr. Bostrom suggested that the BOSC recommend that ORD increase coordination and interaction of communications among the Laboratories/Centers, but not centralized action.

Dr. Bostrom asked if anyone thought the report should be reorganized. Several members responded that they thought the report was well organized. Dr. Schnoor asked about the wording in the third line of the second paragraph under the section titled, Management of Research Results Communications Efforts. Do you really mean independently of policy changes? He suggested replacing "independently of policy changes" with "with greater timeliness and effectiveness." Dr. Bostrom replied that the original wording was deliberate, but she could see how it could be misunderstood. Dr. Farland explained that ORD communications often were delayed because the Agency did not want them to interfere with a PR press release issued by the Administrator. However, if ORD is issuing routine releases, they probably will not be viewed as interference with other Agency communications. Dr. Schnoor asked about the overlap between PR efforts and communication of research results. Dr. Bostrom noted that some communications are clearly PR and others are clearly communication of results; however, there are other communications that include both components. Dr. Farland commented that it can be difficult to separate the two. ORD often is asked to participate in press conferences. It was suggested that the third sentence in the fourth paragraph on page 2 be reworded as follows: "PR and communication of research results often overlap and both are important in their own right." Dr. Daston questioned the wording "to improve communications staffing and practices" in the recommendation at the top of page 3. Dr. Harding said the Subcommittee was referring to staff training. Dr. Bostrom suggested the following revision: "ORD should continue its efforts to improve its communication practices ..."

Dr. Bostrom suggested moving the sentences regarding goals on page 3 to the section on strategic management. She noted that the section in which goals currently are located on page 3 focuses on audience identification. The members agreed with this suggestion. Dr. Windom noted that pages 3-4 of the report address the issue of engaging the audience; however, the recommendation does not specifically address this issue. Dr. Bostrom said that the section on page 3 addresses audience identification and the formative evaluation section (pages 3-5) addresses evaluating the audiences and their specific needs, interests, and concerns. She asked if the formative evaluation section should be moved to precede the section on audience identification. There was general agreement with this suggestion.

Dr. Schnoor asked about the last sentence in the second paragraph on page 3. The public also is an implied audience. Dr. Bostrom explained that ORD's communications goal is focused on ORD staff. Dr. Farland commented that this interpretation varies depending on whether you are talking about ORD's goals for communicating with the public or ORD's goals for bringing its staff on board for communicating results. The goal cited at the workshop is the latter.

Dr. Bostrom pointed out that ORD did not articulate a set of goals and audiences at the May workshop. She thought the report should recommend that ORD state these goals explicitly and clearly. The BOSC could assist ORD in articulating these goals. Dr. Bostrom agreed to rewrite the section on goals before the conclusion of the meeting.

Dr. Bostrom asked if there should be more references in the formative evaluation section. Dr. Johnson said that more references in this section would make the sections with no references appear inadequate. He noted the comparison of NRMRL to NCEA on page 5 (fourth paragraph), and asked if the report should include direct comparisons. Dr. Bostrom replied that it would be difficult to cite specific examples from the workshop without direct comparisons. It was agreed that the report should include specific comparisons.

Dr. Bostrom asked Dr. Farland if anyone in ORD had reviewed the report to ensure that the facts are accurate. Dr. Farland and Ms. Hamilton indicated that the report had been sent to Michael Brown and Mike Moore (EPA/ORD), but they had not received any comments to date. Dr. Farland agreed to ask if they intended to submit comments. Dr. Farland asked Beverly Campbell to distribute the draft report to the Laboratory and Center Directors and request them to check the facts in the report as well. Dr. Chameides suggested that the Executive Committee approve the report with the provision that changes may be required following the review by ORD. If the Subcommittee believes the changes warrant a subsequent review by the Executive Committee, then Dr. Bostrom will request a second review. Dr. Schnoor favored this approach.

Dr. Henderson pointed out that the paragraph at the bottom of page 5 is a mixture of positive and negative statements. She suggested that the positive comments be aggregated at the beginning of the paragraph, followed by the criticisms. For example, the second sentence that begins "Despite the amount..." should be moved to the end of the paragraph. Dr. Schnoor asked if the report should provide some guidance regarding the second recommendation on page 6. Dr. Bostrom responded that a number of the Laboratories/Centers already have made progress towards this recommendation.

Dr. Windom questioned the wording of the last sentence in the first paragraph on page 6 that begins "For the purposes of analysis..." He suggested clarifying what was being analyzed and evaluated. Dr. Bostrom agreed to rewrite the sentence so that it is clear that the social scientists will assist in analyzing response or evaluative data. Dr. Bostrom noted that the section on goals (from page 2) will be inserted in the strategic planning section on pages 6-7. She will rewrite this section as needed to accommodate the move. Dr. Johnson asked Dr. Bostrom to carry the edits through to the list of recommendations on page 8. Dr. Henderson said that she was very pleased with the report because it was short, focused, and readable.

Dr. Bostrom asked Beverly Campbell to format the report and finalize it for submission to the AA/ORD. She indicated that the report would include two appendices. The first would be the proceedings from the May communications workshop and the second would be the self-study responses to the Subcommittee's communications questions that were prepared by the ORD Laboratories and Centers.

Dr. Schnoor asked for a motion to approve the draft communications report. Dr. Chameides moved that the report be approved subject to the fact checking efforts of Michael Brown/Mike Moore and the Laboratory and Center Directors. The Subcommittee is empowered to change the report as appropriate to correct factual errors noted during the fact-checking reviews. Only if the Subcommittee deems it necessary, will the revised report be submitted to the Executive Committee for a subsequent review and approval. Dr. Dorward-King seconded the motion and the report was approved unanimously with the provisions stated above.

Report on the SAB Review of Air Toxics Research Strategy and MYP

Dr. Henderson was asked to represent the BOSC at the Science Advisory Board (SAB) review of the Air Toxics Research Strategy (ATRS) and MYP, which was held July 23-24, 2003. Dr. Henderson not only attended the meeting, but was asked by Fred Miller, who chaired the review committee, to participate in

the review. She explained that air toxics are air pollutants that may pose a risk to human health or the environment. They include 188 chemicals listed under Section 112(b) of the Clean Air Act (CAA) as hazardous air pollutants (HAPs). The CAA approach to air toxics is to identify and list HAPs, develop technology-based standards, and implement a risk-based program to assess residual risks after the standards are met. She identified four categories of air toxics addressed in the strategy and MYP—urban air toxics, mobile source air toxics, indoor air toxics, and stationary source air toxics. Dr. Henderson noted that some toxics appeared in more than one category. For example, acetaldehyde appeared in all four categories. She then presented a cross-walk of chemical structure HAP groups and priority program air toxics.

Dr. Henderson reviewed the five principles delineated in the ATRS, and explained that the strategy is implemented through the MYP, the steering committee, scientist-to-scientist meetings, and cross-laboratory projects. The MYP has two long-term goals: (1) reduce the uncertainty in air toxics risk assessments, and (2) implement risk reduction of air toxics. The MYP also identifies Annual Performance Goals (APGs) and Annual Performance Measures (APMs) to 2010. The priorities within the program to be decided include: the division of studies within EPA (other MYPs), funding of studies external to EPA, and individual chemicals versus mixtures.

Dr. Henderson listed the key research questions to be addressed by the MYP (e.g., What are the sources of air toxics and what are their characteristics?) and the types of recommendations resulting from the review. These recommendations included:

- Create a better link between the ATRS and MYP.
- Apply an updated risk assessment framework, such as in the Presidential Commission, to include stakeholder involvement and risk communication consideration.
- Improve analytical methods for ambient monitoring.
- Provide an iterative process by which air toxics can be added or deleted from lists.
- Consider more emphasis on mixtures.
- Develop methods to determine unbiased best estimates of exposure-response relationships and population distributions of exposure and their uncertainties.

Dr. Windom asked if radioisotopes were addressed in the strategy and MYP. Dr. Farland replied that, in 1990, there was an explicit decision to include only those toxics with which EPA was working. He noted, however, that radioisotopes are being addressed as part of the homeland security efforts. Dr. Chameides wondered why a method to prioritize, add, and subtract air toxics from the list was not a key research question. Dr. Henderson responded that the issue will be addressed in the SAB report. That report also will touch on regulating by source rather than by individual compounds. Dr. Daston noted that it is difficult to identify the sources to regulate until you have identified the health outcomes you want to impact. He suggested the need to focus on the pollutants' contribution to morbidity. Dr. Henderson noted that there was very little focus on ecology; the strategy and MYP focused almost exclusively on human health. Dr. Farland commented that the MYP focused very specifically on certain aspects of air toxics research needs.

Dr. Schnoor asked about the review process used by the SAB. Dr. Henderson said that the SAB appointed a committee to review the ATRS and MYP. The two documents were distributed to the members prior to the meeting. In addition, the Chair asked members to be prepared to lead the discussion on certain sections of the report at the July meeting. The committee met in July to discuss the two documents. There were presentations from ORD staff as well as extensive discussion of the ATRS; there was less discussion of the MYP. At the conclusion of the meeting, members were given specific writing assignments. The sections are being drafted and will be finalized through e-mail. The SAB report is

expected to be submitted to EPA by the end of December. Dr. Henderson noted that the entire review will be completed in 6 months.

Nominations Subcommittee Report

Dr. Johnson briefly described the process used by the Nominations Subcommittee to develop the shortlist of candidates presented to the BOSC Executive Committee. At the January meeting, the BOSC Executive Committee determined that the Board required expertise in three major areas—risk assessment, ecology (fisheries and wildlife), and behavioral science (including psychology). The Board members agreed that expertise in air pollution would be required in the next round of nominations. The Subcommittee reviewed the credentials of approximately 500 candidates. The nominations were submitted in response to a solicitation posted on the National Center for Environmental Research (NCER) Web Site, requests for nominations sent to the EPA Laboratory and Center Directors, and requests for nominations distributed to professional societies and experts who serve on peer review panels to review grant applications submitted to the Agency.

The summarized credentials of the candidates were reviewed by at least two Subcommittee members to develop a first-generation shortlist. The expanded credentials of the candidates on the shortlist were reviewed by two additional Subcommittee members to generate the second-generation shortlist. The candidates on this list were discussed in a Subcommittee conference call held on August 6, 2003. All Subcommittee members participated in the call with the exception of Dr. Windom. The list was narrowed to 13 candidates and it was presented to the BOSC Executive Committee at the September meeting. Dr. Windom expressed some concern about one candidate's lack of experience on advisory boards. The Executive Committee members agreed to eliminate this individual from the list, bringing the total number of candidates to 12.

The Subcommittee concluded that there are no strong candidates among those nominated who have expertise in the area of behavioral science, and recommended that a focused search be initiated to identify candidates in this specific area. He added that the Subcommittee identified a secondary list of candidates with expertise in air pollution; Dr. Johnson hopes to expand this list, which will be presented to the BOSC Executive Committee at a later date. Dr. Johnson asked members of the Executive Committee to nominate individuals with expertise in behavioral science and air pollution.

Dr. Henderson said that she had spoken to two behavioral scientists about the Board and both declined to be nominated. She suggested that a request from the AA/ORD may be more effective in convincing them to serve on the Board.

Dr. Johnson stated that there are two current vacancies and five members may rotate off the Board in the next year. Therefore, he recommended that the list of 12 candidates be forwarded to Dr. Gilman for consideration, so that five new members could possibly be on the Board by May 2004, and perhaps by January 2004. Ms. Hamilton noted that the approval process is becoming quite complex and she hoped to obtain approval of the new members before the new process becomes mandatory.

Ms. Hamilton asked if there was adequate diversity among the 12 candidates on the list. Dr. Johnson replied that there is some gender diversity (2 of the 12 are female), but he was not certain about ethnic diversity. He did not think there were any African Americans on the list. There is geographic diversity as well as candidates from industry, academia, and consulting. Ms. Hamilton pointed out that a representative from the White House will review the list to ensure its diversity.

Dr. Johnson asked if the list should be prioritized before it is submitted to Dr. Gilman. The BOSC did not want to prioritize the list, but the Board identified six individuals who were broad lateral thinkers and

might be greater assets to ORD. The members agreed that the letter submitted to Dr. Gilman should identify these six candidates and ask that he consideration selection of at least one of them for membership. Dr. Johnson agreed to draft a letter to Dr. Gilman that describes the process used to identify candidates and develop the list submitted for consideration. Dr. Schnoor asked for a motion to approve the report of the Nominations Subcommittee and submission of the letter identifying the 12 candidates to Dr. Gilman for consideration. Dr. Daston moved to approve the report and submission of the letter, and Dr. Bostrom seconded the motion. The report was unanimously approved by the BOSC Executive Committee and Dr. Jerry Schnoor was directed to submit the list of 12 candidates to Dr. Gilman for consideration. Dr. Schnoor noted that Dr. Gilman suggested several excellent candidates to the BOSC during the last round of nominations, and he may do so again. Dr. Johnson welcomed Dr. Gilman's suggestions as well as those of the BOSC members, particularly in the areas of social sciences and air pollution. Dr. Schnoor thanked the Subcommittee members for their excellent work.

BOSC Future Directions

After reviewing the preferences submitted by the Executive Committee members, Dr. Johnson identified the following Subcommittees:

Computational Toxicology Subcommittee
George Daston (Chair)
Jerry Schnoor
Jim Clark
Mike Clegg

Endocrine Disruptors MYP Subcommittee
Anna Harding (Chair)
Dan Acosta
Juarine Stewart

Global Change MYP Subcommittee
Ann Bostrom
Bill Chameides
Elaine Dorward-King

Mercury MYP Subcommittee
Herb Windom (Chair)
Jim Johnson
Rogene Henderson

Dr. Johnson noted that the Chair of the Global Change MYP Subcommittee has yet to be determined. He proposed using a format similar to that employed by the SAB in reviewing the ATRS and Air Toxics MYP (establish subcommittee, distribute MYP for review prior to meeting, meet to discuss the MYP and make writing assignments, distribute and review drafts via e-mail, and present the report to the Executive Committee). He noted, however, that the Computational Toxicology Subcommittee may require a different approach. Dr. Johnson hoped to complete these reviews within 6 months from the date of distribution of the documents.

Dr. Schnoor stated that the subcommittees should include 2 or 3 consultants, depending on the expertise required to review the document. He mentioned that Ms. Hamilton has a list of consultants from which to select subcommittee members. Ms. Hamilton indicated that consultants also can be selected from the list of SAB consultants, which is quite extensive. Dr. Johnson asked if there will be a generic charge for the three MYPs. Dr. Farland responded that ORD has developed a detailed charge and he will submit it to the BOSC members during the Friday session. He asked that the members review the charge to determine if it is on target and doable.

Dr. Farland mentioned that the three MYPs to be reviewed by the BOSC also have corresponding research strategies. The BOSC may want to review both documents, just as the SAB did for air toxics. Dr. Schnoor noted that this is more than a management review. The charge will include review for scientific content as well. Dr. Schnoor asked Dr. Farland to provide brief overviews of the three MYPs so that the members could give some thought to the types of additional expertise needed for their subcommittees.

Overview of MYPs to be Reviewed by the BOSC

Mercury MYP. A 1997 EPA Mercury Study Report to Congress discussed the magnitude of mercury emissions in the United States, and concluded that a plausible link exists between human activities that release mercury from industrial and combustion sources in the United States and methylmercury concentrations in humans and wildlife. Regulatory mandates require EPA to address these risks. The Agency is developing risk management research for managing emissions from coal-fired utilities (critical information for rulemaking) and non-combustion sources of mercury; risk management research for fate and transport of mercury to fish; regionally-based ecological assessments of the effects of methylmercury on birds; assessment of methylmercury in human populations; and risk communication methods and tools. EPA has established two long-term goals for mercury research: (1) to reduce and prevent release of mercury into the environment, and (2) to understand the transport and fate of mercury from release to the receptor and its effects on the receptor.

Global Change MYP. The Global Change Research Act of 1990 established the U.S. Global Change Research Program to coordinate a comprehensive research program on global change. This is an interagency effort, with EPA bearing responsibility to assess the consequences of global change on human health, ecosystems, and social well-being. Research examines future global change scenarios and the influence of climate, land use, and other factors on issues that are important to the public. Additional assessments will focus on air quality, water quality, ecosystem health, and human health. EPA's research plan for global climate change lays out five long-term goals:

1. Determine the regional and national implications of climate change and variability for the people, the environment, and the economy of the United States in the context of other, non-climate (environmental, economic, and social) stresses.

2. Provide the approaches, methods, and models to quantitatively assess the effects of global change (climate change, land use change, and UV radiation changes) on regional air quality; identify technology advancements and adaptive responses and quantify their effect on, and feedback from, emissions and air quality; and develop and apply tools to integrate global change effects across environmental media.

3. Build the capacity to assess and respond to global change impacts on fresh water and coastal ecosystems.

4. Determine the possible impacts of global change on water quantity and quality and the consequences for aquatic ecosystems and drinking water and wastewater systems. Develop adaptation strategies to increase the resilience of those systems.

5. Build capacity to assess and respond to global change impacts on human health in the United States, and conduct initial assessments.

Endocrine Disruptors MYP. To support its regulatory mandates, EPA's research focuses on improving the scientific understanding of the exposures, effects, and management of endocrine disruptor chemicals and determining the extent of the impact they may have on humans, wildlife, and the environment. EPA will evaluate current and develop new standardized protocols to screen chemicals for their potential endocrine effects. The Agency has established three long-term goals for its research on endocrine disruptors: (1) provide a better understanding of the science underlying the effects, exposure, assessment, and management of endocrine disruptors; (2) determine the extent of the impact of endocrine disruptors on humans, wildlife, and the environment; and (3) support EPA's screening and testing program.

Dr. Farland noted that the Mercury MYP and Global Change MYP are posted on the Web at http://www.epa.gov/osp/myp.htm. The Endocrine Disruptors MYP should be posted on the site by the end of September. Dr. Bostrom pointed out that it is difficult to review the MYPs because without budget numbers, there is no means of assessing the magnitude of the various projects in the plan. Dr. Farland responded that the MYPs are focused on substance and not budgets.

Dr. Schnoor asked the members of the subcommittees to discuss the types of expertise they need and to identify consultants to be added to the subcommittees. Ms. Hamilton agreed to check if the consultants identified by the subcommittees are SAB consultants. She noted that it will reduce the time required for approval if the consultants are on the list of SAB consultants. Dr. Schnoor hoped to have the subcommittees established by January 2004.

Dr. Schnoor indicated that the BOSC will take on additional assignments during the next year. The BOSC will probably provide input on ORD's risk assessment methods review, the homeland security research strategy, and the Report on the Environment. Dr. Farland said that Dr. Gilman will touch on many of these areas during the Friday session.

National Homeland Security Research Center Report

Tim Oppelt (Director, National Homeland Security Research Center) reminded that BOSC members that he briefed them in January 2003, shortly after the Center was organized. The Center has been very busy during the past 9 months, and his presentation focuses on those accomplishments.

The goal of the program is to provide, within 3 years, appropriate, affordable, reliable, tested, and effective technologies and guidance for preparedness, detection, containment, decontamination, and risks of chemical and biological attacks on buildings and water systems. Mr. Oppelt described the scope of the program and the priority chemical/biological contaminants. For buildings, the priority contaminants include 27 chemical warfare agents, 7 biological agents, and 13 toxic industrial chemicals; for water, the priority contaminants include 37 chemical contaminants, 22 biological contaminants, and 4 radiologic agents. The program focuses on characterization/detection, prevention/containment, decontamination/mitigation (a large part of the program), and disposal of residues. It also includes risk assessment, technology verification, and technical assistance/technology transfer.

The budget for homeland security research climbed from $3.6 million in 2002 to $50 million, and it is expected to fall to $29 million in 2004. Most of this money is being used to fund interagency agreements (e.g., Food and Drug Administration, U.S. Army, U.S. Geological Survey) and contractors (approximately 90% of the budget). Of the total $80 million homeland security research budget, $19.5 million is allocated to decontamination, $17.3 million to contaminants, $15 million to risk assessment, $14.6 million to verification, $11.2 million to detection, and $5 million to disposal.

The program involves a two-pronged approach. Technology verification was initiated at the same time the threat scenario analysis was initiated. Approximately 12,000 possible scenarios were reviewed and ranked on the basis of technical feasibility, potential consequences, and probability of occurrence. The public health and environmental and economic consequences were assessed. The Center currently is in the process of conducting modeling simulations and screening level risk assessments for the highest 50 theat scenarios. They are developing an assessment tool to estimate the risks from different scenarios. In addition, a set of training modules is being developed for use by water utilities in preparing for threats. The modules have been reviewed by the American Water Works Association (AWWA) and several utilities.

The next step in the threat scenario analysis is to consult law enforcement agencies on the probabilities of occurrence. Dr. Daston asked if EPA generated the list of threats. Mr. Oppelt replied that the list was developed by EPA and an outside contractor. Dr. Windom asked if any scenarios take into account multiple occurrences. Mr. Oppelt said the they are not looking at multiple occurrences, but acknowledged that it would be helpful to examine interdependencies. He added that Center staff have not yet reviewed the vulnerability assessments submitted by utilities. Dr. Johnson asked if the highest 50 threat scenarios are based on consequences or probability. For example, it was a low probability that terrorists would highjack an airplane and crash it into the Pentagon, but the consequences would have been quite high. Dr. Johnson cautioned against focusing only on events of high probability.

Peter Jutro (EPA/NHSRC) indicated that the scenario ranking was based on the convolution of threats; if the consequences are very low then the scenario was dropped from the list. There are plans to brief the intelligence community on these 50 threat scenarios. If any of these 50 are of no concern to them, those scenarios will be removed from the list.

Since January 2003, the Center staff has increased to 36 (11 of which are through details and IPAs). They have conducted three all-staff retreats, most of the staff have obtained security clearances, and the Center has developed a manual for classifying materials. The research plans for water security and buildings have been submitted to the National Academy of Sciences (NAS) for review. The Center also has established 24/7 response capability and a BSL-3 Laboratory. A number of key research projects are underway and the Center is actively coordinating its efforts with the Office of Water, Office of Solid Waste and Emergency Response, Office of Pesticide Programs, Office of Homeland Security, Office of Air and Radiation, and Regional Offices. The Center also is collaborating with a number of federal agencies, including the Department of Homeland Security, Department of Defense, Department of Energy, and the Centers for Disease Control and Prevention (CDC). In addition, the Center is collaborating with the AWWA and AWWA Research Foundation, Building Owners and Managers Association, American Institute of Architects, Real Estate Roundtable, American National Standards Institute, and American Society of Heating, Refrigerating and Air-Conditioning Engineers. Mr. Oppelt reported that the tabletop exercises were conducted within ORD and in Pittsburgh, Cleveland, and Louisville. In addition, the technical verification program has been fully implemented.

Mr. Oppelt presented a number of program highlights. With regard to safe buildings, the Center has improved anthrax sampling and analysis methods, developed fumigant efficacy test methods, conducted a systematic chemical/biological decontamination evaluation, developed technical guidance for the incineration of decontamination materials, assessed the effectiveness of residential safe havens, evaluated gaseous chemical filtration systems (ongoing), completed an indoor exposure model, and conducted an engineering analysis of the Capitol Hill anthrax decontamination.

For water security, the Center has identified lessons learned from vulnerability assessments, developed a sampling and analysis protocol for unknown contaminants, developed early warning monitors for distribution systems, completed a distribution system field study, and initiated simulation of distribution system threats. The Center soon will initiate chemical/biological pipe loop studies, work on distribution system decontamination, and treatment efficacy studies.

Progress also has been made on the Rapid Risk Assessment program. The Center is developing an expert system or risk tool to assess the implications of threats. Threat scenario screening level risk assessments will be initiated in September 2003, a National Institute of Environmental Health Sciences (NIEHS) and Agency for Toxic Substances and Disease Registry (ATSDR) interagency workshop will be conducted in November 2003, and studies of multipathway water exposure factors will be initiated in December 2003.

Under the Environmental Technology Verification (ETV) Program, 9 rapid toxicity testing technologies, 2 chemical in air detectors, 10 ventilation air filters, 3 building decontamination technologies, 6 point-of-use water treatment systems, and 1 decontamination wastewater treatment technology have been evaluated.

Department of Homeland Security Report

Dr. John Vitko (Department of Homeland Security), Director of the Chemical and Biological Program Science and Technology Directorate, provided an overview of the activities of the Department of Homeland Security (DHS). He noted that DHS provides overall coordination among agencies and is responsible for developing an integrated strategy for homeland security. Dr. Vitko noted that the emphasis is on high consequence threats (e.g., anthrax, smallpox). DHS uses planning cases to catalyze action and to measure progress. In some cases, DHS has the lead and in others they do not. A report card is generated for each planning case to look at its attributes now, mid-term, and long-term. The report card reflects how our capabilities are changing and how we perceive a threat is changing.

In FY 2004, DHS will use systems studies to guide an integrated end-to-end response. In FY 2005, efforts will focus on architectures and simulation, and in FY 2006 - FY 2008, DHS will implement gaming and simulated testing, red-teaming, and training.

A key component of homeland security is anticipating and deterring threats. However, for those attacks that cannot be avoided, the goal is to minimize the consequences of attacks so that they can be managed by the existing medical system. Therefore, biowarning is critical. The National Biodefense Analysis and Countermeasures Center provides scientific support to the intelligence community (Fort Dietrich) as well as operational bioforensics research and development, and knowledge management (Plum Island Animal Disease Center). Dr. Vitko emphasized the criticality of early detection. This requires environmental monitoring to detect the agent directly, integrated biosurveillance to detect the effects of the agent, and biowarning and incident characterization. DHS, with the assistance of EPA, has implemented BioWatch, which is a wide area monitoring system that currently is focused on urban areas and high-value facilities. It also includes targeted monitoring for special events and specific targets (e.g., cattle). Dr. Harding asked about who is analyzing the monitoring data. Dr. Vitko replied that the data are analyzed by the CDC. Dr. Harding asked what would happen if CDC detected something. Would they work with the state health departments? Dr. Vitko responded that they would work directly with the public health departments at the city level. He added that DHS currently is working with city health departments to do consequence management exercises. Dr. Vitko pointed out that the major cost of the BioWatch system is labor; there are plans to replace the samplers with detectors in an effort to reduce the labor costs.

Dr. Vitko reported that DHS staff learned a great deal with the BioWatch deployment. They recognized the need for incident characterization tools and playbooks. They also developed a systems approach to urban decontamination, which focuses on both interior facilities and exterior areas. Dr. Vitko noted that outdoor decontamination is very complicated and is posing significant challenges. Large outdoor toxic chemical releases, water supply and distribution, and confined facilities are areas of concern. He noted that DHS is taking an integrated systems approach to chemical defense that involves facility characterization, ultrasensitive detection, an information management system, and restoration protocols.

Dr. Vitko concluded his presentation by describing the coordination between DHS and EPA. He reported that DHS is collaborating with EPA at many levels, both with the Agency's Office of Homeland Security and the National Homeland Security Research Center. EPA is a critical partner in BioWatch air monitoring systems for major cities and metropolitan areas. DHS worked closely with EPA to deploy BioWatch before U.S. troops were sent into Iraq. DHS is coordinating with the National Homeland

Security Research Center on facility protection, water security, and rapid risk assessment. In addition, there is programmatic coordination with ETV on testing and standards.

Dr. Acosta asked how DHS collected, coordinated, and communicated the vast amount of information on homeland security. How are key individuals kept informed? Dr. Vitko replied that coordination occurs at different levels; some information is communicated to the Secretary and other information is not. He noted that the most significant coordination effort is the Homeland Security Council. More than 20 agencies are involved in this council and they are examining all programs across the government in an effort to determine what is not being addressed. In response to a question about the DHS budget, Dr. Vitko responded that DHS has a budget of $37 billion, but the Department is spending much more. Most of the $37 billion is spent on operational costs; the science and technology budget is about $800 million. A significant amount is spent on transportation security, followed by emergency preparedness and response. The Department of Health and Human Services (DHHS) is second to DHS in its homeland security budget.

Dr. Schnoor asked if DHS had begun to conduct drills to test the system. Dr. Vitko replied that they have done drills to review agency interactions as well as federal and state interactions. Dr. Beth George (DHS) mentioned that DHS is developing a methodology to test the BioWatch system. Dr. Vitko added that the BioWatch system has been characterized extensively; approximately 300,000 bioassays have been run on the system. Dr. Bostrom asked if DHS has been using cities or states as laboratories to test system improvements. Dr. Vitko replied that initially the cities wanted to develop their own plans, but those same cities have come back and asked for templates. He noted that DHS has conducted consequence management workshops with a number of cities; these workshops have allowed staff from both organizations to explore and share ideas. DHS plans to pilot the second generation BioWatch system in several cities to test its effectiveness. This new system employs robotics to reduce costs. Dr. Schnoor asked Dr. Vitko to describe the greatest challenge associated with coordination. Dr. Vitko replied that the biggest challenge is getting the right people with the right expertise in the right place at the right time. He commented that coordination is not limited by budget; it is limited by the vision of the individuals to collaborate with one another and the willingness to take the time to communicate.

Dr. Schnoor thanked Dr. Vitko and Mr. Oppelt for their excellent presentations and asked how the BOSC could assist ORD in this area. Mr. Oppelt replied that he would like the BOSC to review the Center's entire strategy (individual components have been reviewed separately in other reviews). Does the strategy fit together? Is the program being implemented efficiently and effectively? What can be done to improve management of the program?

Before Dr. Schnoor recessed the meeting for the evening, he reminded the BOSC members to review the minutes and workshop proceedings, as well as the Mercury MYP and the Report on the Environment.

Friday, September 12, 2003

Dr. Schnoor called the meeting to order at 8:35 a.m., and announced a few changes to the agenda. He stated that because the report on the Air Toxics Research Strategy and MYP and the session on future directions were addressed on Thursday, the meeting would adjourn at 12:00 noon.

Approval of May 2003 Meeting Minutes

Dr. Schnoor asked if there were any comments on the May 2003 meeting minutes. He asked that the third sentence in the second paragraph on page 30 be rewritten to reflect that the BOSC members provided comments during the meeting and the letter was finalized and approved. Dr. Schnoor asked Beverly Campbell to correct that sentence. When there were no other comments on the minutes, Dr. Schnoor

asked for a motion for approval. Dr. Harding moved that the minutes be approved with the correction requested by Dr. Schnoor and Dr. Stewart seconded the motion. The May minutes were approved unanimously by the BOSC.

AA/ORD Remarks

Dr. Gilman thanked the members for their efforts on behalf of ORD. He mentioned that EPA had been the subject of unwarranted criticism in the past month and he wanted to set the record straight. The first issue concerns the Inspector General's (IG) report on EPA's 9/11 activities. The IG focused on two press releases that were issued by EPA shortly after 9/11 that concerned ambient air quality. Dr. Gilman pointed out that although the press releases were reporting on ambient air quality away from the site (not at ground zero), the IG failed to note this distinction. Before issuing these press releases, EPA discussed them with the Council on Environmental Quality (CEQ), which suggested that the language be "toned down." EPA made an effort to do this, and the IG is using this to accuse EPA of deliberately giving a false impression and misleading the public about the quality of the air. Dr. Gilman wanted to make it clear that EPA did not manipulate the data or report them falsely. He was very troubled by this bad press because it belittles the efforts of so many EPA staff who worked around the clock at ground zero following 9/11. In fact, Governor Whitman insisted that EPA create a Web site within the first few days following the tragedy so that monitoring data could be posted and accessed by the public. There was some concern within the Agency about taking this approach because the data could not be subjected to quality assurance/quality control; however, Gov. Whitman was adamant that failure to do so would make it appear that EPA was withholding the data.

The second unfortunate incident that is giving EPA bad press is the removal of a chapter from the Report on the Environment. *Science* reported that statements in the report were manipulated by the White House, but that is definitely not the case. Dr. Gilman pointed out that a huge percentage of the data in the report was provided by other agencies. The draft report was submitted to these agencies for an interagency review to ensure that the data were reported accurately. EPA modified the report based on the comments received from this review. The peer review panel rejected a number of the comments from the agencies and worked to rewrite others, but the report is not technically flawed. With regard to the deletion of the global change chapter, Dr. Gilman indicated that he made the decision to remove it rather than delay publication of the report. There were many issues still to tackle with regard to the global change chapter and time was running out to publish the report prior to Gov. Whitman's departure. Dr. Gilman noted that he was not overly concerned about removing the chapter because the Agency was continuing to work on collecting the data. Dr. Gilman stated emphatically that EPA did not include papers of questionable repute in the report. He encouraged the Board to share this information with their colleagues and to contact him if they have any concerns about the quality of EPA's science.

Another issue of concern is peer review. The Office of Management and Budget (OMB) and the Office of Science and Technology Policy have developed guidelines for peer review that are similar to the practices of the National Research Council (NRC). EPA already has instituted similar procedures within the Agency. Since 1995, it has been EPA's policy that all products undergo peer review. The Agency identified 850 products that should be subjected to peer review. About 90 percent of these products underwent both internal and external peer review. The external reviews ranged from a few experts reviewing the product and submitting comments via e-mail to panels of 5-10 members who meet to review products to reviews by the SAB, BOSC, or NRC.

The Chair of the SAB told Congress that it would be difficult to find opportunities to improve EPA's peer review process. Compared to other federal agencies (e.g., Army Corps of Engineers, U.S. Fish and Wildlife Service), EPA has an outstanding record of peer review.

Dr. Johnson asked if EPA responds to these external reviews. Dr. Gilman replied that the Agency responds formally to SAB reviews, but has been less diligent in responding to the BOSC reviews. Dr. Johnson recommended that the Agency prepare written responses to these reviews. Dr. Farland noted that documents include review comments as well as public comments. Dr. Chameides stated that NRC does not compensate its reviewers, and it may not be necessary for EPA to pay its reviewers. One issue with peer review is that the Agency decides how to respond to the comments. Dr. Gilman replied that EPA has changed its procedures. The program manager can no longer sign off on the peer review process; another individual in EPA must be responsible for the review.

Dr. Gilman noted that the credibility of the SAB is low. Those outside the Agency view the SAB members as EPA employees. EPA is trying to develop an approach to change this perception. One option is to increase the number of members on the SAB and adopt a two tier system (similar to that used by the NAS). The fact that EPA compensates the SAB members also contributes to this perception problem. Dr. Farland commented that unless reviewers are compensated by EPA, the reports they review cannot be kept confidential. Dr. Chameides noted that part of the problem is political and part is perception (based on practices that date back 15 years). The quality of the products will change that view, but it takes time.

Dr. Gilman mentioned another area that may be of interest to the BOSC—EPA's overly conservative practices concerning risk assessment at the regional level and in Superfund. Many science decisions are made at the regional level so ORD is reviewing those programs, practices, and policies. ORD is attempting to understand the practice. Why do we do it that way? What needs to be improved? What should remain the same? This review has caused concern within the Regions, and one individual recently accused Dr. Gilman of trying to roll back the standards. Dr. Gilman explained that this review is not intended to roll back standards, but to review the facts and make corrections. He would like the BOSC to be briefed on this review at the next meeting because ORD will be thinking about the role of external groups in this review in the next month.

EPA recently compared the Integrated Risk Information System (IRIS) to regulatory standards in California, Canada, and other countries to determine if EPA was more conservative than other regulatory agencies. This review indicated that EPA falls somewhere in the middle. Dr. Gilman commented that Europe touts the stringency of its standards, but the quality of the air and water in these countries leads one to believe that the strict standards are not enforced.

Dr. Gilman reported that the Senate has marked up the appropriation and cut ORD's budget substantially. He noted that even the particulate matter (PM) budget has been reduced. Dr. Gilman said that he hated to see a reduction in the PM budget because the Agency has made such progress and is on the verge of answering many critical questions about PM. More research is needed to determine which particles are of most concern and to identify the sources of these particles. This information is needed to develop effective regulations. The computational toxicology program budget also was cut. The Agency hopes to be able to divert some savings so that the computational toxicology program can be funded (at least partially). EPA is planning a workshop with other agencies on computational toxicology. The workshop will be held in late September and it will focus on identifying ways to build relationships and leverage resources. Dr. Schnoor asked that Dr. Daston (who will chair the Computational Toxicology Subcommittee) be invited to attend that workshop. Dr. Gilman added that the Senate also reduced the budget for IRIS, despite the fact that the Senate instructed EPA to expand and improve its quality. The homeland security budget also took a hit.

Dr. Mike Clegg (University of California–Riverside) asked if ORD communicates with the appropriations staff on a regular basis. Dr. Gilman replied that there is very limited interaction; the staffs are small and they possess only a superficial understanding of the science and research needs. Dr. Schnoor was

concerned about the reduction of the IRIS budget. He noted that the BOSC has stated that IRIS is one of EPA's most important databases. Dr. Gilman mentioned that even the extramural grants budget was effectively reduced because of add-ons.

Dr. Daston stated that ORD is taking the correct approach by seeking to work with other organizations on computational toxicology. A consortium of industry and government would be most effective. He applauded EPA's effort to review the Agency's risk assessment practices. He asked if the report will be made available for public comment, and Dr. Gilman replied that there will be a formal public comment period. EPA may want to conduct workshops on certain topics related to risk assessment. Dr. Daston said that Dr. Gilman's decision with regard to removing the global change chapter from the Report on the Environment was a rational one, but the issue remains unresolved. Are there plans to work through the remaining issues and publish a supplement to the report in the future? Dr. Gilman replied that the Agency cannot publish another report without buy-in from the Administrator because it requires substantial effort and funds. The original plan was to publish a report every 3-5 years. Dr. Gilman noted that the Department of the Interior is very interested in environmental indicators and how they could be very useful with GPRA goals; however, the future of the report in unknown at this time. Dr. Schnoor thanked Dr. Gilman for his insightful update on ORD.

EPA Report on the Environment

Dr. Denice Shaw (EPA/NCEA) reminded the BOSC that Peter Preuss, Director of NCEA, briefed them about the Report on the Environment at the January 2003 meeting, and much had been accomplished since then. Dr. Shaw stated that the directive behind the report was from Gov. Whitman who wanted a report with high quality information that would enable the Agency to evaluate the progress it is making towards its goals of cleaner air, purer water, and better protected land.

The report is organized into five chapters—Cleaner Air, Purer Water, Better Protected Land, Human Health and Ecological Condition. Dr. Shaw noted that the most important message of the report is the need to shift to an outcomes framework. Identifying environmental outcomes such as better human health and ecological condition requires a significant shift in how the Agency frames questions and issues about environmental quality. The first three chapters of the report ask questions that tend to follow traditional Agency efforts to prevent, control, or remediate the effects of pollution. The final two chapters on human health and ecological condition ask questions about outcomes. To understand how EPA's mission affects these outcomes requires indicators not only of pollutant releases and ambient conditions, but indicators that span the chain of events between release of a pollutant; exposure of people, plants, and animals; and the chain of events from dose to effects. Dr. Shaw stated that for a few of the questions in the report, indicators were identified that are available at the national level. More frequently, however, EPA found that promising indicators have been developed and measure for limited geographic areas, or for a part of the causal chain. The last sections of each chapter of the report describe challenges and data gaps associated with the particular subject area.

Dr. Shaw described the process that was used in developing the report. The steps included: scoping the content, question development, indicator and data selection and review, content development, and draft reviews by EPA, states, tribes, federal partners, and OMB. Dr. Shaw stated brief conclusions that summed up the findings for each chapter. Substantial progress has been made in developing and utilizing indicators that effectively measure status and trends in air quality consistently across the country. Dr. Chameides asked if "substantial progress" with regard to cleaner air meant that EPA is doing a good job in that area, and Dr. Shaw affirmed that EPA is doing a good job collecting data to assess national air quality.

Current indicators for measuring and reporting inland water quality often are adequate at the state and local level but cannot provide a national picture. Dr. Shaw noted that indicators are available for measuring and reporting on several aspects of condition for estuaries and the Great Lakes. Dr. Schnoor commented that he believes that the nation's water has improved but EPA could not obtain the data to prove it. Dr. Windom asked if the problem was that the data from different sources were not comparable. Dr. Shaw confirmed that data comparability was the issue; there are no monitoring programs that collect consistent data across the United States. Dr. Farland added that, even on a watershed basis, the data are inconsistent and incomplete. Dr. Windom stated that it is more important to have a few comparable data than a great deal of incomparable data. Dr. Farland responded that there are efforts underway to assist the states in implementing consistent monitoring programs. Dr. Shaw noted that any strategy implemented by EPA would incorporate the broad monitoring programs outside the Agency. She added that the Environmental Monitoring and Assessment Program (EMAP) and the National Oceanic and Atmospheric Administration (NOAA) were primary sources of data for estuaries and Great Lakes.

Currently, indicators to accurately characterize land use are limited by a diversity of approaches and mandates. Excellent data exist for certain sectors (e.g., forests), but a comprehensive picture across all land uses is not available. EPA's programs for pesticides, chemicals used in industry, and handling of solid and hazardous wastes do not specifically authorize national ambient monitoring.

Data on human health indicated that, overall, Americans are healthier and live longer but, except in a few cases, we lack the indicators and scientific understanding to know how much of this is attributable to environment, and how much to other factors such as health care and life style. Dr. Johnson asked for an example of where we have made a connection between health outcomes and environmental exposures. Dr. Shaw replied that lead in blood is the best example. She added that biomarkers are used to measure exposure, but it is unknown how that exposure contributes to the disease.

Significant gaps currently exist in the availability of indicators and data, making it impossible to fully describe ecological condition or to report on the status and trends nationally. Dr. Shaw presented a table from the report that showed the distribution of available ecological condition indicators across the ecosystem types (e.g., forests, farmlands, coasts and oceans). She pointed out that there are many gaps and only a few indicators at the national level. Dr. Shaw mentioned that EPA relied on both the Heinz report and an SAB report on ecological indicators in developing the Report on the Environment. The Heinz report identified a number of indicators and the SAB report included a checklist of things that should be considered with respect to ecological condition. She acknowledged that there are significant gaps in the data to report on ecological condition.

Dr. Shaw stated that the report has an important role in the Agency's movement toward better managing and identifying environmental outcomes. It highlights the need to further assess the Agency priority and expectations for "outcomes" as they pertain to human health and ecological condition. She noted that a better understanding of linkages is vital to fully developing the understanding envisioned by the cascade of events from source (or stressors) to effects (or outcomes) on human health and ecological condition.

Dr. Shaw indicated that there were plans to publish the next report in 2006, which would be synchronized with the EPA Strategic Plan. EPA plans to develop a regional scale presentation of the 2003 indicators, and to conduct a knowledge and information gaps assessment of the 2003 Report on the Environment. There also are plans to refine ecological condition and human health outcomes. The 2003 report will be reviewed by the SAB and NAS.

In closing her presentation, Dr. Shaw identified the organizations that participated in the development of the 2003 report. These include: ORD and Office of Environmental Information (OEI), EPA Regions and

Program Offices, federal agencies (via CEQ workgroup—Departments of Commerce, Interior, Health and Human Services, and Agriculture), states (via Environmental Council of States workgroup), and tribes.

Dr. Windom wondered why EPA did not try to forecast trends (e.g., demographic changes, land use changes) that would be helpful in predicting future problems. Dr. Shaw said that this issue was discussed in the scoping phase of the report, but it was decided that such information would not be addressed in the 2003 report. These issues may be included in the next report, along with information on societal values. Dr. Chameides indicated that this report should focus on status and outcomes and not forecasting. These are two very different exercises and they should be kept separate. Dr. Daston agreed with Dr. Chameides because he preferred the Report on the Environment to be a factual report. Dr. Bostrom commented that the chapters do not include any judgement about the indicators or the environmental condition. Unfortunately, the public report did not provide that either. It makes it appear as if EPA is hiding behind the science.

Dr. Shaw indicated that these issues about the scope of the report are very important. Should we judge a condition and say whether something is good or bad? The Agency made a deliberate decision not to include judgements in the report. Perhaps ORD could prepare several papers to be issued with the report that provide some judgements about the data. Dr. Chameides noted that the Agency would need to report trends to make a judgement as to whether things are getting better or worse. Dr. Shaw replied that the 2003 report would be used as a baseline to do just that. The subsequent reports will identify trends. Dr. Dorward-King stated that she found the report refreshing in its honesty about the fact that the data collected are not necessarily the data needed to measure outcomes. The intellectual process of preparing the report was very beneficial to EPA—the Agency has now given considerable thought to what it needs to be measuring and addressing to change outcomes. She recommended that ORD be proactive in leading efforts to develop regulations that will improve outcomes rather than regulating the things that can be controlled. Dr. Harding praised the report but expressed some concern that the public health surveillance system is not adequate to provide the data EPA needs to assess outcomes. Dr. Shaw pointed to the need to clarify the outcomes discussion. She added that there is little incentive for the Program Offices to go any further than what they are required to do by law. Therefore, this shift to outcomes will have to come in small steps.

Dr. Shaw indicated that the 2003 report will be reviewed by the SAB in November 2003, and it will be reviewed by the NAS, but that review has not been scheduled. In response to Dr. Windom's earlier comment on forecasting, Dr. Farland reported that EPA is looking at environmental impacts on the elderly—what the environment does to them and what they are doing to the environment.

Dr. Chameides asked about the process used to prepare the report. Who developed the questions? Were the air questions developed by OAR? He recommended some separation between the individuals who regulate and those who determine the success of those regulations. Dr. Johnson commented that such separation would not be necessary if the questions are based on outcomes. Dr. Chameides was still skeptical and supported the separation. Dr. Daston stated that the report does an excellent job of synthesizing data and pointing to gaps. The dilemma faced by the Agency is whether to spend more money enforcing environmental laws or spending more on fulfilling the Agency's mission. He asked if the report will have any impact on resource allocation. Dr. Shaw replied with uncertainty. The next report will be tied to the EPA Strategic Plan, which guides the budget, so the report could have some impact on the budget. Dr. Bostrom stressed the need for an incentives structure that provides incentives for the data needed to assess the Agency's progress. Dr. Farland mentioned that Dr. Shaw touched briefly on the coastal environment; it may be useful to provide the BOSC a more detailed briefing on coastal programs because the Agency is doing more in this area and the BOSC could make more definitive comments. Dr. Schnoor responded that the BOSC is very interested and would appreciate such a briefing.

Mercury Research Multi-Year Plan

Dr. Farland stated that he was presenting the Mercury MYP on behalf of Herman Gibb (EPA/NCEA), lead author of the plan, who was unable to come to the BOSC meeting. Along with the Mercury MYP, Dr. Farland distributed a draft background and charge to the BOSC for the three MYP reviews. He asked that BOSC members review the charge and invited their comments. He also introduced several EPA staff at the meeting who had worked on the report—Ed Washburn, Jeff Morris, Mimi Dannel, and Bill Stelz.

The Mercury MYP supports Goal 4–Multimedia/Healthy Communities and Ecosystems of the EPA Strategic Plan. The research efforts identified in the MYP are guided by the Mercury Research Strategy, which was published in September 2002. The strategy focused on reducing uncertainties associated with assessing and managing mercury risks. Dr. Farland asked the BOSC to determine if the link between the two are adequate and if EPA's role is appropriate given the work done by other agencies and organizations.

Dr. Farland presented a logic diagram that explained the mercury research program design. The diagram identified resources, research activities, outputs, clients, short-term outcomes, intermediate outcomes, and long-term outcomes, as well as outreach and effective transfer and environmental indicators. Dr. Farland stated that ORD focuses on the middle of the logic diagram. He noted that he program is planned right to left (on the diagram), but implemented left to right. Dr. Johnson asked if the audiences help identify the outcomes; this is not clear from the diagram. Dr. Farland responded that the audiences do provide input, but it is not evident in the diagram because it is designed to illustrate implementation of the program.

Dr. Farland provided a brief summary of the Mercury MYP. Two long-term goals are defined in the plan (there was only one goal in the original plan): (1) to reduce and prevent the release of mercury into the environment (LTG 1), and (2) to understand the transport and fate of mercury from release to the receptor and its effects on the receptor (LTG 2). There are 12 APGs defined in the plan; 5 in LTG 1 and 7 in LTG 2. The MYP integrates ORD intramural and extramural research efforts through FY 2010, and the resources for the program are approximately $5.5 million and 8.0 FTEs per year. Almost all of the FTEs are focused on LTG 1.

The research in the plan focuses on mercury sources, control technologies, environmental fate and behavior, and ecological/biological effects. The cross-component activities in the MYP include measuring, monitoring, and modeling. Dr. Farland presented a diagram that depicted the regulatory timeframe for activities related to mercury and air emissions. He noted that the MYP is designed to answer questions in the implementation phase of the regulations.

Two diagrams depicting the relationships between APGs for the two LTGs were presented. In the early years for LTG 1, there is a focus on control technologies, performance, costs, residuals, pollution prevention options, and continuous monitoring. As we move into the out years, the focus shifts to management of mercury in co-pollutants, non-combustion sources of mercury, regulation development, multipollutant controls, management of non-utility sources waste elimination, and stockpile issues. For LTG 2, the early efforts focus on an assessment of key fate and transport issues and the later efforts move toward information sources of mercury emissions, risk communication, assessment of health risks, assessment of ecological risks, and an integrated multimedia modeling framework.

Dr. Farland noted that there are likely to be shifts in the emphases as the plans are implemented. He presented a table that illustrated the evolving LTG emphases. For example, risk management research on combustion sources of mercury is likely to remain level through 2004, and then decrease; ecological risk assessment research is likely to increase over time.

There are a number of key science questions to be addressed by the plan:

- How much methylmercury in fish consumed by the U.S. population is contributed by U.S. emissions relative to other sources of mercury (such as natural sources, emissions from sources in other countries, and re-emissions from the global pool)? How much and over what time period, will levels of methylmercury in fish in the U.S. decrease due to reductions in environmental releases from U.S. sources?

- How much can mercury emissions from coal-fired utility boilers and other combustion systems be reduced with innovative mercury control technologies? What is the relative performance and cost of these new approaches compared to currently available technologies?

- What is the magnitude of contributions of mercury releases from non-combustion sources; how can the most significant releases be minimized?

- What are the risks associated with methylmercury exposure to wildlife species and other significant ecological receptors?

- What critical changes in human health are associated with exposure to environmental sources of methylmercury in the most susceptible human subpopulation? How much methylmercury are humans exposed to, particularly women of child-bearing age and children among highly-exposed population groups? What is the magnitude of uncertainty and variability of mercury and methylmercury toxicokinetics in children?

- What are the most effective means for informing susceptible populations of the health risks posed by mercury and methylmercury contamination of fish and seafood?

Dr. Farland noted that approximately 7 percent of women of child-bearing age are above the reference dose for the population, so there is public concern.

The major research outcomes for FY 2004-2005 identified in the plan include: (1) information on managing mercury and other co-pollutants from utility boilers to support air quality officials and utilities in determining the most cost-effective approaches to reduce emissions; (2) a technical assessment of the effect of air pollution control systems on the characteristics of mercury-contaminated residues, and increased costs or environmental risks from their management; and (3) an assessment of key fate and transport issues for tracking the fate of mercury from sources to concentrations in fish tissue.

Dr. Farland noted that there are other mercury-related activities to be conducted. The human reference dose for methylmercury (0.1 ? g/kg/day) is scheduled for reevaluation in the MYP by 2009. Should this occur earlier in the plan? EPA is interacting with the United Nations Environmental Program (UNEP) and is searching for opportunities to leverage resources by working with other agencies that have multipollutant initiatives. A revised draft of the EPA Mercury Action Plan should be completed by spring 2004.

In summarizing the Mercury MYP, Dr. Farland stated that it supports Agency goals, aids ORD as a planning and communication tool, provides a link between the Agency and ORD's Strategic Plan that serves as a basis for ORD's budget request, and provides logical sequencing for the ORD research program. This MYP also implements the Mercury Research Strategy, improves mercury risk management and assessment, and supports development of the draft Mercury Action Plan. Dr. Farland noted that EPA is part of the White House Interagency Workgroup on Methylmercury, and in this role, EPA provides a summary of mercury monitoring/existing data and R&D programs as needed.

Mr. Stelz commented that NCER is issuing a number of new extramural grants that will focus on the atmospheric chemistry aspects, mercury sources, and fate and transport. Dr. Acosta asked about he difference between ecological receptors and pharmacological receptors. Dr. Farland replied that ecological receptors refer to the food chain, so the two would be very similar. Dr. Daston asked why the plan does not include efforts to corroborate data that support the reference dose. He noted that there is a large population that is potentially at risk and this could pose a significant public health burden. Dr. Daston commented that there is little focus on noncancer outcomes. He thought EPA should consider allocating more funds to this effort given the magnitude of the potential health problem. Dr. Farland agreed that EPA should continue to ascertain the validity of the reference dose and work with other organizations to do so.

Dr. Schnoor asked if the BOSC members had any questions or comments regarding the charge for the MYPs. Dr. Farland noted that the charge sets the bar very high for the MYP, but it will be very helpful to ORD if the BOSC undertakes the charge. He believes that it will improve all future MYPs. Dr. Bostrom mentioned that budget numbers in the plans would be helpful. She has no idea of the magnitude of the tasks identified in the plan. Dr. Schnoor commented that this charge was more detailed than past charges submitted to the BOSC. He also noted that the review involves both management and scientific issues. Dr. Henderson said that the charge was appropriate based on her experience with review of the Air Toxics MYP. Dr. Schnoor stated that it will be difficult to assess whether ORD's role is appropriate given the roles of other agencies/organizations without a description of the efforts of the other organizations. Dr. Stewart asked if the BOSC should identify overlaps as well as gaps, and Dr. Farland replied that the BOSC should identify both. Drs. Johnson and Bostrom suggested adding some wording to the third item on the charge to address how well APMs contribute to achieving the LTGs or how well the APMs reflect the desired outcomes. They agreed to prepare a sentence to be added to item 3 of the charge.

Dr. Dorward-King noted that mercury is one area that requires a strong international component. She thought this should start earlier than 2006, which is when it is projected to begin in the plan. Dr. Schnoor stated that the BOSC is satisfied with the charge and the members will work out the final details with Drs. Farland and Gibb. Dr. Farland said that ORD would like to have the BOSC's input on the MYPs by June 2004.

Public Comment

David Egilman (Brown University) stated that there is a public perception that the White House interfered with EPA science in the Report on the Environment and the press releases on air quality following 9/11. He noted that this is a communications issue that should be dealt with at the highest level within the Agency.

Dr. Egilman also said that EPA has not addressed outcome evaluation of all regulatory actions. If mercury emissions are squeezed domestically, it is likely that they will be moved to other countries. The Agency must deal with mercury as a global issue; otherwise, the problem could be exacerbated.

Future Meeting Dates and Wrap-Up

Dr. Schnoor indicated that the next BOSC meeting is scheduled for January 22-23, 2004, and it may be held at the new laboratory facilities in Research Triangle Park, NC. The following BOSC meeting is scheduled for May 13-14, 2004, in Washington, DC.

Dr. Bostrom suggested that the BOSC should discuss the possibility of writing letters to *Science* concerning the erroneous statements in that journal. Should we discuss this issue with the ethics official? Ms. Hamilton agreed to pose the question to Ms. Love, one of the EPA ethics officials, and provide the

BOSC members her response via e-mail. Dr. Bostrom recommended that EPA be proactive in correcting these misconceptions. Dr. Schnoor agreed to add this discussion to the agenda for the January meeting. He also asked if the members had ideas for self-initiated studies that may benefit ORD. This also will be discussed at the next meeting. He noted that the Report on the Environment is available for public comment until the end of December. Dr. Farland mentioned that the report is available on CD-ROM, and members who would like a copy should e-mail their request to Ms. Hamilton.

Dr. Schnoor asked for a motion to adjourn the meeting. Dr. Bostrom moved to adjourn, and Dr. Stewart seconded the motion. Dr. Schnoor adjourned the meeting at 12:00 noon.

Action Items

- Peggy Love agreed to e-mail to Shirley Hamilton the link to the financial disclosure form that can be saved, and Ms. Hamilton will distribute it to the BOSC members.

- Beverly Campbell will distribute the draft communications report to the Laboratory and Center Directors and request them to check the facts in the report.

- Beverly Campbell will format the report on ORD communications and finalize it for submission to the AA/ORD.

- BOSC members will send via e-mail nominations with expertise in behavioral science and air pollution to Shirley Hamilton. Curricula vitae (CV) should be attached to the nominations.

- The report of the Nominations Subcommittee was unanimously approved by the BOSC Executive Committee and Jerry Schnoor was directed to submit the list of 12 candidates to Dr. Gilman for consideration. Jim Johnson agreed to draft a letter to Paul Gilman that describes the process used to identify candidates and develop the list submitted for consideration. This letter will be submitted to Dr. Gilman along with the CVs of the candidates.

- Beverly Campbell will incorporate the revisions to the minutes of the May BOSC meeting and send them to Ms. Hamilton.

- Jim Johnson and Ann Bostrom agreed to prepare a sentence to be added to the third item on the charge for the MYPs. The additional sentence will address how well APMs contribute to achieving the LTGs or how well the APMs reflect the desired outcomes.

- Ann Bostrom suggested that the BOSC discuss the possibility of writing letters to *Science* concerning the erroneous statements in that publication. Ms. Hamilton agreed to pose the question to Ms. Love, one of the EPA ethics officials, and provide the BOSC members her response via e-mail.

- Bill Farland mentioned that the report is available on CD-ROM, and members who would like a copy should e-mail their request to Shirley Hamilton.

- The chairs of the three MYP and computational toxicology subcommittees should submit names of consultants they would like to add to their subcommittees to Shirley Hamilton so that she can determine if they are SAB consultants.

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