B·O·S·C
BOARD OF SCIENTIFIC COUNSELORS

EXECUTIVE COMMITTEE
MEETING SUMMARY

Washington, DC
October 19-20, 2006

Thursday, October 19, 2006

Welcome and Introductions

Dr. James H. Johnson, Jr. (Howard University), Chair of the Board of Scientific Counselors (BOSC), called the 33rd face-to-face meeting of the Executive Committee to order at 8:35 a.m. He welcomed the members and guests to the meeting and asked everyone to introduce themselves. Following the introductions, Dr. Johnson reviewed the meeting agenda topics, which included review of the June meeting minutes and September conference call minutes, remarks of the BOSC Designated Federal Officer (DFO), remarks of the Assistant Administrator for Research and Development (AA/ORD), the program review tool workgroup proposal, the ORD responses to recent BOSC reports (Global Change, Water Quality, and Land), the draft letter report of the Computational Toxicology Subcommittee, updates from the Subcommittees that have upcoming program reviews (Human Health Risk Assessment, Safe Pesticides/Safe Products, Technology for Sustainability, and Homeland Security), update on the National Center for Environmental Research (NCER) and National Exposure Research Laboratory (NERL) Standing Subcommittees, the Human Health Mid-Cycle Review, the ORD briefing on methamphetamine laboratory remediation, BOSC issues and ORD update, the ORD briefing on nanotechnology, the Science Advisory Board (SAB) activities update, and a discussion of future BOSC business. Dr. Johnson asked if there was anything that should be added to the agenda. He noted that approval of the July conference call minutes must be added to the agenda and called for a motion to do so. Dr. Carol Weiss (Harvard University) made a motion to amend the agenda and Dr. Rogene Henderson (Lovelace Respiratory Research Institute) seconded the motion. Dr. Johnson then asked Dr. Henderson to lead the discussion of the June meeting minutes because she chaired the meeting in Dr. Johnson's absence.

Approval of the June 1-2, 2006 Meeting Minutes

Dr. Henderson asked if there were any comments on the draft summary of the June 1-2, 2006 BOSC Executive Committee meeting. Dr. Henderson thanked Beverly Campbell (SCG) for the comprehensive minutes and said that she had two comments. She asked that the word "other" be inserted for the word "specific" on page 5 in the paragraph starting with "The specific findings and recommendations…" She also indicated that she was not familiar with the Title 42 positions that were mentioned in the meeting summary. When no other comments were provided, Dr. Henderson called for a motion to approve the minutes with the suggested edit; Dr. Herb Windom (Skidaway Institute of Oceanography) made a motion to approve the minutes and Dr. Barry Ryan (Emory University) seconded the motion. The June meeting minutes were approved unanimously by the BOSC.

Dr. Anna Harding (Oregon State University) asked if Ms. Lorelei Kowalski (EPA/OSP) had the log in information for the new My Pay system. Ms. Kowalski explained that anyone who also was serving on the SAB received a letter stating that they can use the same password and PIN to access the system for the BOSC. Unfortunately, the letters for the other BOSC members were never sent to Ms. Kowalski; rather, they were sent to Research Triangle Park (RTP), North Carolina, and sent out from there. Everyone on

the BOSC should have received a letter that alerted them to the new system and provided a password and PIN. Dr. Johnson said that Ms. Kowalski would elaborate on this issue during her administrative remarks.

Dr. Johnson asked that future draft minutes include line numbers to facilitate their review, discussion, and approval.

Approval of the July and September 2006 Conference Call Minutes

Dr. Johnson asked for comments on the draft summary of the July 20, 2006 BOSC Executive Committee conference call. Dr. Johnson suggested inserting a parenthetical note after the last sentence in the second paragraph on page 2 of the summary, which concerned scheduling a future conference call. He proposed that the following parenthetical sentence be inserted: "Following the conference call, Ms. Kowalski determined that the members could not vote on approving the report by e-mail; therefore, she scheduled another conference call." Dr. Johnson also suggested that the last paragraph on page 6 of the minutes be moved to the next section, Standing Laboratory/Center Subcommittees. He then called for additional comments. When no more comments were provided, he called for a motion to approve the July minutes as amended. Dr. Gary Sayler (University of Tennessee) made a motion to approve the minutes and Dr. Clifford Duke (The Ecological Society of America) seconded the motion. The July minutes were unanimously approved by the BOSC.

Dr. Johnson explained that the purpose of the September 5, 2006 BOSC Executive Committee conference call was to approve the Science To Achieve Results/Greater Research Opportunities (STAR/GRO) Report that was discussed during the July conference call. The September call also included some discussion of the Standing Laboratory/Center Subcommittee pilots and the vacancies on the BOSC Executive Committee. Dr. Johnson had a comment on page 2 of the summary. He asked that "during the discussion of the report" be added at the end of the last sentence of the first paragraph under the section entitled STAR/GRO Fellowship Subcommittee Report. When no additional comments were provided in response to Dr. Johnson's inquiry, he called for a motion to approve the September minutes. Dr. Weiss made a motion to approve the minutes as amended and Dr. Henderson seconded the motion. The September conference call minutes were unanimously approved by the BOSC.

Reports Transmitted to ORD

Dr. Johnson stated that a number of program review and letter reports had been transmitted to ORD. All of these reports are posted on the BOSC Web Site (http://www.epa.gov/osp/bosc). He explained that the reports are transmitted along with a cover letter that he prepares to Dr. George Gray. In these letters, Dr. Johnson summarizes the process used for the review, the balance of expertise on the Subcommittee, the overarching recommendations of the Subcommittee, and what the BOSC hopes to accomplish by providing this report to ORD; basically the BOSC is looking to provide advice and recommendations that will improve the quality of ORD's research programs.

Dr. Johnson apologized to Dr. Harding for not including the issue of gender distribution in the letter that accompanied the report. This issue was raised at the last meeting, but Dr. Johnson did not want to include it until he had some data on the current gender distribution. Dr. Henderson asked for copies of the letters and Ms. Kowalski agreed to send them to the members.

Dr. Johnson mentioned that because he was on the SAB and had been involved in the program reviews, he provided input for last year's SAB review of EPA's proposed budget. This input was helpful to the SAB in understanding the programs. Dr. Johnson recommended that the BOSC continue to collaborate with the SAB on the budget and other items.

Because this was Dr. Johnson's final meeting as the BOSC Chair, he expressed his appreciation for having the opportunity to work with a group of individuals who are so knowledgeable, willing to

volunteer, and always ready to contribute. The chemistry among the Board members has been good and the BOSC has been very effective. During his tenure, the BOSC has been able to take on many assignments that other groups could not because the Board members have been willing to do the work required. He thanked everyone for the opportunity to serve them as their Chair during the past 2 years.

BOSC DFO Remarks

Ms. Kowalski, DFO for the BOSC Executive Committee, welcomed Dr. Martin Philbert (University of Michigan) and Dr. Weiss to their first face-to-face meeting of the BOSC.

Ms. Kowalski stated that the BOSC is chartered as a Federal Advisory Committee and subject to the rules and regulations of the Federal Advisory Committee Act (FACA). Therefore, this meeting was open to the public, and time was designated for public comment. A contractor, Beverly Campbell from SCG, was present to take notes to capture the presentations and discussions, and the meeting minutes will be made available to the public on the BOSC Web Site after approval by the Executive Committee and certification by the BOSC Chair. Notice of this meeting was published in the *Federal Register*. Ms. Kowalski established an electronic public docket for the meeting on the Federal Docket Management System (FDMS), which can be accessed at http://www.regulations.gov. The number to search for this docket is EPA-HQ-ORD-2006-0824. The *Federal Register* notice and the agenda were available to the public on the docket in advance of the meeting. Ms. Kowalski mentioned that she had not received any requests for public comment prior to the meeting but there is time set aside at 4:00 p.m. today for public comment. As DFO, she worked with EPA's ethics officials to ensure that all appropriate ethics requirements were satisfied for the Executive Committee. Nevertheless, she asked the members to notify her during the meeting if they have any potential conflicts of interest. Each BOSC member should have received a notebook of materials by mail prior to the meeting as well as some supplemental handouts upon check-in to the hotel. She noted that Drs. Henderson and Windom had not picked up their packets at the registration desk. Ms. Kowalski mentioned that there will be a telephone line open for the rating tool discussion and for some of the afternoon program review discussions. Dr. George Gray will be unable to attend the meeting, but Dr. Kevin Teichman (EPA/ORD), who will be replacing Dr. William Farland as the EPA Liaison to the BOSC, will provide the comments from the AA/ORD.

As part of her DFO responsibilities, Ms. Kowalski prepared a summary of the Fiscal Year (FY) 2006 BOSC activities/accomplishments, which included the following: (1) 6 final reports were transmitted to ORD, (2) 20 meetings were held (face-to-face and by conference call), (3) there were 6 active subcommittees, (4) 43 Executive Committee and Subcommittee members were tracked, (5) 118 recommendations were transmitted in reports to ORD, and (6) 80% of the recommendations in the reports transmitted to ORD will be fully implemented and 17% will be partially implemented by ORD.

Dr. Johnson asked about the FY 2005 percentage of recommendations that were fully implemented. Ms. Kowalski replied that she thought the Agency-wide implementation rate was about 50-60% fully implemented in FY 2005. She noted that the ORD 80% implementation rate is higher than that for most other advisory committees.

Dr. Sayler asked if the members could release the materials distributed at meetings to those outside of the BOSC. Ms. Kowalski responded that the materials can be released and are posted on the BOSC Web Site.

With respect to Dr. Harding's earlier question about the new My Pay system, Ms. Kowalski said that she will be contacting each member to walk them through the process. Members will have to change their passwords after they gain access to the system. **She stressed that each member must access the system before the end of the calendar year.** The Web address for the new system is http://www.mypay.gov. Dr. Duke said that he had received a letter and has been able to access the system. Ms. Kowalski was informed that everyone should have received a letter. Drs. Ryan, Windom, and Harding replied that they

did not receive a letter. Dr. Johnson indicated that Ms. Kowalski will contact each member to ensure that everyone has access to the new system.

Ms. Kowalski will be sending out the annual request for members to update their biographical sketches and CVs. She also will be requesting updates of the confidential financial disclosure forms. If a member completed those forms in the last 4 months, they will not be required to update them at this time. Ms. Kowalski reminded members that they must complete their ethics training each year. She also asked the members to submit their homework hours and travel vouchers to her before leaving the meeting. She mentioned that Jason Edwards would be here at the break today to take some photographs of the Board members. She asked any attendees who had not done so already to sign in at the registration desk.

Remarks of the AA/ORD

Dr. Johnson introduced Dr. Teichman, who is now the Acting Deputy Assistant Administrator for Science in ORD. With Dr. Farland's retirement from EPA, Dr. Teichman will be serving as the EPA Liaison to the BOSC. Dr. Teichman's biosketch was distributed by Ms. Kowalski. He previously served as the Director of ORD's Office of Science Policy (OSP), where he coordinated ORD participation in EPA policy making in all media to ensure these policies reflected sound science. He has helped lead the planning of ORD's research program, striving to ensure it meets the needs of the EPA program and regional offices. Dr. Teichman has B.S. and M.S. degrees from Massachusetts Institute of Technology (MIT) and a Ph.D. degree from the University of California-Berkeley, all in Mechanical Engineering. Dr. Johnson was pleased to welcome Dr. Teichman to his new role as the Liaison to the BOSC.

Dr. Teichman said that he hoped to attend as much of the meeting as possible but he also was participating in the Human Studies Research Review Board FACA meeting, which was being conducted simultaneously. He expressed Dr. George Gray's apology for being unable to attend the meeting. Dr. Gray was in China, meeting with the Minister of Science and Technology to discuss joint research opportunities. Dr. Teichman explained that EPA can learn a great deal from China, particularly in the area of green buildings.

Dr. Teichman has asked Dr. Gray to fill the Deputy Assistant Administrator for Science position as quickly as possible. Dr. Farland had been acting in that position for the past 6 years and he was made permanent just before he retired. Dr. Gray will probably fill the position within the next 2 years.

Since his days at MIT when he looked at energy consumption in schools and city offices and made recommendations for energy conservation, Dr. Teichman has been applying engineering principles to the indoor environment. He worked hard to get ORD involved in indoor air issues and then became the manager of ORD's indoor air quality research program. Since then, his responsibilities have expanded to additional media. His heart has always been to ensure that the science informs environmental decision making at the national, regional, state, and local levels. That is the only way to achieve the desired outcomes.

Dr. Teichman had the opportunity to serve as a teaching assistant to Dr. Edgerton. Often dignitaries, such as Jacques Cousteau, would come to the laboratory, which also was visited by many kindergartners. Dr. Edgerton never talked down to anyone; he shared his ideas and treated everyone with the same respect. Dr. Teichman hopes to carry that tradition into this new effort. He is not a toxicologist as Dr. Farland was, but he will do his best to carry on the job in Dr. Farland's absence. Dr. Teichman thanked Dr. Johnson for his very able leadership of the BOSC for the past 2 years. He also thanked Dr. Windom for his 6 years of service, as well as Dr. Michael Clegg (who was not present) for his service. This is the last BOSC meeting for these three members. Dr. Teichman announced that Dr. Jim Clark (Exxon-Mobil) has agreed to serve as the new Chair of the BOSC. He then welcomed Dr. Weiss and Dr. Philbert to their first BOSC meeting.

Dr. Teichman noted that there are three vacancies on the Board that need to be filled. The potential candidates submitted by the BOSC have been prioritized in order of the expertise needed on the BOSC. This list has been provided to Dr. Gray, who made a few changes. Ms. Kowalski has begun calling the candidates in an effort to fill the vacancies.

ORD has developed 10 principles of operation that will be distributed to the BOSC in the future. These principles concern topics such as environmental stewardship; being a center of scientific excellence; partnering; exhibiting leadership; trusting each other and being worthy of each others' trust; communicating openly, honestly, and clearly; making informed decisions; embracing the perspectives of others; and celebrating accomplishments.

Dr. Teichman reported several new appointments at EPA. Dr. Warren Lux is EPA's new Human Subjects Research Review Official. A biosketch on Dr. Warren was distributed with the meeting materials. He will continue to ensure that EPA's research complies with all regulations that govern the protection of human research subjects. Mr. Jon Hermann has been selected as the new Director of the National Homeland Security Research Center, and Dr. Rick Linthurst is the new National Program Director (NPD) for Ecological Research.

Dr. Teichman informed the BOSC that EPA's RTP campus has been voted the third best place for post-doctoral fellows to work. Because this survey included many leading public and private organizations, this is quite an honor. He then mentioned that EPA will be issuing a new FACA award for which DFOs are eligible. The award will be presented at the end of November. He concluded his remarks, stating that he would like to leave some time for questions.

Dr. Johnson called for questions. Dr. Henderson asked what the Board needed to do to nominate Ms. Kowalski for the FACA award. Dr. Teichman replied that Ms. Kowalski's supervisor, Mr. Paul Zielinski, will prepare the necessary paperwork to nominate her for the award at the BOSC's request.

Dr. Sayler was interested in Dr. Gray's visit to China. How does ORD view future China-United States involvement? Dr. Teichman responded that he envisions a strong relationship between the two countries in the future. Representatives from China visited EPA about 5 months ago. He was present when they met with the Administrator and discussed potential research partnerships. Following the unfortunate incident where toxic waste was dumped in a river in northeastern China, the representative who visited Dr. Gray was fired; EPA now is trying to rebuild that relationship and exchange ideas. Dr. Sayler asked if this will be a policy level exchange or will there be funding of joint research. Dr. Teichman responded that he was not certain; if the State Department has funding available, then that money could be used to augment ORD's budget to work on joint projects.

Dr. Johnson reported that all of the nominations for vacancies provided by the BOSC members were submitted to ORD. The letter that accompanied the list of names urged Dr. Gray to consider this input because the BOSC members were in a unique position to understand the types of expertise needed on the Board.

Dr. Johnson recommended that the BOSC prepare a letter of appreciation to Dr. Farland for his service as the EPA Liaison to the BOSC. He asked for a motion on his recommendation. Dr. Windom moved to approve the preparation of a letter of appreciation for Dr. Farland, and Dr. Harding seconded the motion. The proposal was unanimously approved by the BOSC. Dr. Johnson agreed to send Dr. Farland a card with a note expressing the BOSC's appreciation for his service.

Dr. Johnson said that he would be asking the new members for their comments on their initial experiences with the BOSC during tomorrow's meeting. He reiterated the BOSC's intention to nominate Ms. Kowalski for the new FACA award.

Program Review Tool Workgroup Proposal

Dr. Johnson reminded the BOSC members that ORD previously had developed and presented to the Board a performance measurement tool that was rejected by the BOSC because of a number of concerns that were explained to ORD in a letter dated November 8, 2005. ORD initially wanted the BOSC to rate the performance for each long-term goal (LTG) on a scale from 1 to 5. Because the BOSC Subcommittee members typically assigned different individuals to evaluate different parts of a program, the Board did not want to assign a rating score for the program. In addition, the Chairs of the Subcommittees that had completed their reviews did not want to return to the members and ask them to assign a numerical rating retrospectively. Because the Office of Management and Budget (OMB) has continued to seek numeric measures of program performance, ORD asked the BOSC to participate in a workgroup with OMB to develop a rating tool that would be acceptable to all parties. The purpose of the Program Review Tool Workgroup, which includes several BOSC members and representatives from ORD and OMB, is to develop guidance for rating program performance to be used for the BOSC reviews of ORD research programs. The ORD members of the workgroup—Ben Larson, Jim Morant, and Phillip Juengst—were present at this Executive Committee meeting. Drs. Duke, Daston, Weiss, and Johnson represent the BOSC on this workgroup.

Dr. Johnson explained that this new rating process will be incorporated into the current process used by the BOSC Subcommittees in reviewing research programs. A draft proposal developed by the BOSC members of the workgroup was provided in the meeting notebook. Two sets of comments appear on the draft document—those from OMB and those from ORD. ORD's comments appear in italics and OMB's comments are provided in the right margin.

As stated in OMB's Comment [A1], the BOSC review as it currently is done satisfies the Program Assessment Rating Tool (PART) requirements for questions 2.6 and 4.5. The current process is not as helpful in meeting the requirements for question 4.1. This question assesses the program's progress on meeting its LTGs and Annual Performance Goals (APGs), how the program compares to similar programs, and the effectiveness of the program based on independent evaluation. OMB wants to know if the program is on track to meet all of its LTGs, if the program's partners (where appropriate) are committed to the long-term targets (outcomes), and whether the program appropriately addressed any predefined end targets. Dr. Sayler asked if the predetermined end targets were Annual Performance Measures (APMs). Dr. Johnson replied in the affirmative. Dr. Henderson thought it might be helpful to have a definition of goals, end points, targets, and outcomes. Dr. Johnson responded that this is difficult because each group uses different jargon. Goals are the LTGs, end points or targets are milestones, and outcomes are the changes resulting from the use of the research program's products. Dr. Johnson asked Dr. Teichman and the other ORD members of the workgroup if those definitions were reasonable; they confirmed that they were appropriate. Dr. Ken Demerjian (State University of New York) thought that outcomes were the ultimate end points, such as reducing the excess number of deaths associated with exposure to particulate matter (PM). Can EPA demonstrate that it has achieved incremental improvement? He pointed out that outcomes also include ecological improvements. Dr. Demerjian noted that the Health Effects Institute (HEI) and possibly the North American Research Strategy for Tropospheric Ozone (NARSTO) are working on this issue. Although it is difficult to measure improvement, the Agency must demonstrate that it is moving in the right direction. Dr. Weiss commented that if the definition of outcomes extends that far down the road then it will be impossible for EPA to demonstrate progress in real time. The focus should be on how research influences regulations and policies. It is up to others to determine if these regulatory and policy changes affect human health and the ecosystem. Such measures are beyond the scope of EPA research programs. Dr. Henderson said that OMB has rejected this argument and called for more accountability.

Dr. Daston agreed with Dr. Demerjian's comment, and OMB is beginning to recognize that those outcomes cannot be measured in the time frame covered by these reviews. OMB wants to ensure that the Agency's research programs are moving in a direction that will benefit EPA's customers (e.g., the program offices). The BOSC should have the expertise to evaluate, at least qualitatively, whether EPA is

making adequate progress in meeting its LTGs. Dr. Windom mentioned that ORD has not been tracking whether its research products are being used by the program and regional offices. The program offices could follow up with the regions implementing policies or tools to improve water quality to determine if there is an actual improvement in water quality. There could be some quantification of the progress. Dr. Sayler agreed but stressed the need to look beyond the program offices and regions to state and local governments. Dr. Philbert commented that this discussion reminded him of similar discussions at the Defense Advanced Research Projects Agency (DARPA) and the National Institutes of Health (NIH) about quantifying the unquantifiable. When metrics are developed, people start responding to the metric.

Dr. John Giesy (University of Saskatchewan) offered two observations. Earlier this week, he heard from the regulatory staff at EPA that ORD is irrelevant to the program offices. Most program offices share this view and ORD is not doing a good job of getting statements from them that they are using the tools developed by ORD. The regions are using ORD developed tools, but there currently is no mechanism to track and quantify this use. ORD should, at a minimum, track how its primary clients use the science, research tools, and other tools developed by ORD. If ORD can obtain these testimonials, OMB may be satisfied that ORD is achieving its goals. Dr. Johnson noted that the Drinking Water Program did obtain such testimonials for its BOSC program review; Dr. Windom added that the Water Quality Program also provided testimonials. To ensure that these testimonials are balanced, ORD should seek input from those who are using ORD products as well as those who are not.

Dr. Johnson stated that OMB is proposing the addition of three questions to the BOSC program reviews to get more information to address PART question 4.1. He asked if these three questions were acceptable to the BOSC and if they captured the elements the BOSC needs to evaluate performance (the questions are listed on the bottom of p. 8 of this summary).

Dr. Harding asked if the workgroup prepared the draft guidance document. Dr. Johnson replied that the BOSC members of the workgroup prepared this document and then asked for ORD and OMB comments. She asked if these new questions will replace the existing charge questions used by the BOSC. Dr. Johnson answered that the BOSC will continue to use the common charge questions to assess research programs. These additional questions will focus on assessing progress toward achieving LTGs. The responses to these common questions will capture the performance for the entire research program and all activities in support of the program's LTGs. For each LTG, a qualitative score will be assigned that reflects the quality and significance of the research as well as the extent to which the program is meeting or making measurable progress toward the goal. The scores will be given in the form of adjectives that are clearly defined and that are intended to promote consistency among reviews. The adjectives will be used as part of a narrative summary of the review so that the context of the rating and the rationale for selecting a particular rating will be transparent. The adjectives proposed to describe progress are:

- ***Exceptional:*** *indicates that the program is meeting all and exceeding some of its goals either by achieving milestones early or by providing more and better outputs than had been expected, or both. An exceptional rating also indicates that the program is addressing the right questions to achieve programmatic goals. The review should be specific as to which aspects of the program's performance have been exceptional.*

- ***Satisfactory:*** *indicates that the program is meeting most or all of its goals. Satisfactory programs live up to expectations in terms of addressing the appropriate scientific questions to meet program goals, and that work products are being produced and milestones are being reached in a timely way.*

- ***Inadequate:*** *indicates that the program is failing to meet a substantial fraction of its goals, or if meeting them that the achievement of milestones is significantly delayed, or that the questions being addressed are inappropriate or insufficient to meet the intended purpose. The review should be specific as to which aspects of a program's performance have been inadequate.*

Dr. Johnson mentioned that ORD and OMB have proposed adding an adjective between Satisfactory and Inadequate. This adjective would indicate that the program is meeting some of its goals in a timely manner and for which most or all of the questions being addresses are appropriate.

OMB's Comment [A4] asks the BOSC to consider restructuring the definition for Exceptional to lessen the importance of outputs because output performance already is captured in the program's annual measures. Dr. Daston suggested that the Exceptional adjective definition needs to be rewritten without the reference to outputs. Dr. Johnson agreed with Dr. Daston's suggestion. Dr. Ryan expressed some concern about the emphasis of timeliness rather than quality of science. Dr. Philbert asked about the intent of the assessment.

Dr. Daston asked the members to step back and look at the bigger picture. The BOSC has developed and refined a process to review programs and provide good advice to ORD. The workgroup is trying to figure out how the BOSC can serve that mission better by adding some qualification to our evaluations that will help meet ORD's needs in communicating with OMB. This guidance is not intended to change the existing process the BOSC has developed.

Dr. Johnson thought it might be helpful to the new members if Dr. Teichman described the MYPs and the logic models presented in those plans. Dr. Teichman commented that the federal government typically does yearly plans; however, ORD thought it might be helpful to plan on a longer time frame to facilitate the achievement of long-term goals. Therefore, ORD implemented the development of MYPs. There currently are 16 MYPs. Each plan lays out a set of LTGs for the program, a set of APGs to demonstrate progress toward achieving the LTGs, and APMs that are the steps toward achieving each APG. The BOSC usually divides a research program by LTG in its reviews. Therefore, the BOSC would prefer to qualitatively assess the LTGs rather than the program as a whole. Dr. Teichman explained that APMs are products or deliverables; APGs are collections of products that can be transferred to decision makers; and the use of these products will bring about outcomes, such as a reduction in the number of asthma cases.

Dr. Teichman stated that the BOSC should not go outside of its mission or undo the review process that it has worked to create. OMB wants to know if ORD's customers are using its products and how that use affects how they are achieving their mission. OMB would like the BOSC to assess client use of ORD products. Dr. Sayler thought the logic model should be provided to the new BOSC members because it is very helpful.

Dr. Johnson asked for comments on the wording of the proposed adjectives. Dr. Daston suggested that he work with the other workgroup members to wordsmith the adjectives based on this discussion. He asked if there was general agreement on the three adjectives. Dr. Johnson asked if the BOSC wanted to add the fourth category suggested by ORD to fill in the gap between Satisfactory and Inadequate. Dr. Sayler wanted to add the fourth category but Drs. Giesy, Harding, Duke, and Ryan did not. Dr. Giesy commented that the BOSC could add nuances in the text to address the differences between a program that would be considered weak and one that is inadequate. Dr. Daston thought the adjectives should be in the context of a narrative. Dr. Sayler responded that OMB will not want to sift through a narrative to find the information it is seeking. When Dr. Johnson stated that OMB is satisfied with the use of these adjectives rather than a numerical score, Dr. Sayler agreed that the use of three rather than four adjectives was acceptable to him. OMB is pushing to add a fourth adjective because they use a four grade rating system. He did not think it was essential that the BOSC rating system parallel OMB's system. Dr. Daston agreed to take the lead in rewriting the descriptions of the three adjectives.

Dr. Johnson read the three questions that would be added to the BOSC reviews:

- ✧ How appropriate is the science used to achieve each LTG, i.e., is the program still asking the right questions, or has it been eclipsed by advancements in the field?

- ✧ How good is the scientific quality of the program's research products?

- ✧ How much are the program results being used by environmental decision makers to inform decisions and achieve results?

One question focuses on quality, one on structure, and one on outcomes. Dr. Johnson asked if these three questions are comprehensive enough to make the assessment. Dr. Duke pointed out that a number of the existing charge questions have been reworded on the draft guidance when compared to the questions in the handbook. Dr. Johnson explained that some questions were reworded because the previous questions called for yes or no answers. They have been rewritten to elicit a more elaborate response. Program reviews still will be conducted as they have been, but future reviews will include a statement about the progress toward achieving LTGs. Ms. Kowalski said that she did a one-to-one comparison of the existing questions in the handbook with those in the draft proposal. A few of the questions were not included in the draft and a number of questions have been combined. Most of the questions are the same as those used previously. All of the questions (including the three new questions) would be part of the BOSC review process and the Subcommittee would prepare a report as was done in the past, with one exception—the addition of a qualitative evaluation of the LTGs in the context of the three new questions. Is this a satisfactory approach? Should the BOSC use these three questions to assess LTGs? Dr. Daston replied that these three questions are consistent with the BOSC's process and it is the right thing to do to help ORD. Referring to the first of the three new questions, Dr. Giesy said he did not think the BOSC reviews were to assess the appropriateness of the science. Dr. Daston replied that the BOSC reviews have always asked if the program is doing the right science and if the science is being done right. Therefore, he thinks that question falls within the BOSC's purview. Dr. Demerjian asked if the BOSC Subcommittee should prepare a narrative addressing the three questions for each LTG. He thought the Exceptional rating definition should include a statement about quality. Dr. Windom thought the response to these qualitative measures should be provided at the end of the write-up for each LTG. Dr. Weiss thought it might be difficult to assign qualitative ratings based only on the three new questions when there is so much more information on the program.

Dr. Johnson commented that the three new questions are consistent with what the BOSC has been asked by ORD to do. They appear to be "bottom line" questions for structure, quality, and outcomes. Dr. Henderson thought it might be helpful to insert a summary response to these questions at the end of the report so that OMB can locate it easily. If there is no objection, the questions could be reordered so that the three new questions were the last questions in their respective sections. Dr. Duke thought it might be better to pull the three questions into a separate category so that it will be easier to explain to the Subcommittee members why those questions are different. This approach also makes it easier for OMB to find the responses. Dr. Johnson commented that the three new charge questions can be reworded so that it is clear that they are at the LTG level and not the program level. If the BOSC adopts these questions, all program reviews will be conducted at the LTG level. This will eliminate the flexibility that the Board has had in the past. Are there any objections to doing the reviews by LTG? Dr. Harding had no objections. Dr. Henderson commented that for the PM/Ozone review, the LTGs were being revised so it was difficult to do the review according to LTGs. Dr. Johnson stated that this new approach will make it incumbent on ORD to determine the LTGs and communicate them to the BOSC. Ms. Kowalski noted that the BOSC should comment if the members think a goal is inappropriate.

In response to Dr. Sayler's comment, Dr. Johnson agreed that quality of science was not addressed in the Exceptional adjective definition. Dr. Daston said that he will add that to the descriptor. Dr. Harding said that previous reviews have included questions that were very similar to these new questions. Dr. Johnson agreed, stating that they are not new questions, but they now will be applied at the LTG level and will be used to qualitatively assess the performance of the program toward reaching those goals. Dr. Weiss thought the BOSC should not limit the LTG level assessment to those three questions. Dr. Johnson replied that OMB uses different parts of the BOSC review as input for the PART questions. OMB has specifically asked the BOSC to address question 4.1 on performance at the LTG level. Dr. Demerjian thought it might be helpful to determine how OMB uses the BOSC reviews to address PART questions 2.6 and 4.5. Dr. Johnson responded that question 2.6 concerns whether independent evaluations are

conducted as needed to support program improvements; question 4.5 concerns whether the independent evaluations are of sufficient scope and quality to indicate that the program is effective and achieving results. Dr. Johnson emphasized that the three new questions are to be assessed at the LTG level, not the program level.

Dr. Johnson summarized the next steps with regard to the draft guidance. Dr. Daston will revise the wording of the adjectives, including a component about quality of science in the Exceptional descriptor. The three questions will be brought together into a separate section to make sure that they are addressed on the LTG level. He asked that members provide comments on the revised guidance before it is submitted to the entire workgroup. The new guidance, once it is approved by the BOSC and workgroup, will be used for a pilot review of the Safe Pesticides/Safe Products Research Program. Dr. Johnson asked that members provide their comments on the guidance by October 31, 2006, so that he can incorporate them into the draft before departing the BOSC. Dr. Johnson thanked everyone for their open and honest discussion of this topic and for coming to consensus about the next steps. After the pilot review is conducted, the BOSC should reexamine the approach to see if it can be improved. He stated that the revised guidance document will be distributed to the Executive Committee.

ORD Responses to BOSC Reports

In an effort to keep on schedule, Dr. Johnson asked that only questions of clarification be asked during the presentations.

ORD Response to the BOSC Global Change Program Review

Dr. Joel Scheraga (EPA/ORD), NPD for Global Change Research, thanked the BOSC Subcommittee on Global Change Research for their efforts in reviewing the program. He noted that Milton Russell chaired the Subcommittee and Dr. Duke served as the Vice Chair. The charge to the Subcommittee addressed two fundamental questions: (1) Is the Global Change Research Program engaged in the "right" work? (2) Does the Program conduct its research and assessment activities "well"? The "overall conclusion of the Subcommittee is that the Program on the whole has done the "right work" and that it has done it "well."… The Subcommittee concludes that the Program has provided substantial benefits to the nation and that it is on course to make significant further contributions to societal outcomes by informing and facilitating decisions by the public and private actors who must consider the prospects of global change."

The report indicated that program performance can be improved by: (1) a more rigorous approach to priority setting, (2) redirection of place-based activities toward those with broader national applicability, (3) increased attention to threshold and episode-driven changes, (4) expansion of consultation with external advisors, and (5) specific actions in each research focus area.

Dr. Scheraga reported that the Global Program already is implementing changes in response to the BOSC's recommendations. These changes include: (1) the BOSC recommendations were incorporated into the PART submission, (2) LTGs were more closely tied to EPA's mission and statutory requirements, (3) the focus has been redirected to place-based activities with broader national applicability (the Office of Air and Radiation [OAR] and Office of Water [OW] have been identified as primary stakeholders and the program is assessing how global change will affect OAR's and OW's ability to fulfill their statutory/regulatory requirements), (4) reorganization around two LTGs: (a) Air Quality and (b) Water Quality and Aquatic Ecosystems (consistent with the BOSC's recommendation to integrate the water quality and ecosystems focus areas), (5) more rigorous approach to priority setting (a decision assessment pilot is underway), and (6) expansion of consultation with outside experts (e.g., November 1-2, 2006 workshop on uncertainty).

Dr. Scheraga provided the following specific responses to the program-wide recommendations made by the Subcommittee.

Recommendation #1: Affirm current emphasis on decision support for adaptation. However, assure sufficient resources are devoted to "harvest" results of previous assessments.

ORD Response: The program is strongly committed to: (1) the ongoing process of synthesizing and communicating research results, and (2) making information available in a timely fashion and in useful forms. Examples include: CCSP Synthesis & Assessment Products, improved Global Program Web Site to communicate research and assessment results, and enhancements to the Web site for STAR research.

Recommendation #2: Develop an explicit framework for priority setting and project selection.

ORD Response: The program is testing a "decision assessment approach" for priority setting and conducting a pilot on the Chesapeake Bay Program. The steps in the decision assessment are: (1) decision inventory—development of dynamic "decision inventory" to identify classes of climate-sensitive decisions, (2) prioritization—evaluation of returns from providing better scientific information to inform those decisions, (3) investment in priorities, and (4) measurement of outcomes.

The overall goals of the approach are to: (1) identify scope of climate-related decisions made by important groups of decision makers associated with high-priority issues relevant to EPA's mission, (2) demonstrate specification/characterization of attributes of climate-related decisions, (3) identify and prioritize research opportunities, (4) link research more closely to decisions, and (5) illustrate methodology for improved measurement of outcomes.

Recommendation #3: Engage diverse and multidisciplinary external advisors.

ORD Response: The program has made a commitment to the practice of engaging external advisors (e.g., workshops), regular consultation with the BOSC, and the engagement of the National Academies at appropriate times.

Recommendation #4: Take a more integrated and comprehensive systems approach when designing and implementing activities across focus areas.

ORD Response: The program is integrating the water quality and ecosystems focus areas, and more closely aligning these areas with EPA's statutory mandates related to water quality (Clean Water Act [CWA] and Safe Drinking Water Act [SDWA]). The program recognizes that the CWA is designed to protect designated uses (human uses and aquatic life uses of water). The program will increase its focus on watershed as the appropriate scale for analyses and management.

Recommendation #5: Take account of intra-program and external synergies.

ORD Response: The program is integrated and attains its goals through investments in both "intramural" and "extramural" activities. The intramural activities are coordinated across the ORD laboratories and centers, each of which has specialized expertise. The use of these various skills is coordinated by the NPD. The extramural activities include ORD's STAR Program and joint Requests for Applications (RFAs) with other Climate Change Science Program (CCSP) agencies. Synergies are identified by cross-EPA research planning teams with strong ties to cooperating universities, other federal agencies, and other research partners. The program participates in the CCSP planning process (interagency working groups).

Recommendation #6: Expand efforts on on-steady-state issues.

ORD Response: The program has made a commitment to expand efforts on nonlinear issues such as thresholds and episode-driven changes. The recent RFA, "Nonlinear Responses to Global Change in

Linked Aquatic and Terrestrial Ecosystems and Effects of Multiple Factors on Terrestrial Ecosystems: A Joint Research Solicitation—EPA and DOE," is a sign of this commitment.

Recommendation #7: Explore cooperation with other efforts to provide decision support tools and information.

ORD Response: Coordination with other efforts to provide decision support is occurring primarily through the U.S. CCSP and the CCSP's Human Contributions and Responses Work Group, which EPA co-chairs with the National Aeronautics and Space Administration (NASA). EPA also is co-sponsoring (with the National Oceanic and Atmospheric Administration [NOAA]) a National Academy of Sciences study of "decision support science." The panel is working under the Committee on Human Dimensions of Global Change. The objectives of the study are to: (1) elaborate a framework for considering climate-related decision support objectives and activities; (2) assess the strengths and limitations of various strategies, activities, and tools; and (3) recommend strategies that the sponsors might use for organizing decision support activities.

Recommendation #8: Develop a new strategy for place-based adaptation decision support activities.

ORD Response: The program is assessing place-based adaptation for ecosystems as part of CCSP Synthesis & Assessment Product #4.4—"A preliminary review of adaptation options for climate-sensitive ecosystems and resources." The purpose is to review management options for adapting to climate variability and change, and to identify characteristics of ecosystems and adaptive management responses. Several projects are underway that focus on water quality and place-based adaptation.

Dr. Scheraga then provided responses to the specific recommendations made by the Subcommittee in each research focus area. For the Air Quality Focus Area, the program is aligned with major statutes for which EPA has authority (i.e., Clean Air Act [CAA]). The program is exploring the potential for extending the results of the Air Quality Assessment—using downscaled climate scenarios in other applications, using results to evaluate health consequences, and using results to evaluate ecosystem impacts.

For the Water Quality Focus Area, the program is aligned with the major statutes for which EPA has authority (i.e., CWA and SDWA). Ecosystems protection is a goal of the CWA. The water quality and ecosystems focus areas have been integrated. The work now encompasses: human uses of water, aquatic uses of water, and development and application of integrated watershed-based (or place-based) approach for protecting water quality. The benefits of restructuring the program include: (1) better integration of program elements through application of a watershed approach, (2) better integration of human health impacts with water quality, (3) facilitated development of tools to evaluate multiple benefits for more effective adaptation through application of watershed approach, (4) better identification of criteria for project prioritization based on utility to national-scale water and air quality protection programs, (5) closer alignment with OW that will allow better integration of data and expertise, and (6) direct relevance of research and information tools to decision makers and managers.

The program has initiated a dialogue with OW to identify needs and priorities, make greater use of internal expertise within OW, and develop joint products (e.g., BASINS/Climate Assessment Tool). The program will continue to use advisory groups, including the cross-Agency advisory committee, the National Research Council (NRC) panel on decision support, and the CCSP Interagency Work Groups and their Science Steering Committees.

The Human Health Focus Area is being integrated into the air quality and water quality/ecosystems focus areas. The program's 2007 Climate Change/Air Quality Assessment will provide input to analysis of health impacts of criteria air pollutants. The program is leading the production of the CCSP Synthesis & Assessment Product #4.6—"Analyses of the effects of global change on human health and welfare and human systems."

The ecosystems focus area will focus on truly representative (i.e., generalizable) aquatic ecosystems for adaptation decisions. This will be achieved through interaction with the water quality focus area. The notion of "representativeness" will be incorporated into decision criteria where feasible.

Regional/place-based assessments were "right for their time." The program is actively considering alternatives for "place-based" work (e.g., watersheds, biomes, urban environments). There has been a change in thinking about "regions" reflected in the CCSP reports. For example, Synthesis & Assessment Product (SAP) #4.4 is focusing on managed systems and using place-based case studies of a particular ecosystem type to illustrate adaptation issues and options. SAP #4.6 will include human settlements (including urban environments) in its scope.

Dr. Scheraga noted that the interactions of the program staff with the BOSC Subcommittee have led to major improvements in the program. It was an excellent opportunity for the program to hear and learn from external advice.

Dr. Duke, who served as Vice Chair of the Global Change Subcommittee, stated that the program has done a good job of interpreting the Subcommittee comments and recommendations and clearly has acted on those recommendations. Dr. Duke was very impressed with the responses and he applauded the program for its actions. He asked that ORD's response be shared with the other members of the Subcommittee. He thought the decision support approach and National Academy of Sciences (NAS) study were appropriate. Dr. Duke noted that this research program is part of the larger CCSP; the Subcommittee had to keep that in mind when making its recommendations. Dr. Scheraga commented that a significant question is: Where should the CCSP go next with its assessment activities? He has briefed an NAS panel addressing this question about the directions ORD's Global Program is going, and the changes being made in response to the BOSC's recommendations. Dr. Duke thanked Dr. Scheraga and the program staff for their efforts in preparing this response.

ORD Response to the BOSC Water Quality Program Review

Dr. Charles Noss (EPA/ORD), NPD for the Water Quality Research Program, thanked the BOSC Subcommittee for its efforts to review the program and provide compliments, constructive advice, and specific recommendations. The Water Quality Subcommittee was chaired by Dr. Windom and co-chaired by Dr. Sayler.

The Water Quality Subcommittee conducted its review of the Water Quality Research Program in late 2005 and early 2006. Conference calls were held on December 7 and 16, 2005, and January 12, 2006. The face-to-face review meeting was held in Cincinnati, Ohio, January 25-27, 2006, and the Subcommittee's final report was delivered to ORD in July 2006.

Dr. Noss presented ORD's response to each of the recommendations in the report.

Recommendation #1: A more transparent approach to prioritizing research should be provided in the next MYP.

ORD Response: Processes for collecting information and transparently making decisions will be documented in the revised MYP.

Recommendation #2: A more structured annual accounting of program outcomes should be implemented.

ORD Response: Outputs and publications will be recorded as indicated in PART measures. New accountability measures are being identified.

Recommendation #3: The exploratory part of the STAR Program should be reinstated.

ORD Response: The program concurs and encourages the continued funding of the STAR Program.

Recommendation #4: The program should include partnering and collaboration.

ORD Response: The MYP work groups have identified regional representatives who can help create local participation in national efforts.

Recommendation #5: The MYP should better communicate the goals of the program.

ORD Response: The revised MYP will provide greater background and context as well as descriptions of future research directions.

Recommendation #6: Biosolids should not be elevated to an LTG.

ORD Response: Biosolids research has been incorporated into the structure of the three existing LTGs.

Recommendation #7: The program should strive to maintain its core competency in water quality research and encourage exploratory research.

ORD Response: The NPD will work with the ORD laboratories and centers to meet objectives. The program also will continue to support the STAR Program.

Recommendation #8: The program should increase use of external reviews for RFAs. A better link to the grant program is recommended.

ORD Response: The grant management processes will use external experts and a direct link to the ORD grants page will be posted on EPA's home page.

Recommendation #9: Internal and external peer review of program products should continue, as well as collaboration with other agencies.

ORD Response: The established peer review policy will continue to be followed. The NPD has actively encouraged increased collaboration with other agencies.

Recommendation #10: The biosolids program should not be elevated to an LTG, and program design should articulate the proactive aspects of the Water Quality Research Program (WQRP).

ORD Response: Biosolids research has been incorporated into the existing LTGs and the program is working to revise the MYP and present the program proactively.

Recommendation #11: The prioritization process and research progression should be improved upon and stated more clearly.

ORD Response: The program has developed criteria for ranking research within the MYP and they will be presented in the revised MYP.

Recommendation #12: Improve linkage between the program and individual projects.

ORD Response: The program is committed to creating clear and descriptive linkages from LTGs to individual projects.

Recommendation #13: Program plans should follow a line of inquiry to better show the sequence and relevancy of the research.

ORD Response: The revised MYP will reflect an improvement in this area.
Recommendation #14: The program should institutionalize a more systematic approach to communicating with clients.

ORD Response: The Research Coordination Team (RCT) has been re-established with new members. A schedule for regular ORD/OW management meetings is being established.

Recommendation #15: Specific prioritization criteria are recommended.

ORD Response: Revised processes for prioritization will be documented in the revised MYP.

Recommendation #16: The program should more thoroughly track progress of APMs under each LTG.

ORD Response: More descriptive linkages are being developed for APGs and APMs to help track research activities and to evaluate progress.

Recommendation #17: The program should continue to diversify its research competence.

ORD Response: The NPD will work with ORD laboratories and centers to maintain a balance between anticipated research needs and existing client priorities.

Recommendation #18: Implementation of incentives that encourage collaboration, especially with state/local government, is recommended.

ORD Response: The MYP work groups are actively seeking new opportunities for collaboration and proposed new outcome measures should reinforce collaboration.

Recommendation #19: The program should institute better communication between the STAR Program and the ORD laboratories.

ORD Response: A “took-kit” is in the planning stages for the EcoHAB grants in addition to existing methods of communication.

Recommendation #20: The MYP should describe a sense of program continuity.

ORD Response: The revised MYP will provide greater background information and context along with its description of future research directions.

Recommendation #21: The program should encourage its scientists to aim for the higher tier journals.

ORD Response: The NPD will communicate with laboratories and centers to develop an action plan.

Recommendation #22: The program should strive to establish relationships with users to encourage better technology transfer.

ORD Response: The program concurs and will seek to develop metrics for the WQRP, and will work with other NPDs to define measures that can be used across ORD.

Recommendation #23: Enhancing interactions with other stakeholder groups is recommended.

ORD Response: ORD laboratories and centers will be encouraged to partner with extramural agencies and nongovernmental organizations (NGOs) to support the WQRP goals.

Dr. Noss concluded his presentation by stating that the BOSC review is crucial to the success of the WQRP. The BOSC's input improved the program's responses in the PART review process and the Board's guidance enhances program management.

Dr. Windom thanked Dr. Noss for his response to the report. He mentioned that Dr. Noss' presentation focused primarily on the recommendations, but there were many positive comments about the program in the report. The Subcommittee was provided a draft MYP (which was done very quickly) that was very helpful in conducting the review. The Subcommittee members were very impressed with the enthusiasm of the program staff. The program's three LTGs are linked together cleanly and feed each other. The Subcommittee members also gained a great deal of information about the program while talking to the scientists; this interaction gave them a better understanding of the program. He pointed out that the Subcommittee was not criticizing the program for its lack of collaboration and cooperation. There was a great deal of collaboration with NOAA and the U.S. Geological Survey, and the program was doing a good job of leveraging resources. Dr. Windom was confident that communication of the program will be enhanced with the revised MYP.

Dr. Sayler asked about Dr. Noss' mention of peer review. What is the peer review process for cooperative agreements? Dr. Noss replied that each laboratory/center operates independently with respect to the use of peer review. In some laboratories/centers, the peer review process is more formal. There are documents and policies that guide peer review. There are specific instances to request outside input and there are six different mechanisms to obtain this external input. In general, high visibility products receive a high level of peer review.

Dr. Sayler asked about the feedback the program received from its PART review. Dr. Noss responded that he is still discussing the review with the PART examiner; this interaction began in fall 2005.

Dr. Johnson commented that he is beginning to see some recurring themes in the program reviews, including prioritization (transparency and rigor), communication, and collaboration. He noted that the reports seem to strike a balance between positive comments and recommendations for improvement.

ORD Response to the BOSC Land Program Review

Dr. Randall Wentsel thanked the BOSC Land Subcommittee for its review of the Land Research Program. The Subcommittee was chaired by Dr. Charlie Menzie and Dr. Clark served as the Vice Chair. The BOSC Subcommittee met initially by conference call to receive background information and to discuss a number of administrative issues of the review. The charge questions to the Subcommittee reflected the OMB research criteria. The notebook of materials submitted by the program to the Subcommittee included the draft Land MYP and details on ORD and the Land Research Program. The face-to-face review meeting was held December 13-15, 2005, in Cincinnati, Ohio, and it included presentations and posters. The final report was submitted to ORD in July 2006, and it included nine overarching comments as well as comments on the five charge questions. Peer review of the draft MYP generated many comments that are helpful in finalizing the plan. The Subcommittee's report included a number of positive comments on the relevance, quality, and performance of the program.

The overarching comments in the report covered the following topics:

- ✧ The Land MYP as an organizing roadmap.
- ✧ The Land MYP as a communication tool.
- ✧ Emerging issues.

- ✧ Collaboration and leveraging.
- ✧ Development of new scientists.
- ✧ Research gaps due to reductions.
- ✧ Balance between performance metrics and research drivers.
- ✧ Defining outcomes and characterization of uncertainty.

The responses to specific recommendations are presented below.

Recommendation #1: The Land MYP could better serve as an organizing roadmap and framework by addressing: (1) how it could communicate information more clearly, (2) how future conditions can be better anticipated, (3) how collaborative efforts can be pursued with greater effectiveness, and (4) how certain historical program needs are addressed as programs sunset or are terminated.

Recommendation #2: Improve the readability of the plan by highlighting the essential features of the Land MYP and minimizing jargon and acronyms. Consider rephrasing the two LTGs to reflect technical or scientific themes inherent in ORD efforts to enhance the success of the Office of Solid Waste and Emergency Response (OSWER) programs in Land Preservation and Restoration.

Recommendation #3: A balance needs to be maintained between the benefits of performance metrics and the costs and potential constraints that these metrics sometimes place on programs. The Subcommittee acknowledges the interplay of forces regarding performance metrics, but endorses their continued use and suggests that the need for balance be borne in mind.

Recommendation #4: There may be gaps and impacts resulting from sunsetting or terminating particular research initiatives, such as the Hazardous Substance Research Centers and the Superfund Innovative Technology Evaluation (SITE) Program. The rationale for program removal or sunsetting should be stated clearly within the Land MYP along with strategies for addressing those gaps if they indeed exist. If there are recognized gaps associated with sunsetting or terminating programs, these could be prioritized for collaborative research efforts.

ORD Response: The communication/organization comments on the MYP will be addressed in the revised MYP, which is expected in January 2007. It will address any gaps caused by reductions. The research questions to be addressed by the program will be discussed under the research theme. The table of APGs and APMs will be reformatted for clarity in the progression of research. The flow of the revised MYP will be improved by moving some sections to appendices.

Recommendation #5: The Land Research Program does a good job of focusing on near-term needs but there is a lack of emphasis on emerging issues. Consider including periodic forecasting of emerging problems that could be examined in a preliminary way to judge their import.

ORD Response: The revised MYP will include how to address emerging issues and future conditions. The program is shifting to study nanomaterial fate and transport. The program has a history of shifting to address issues (e.g., sediments, vapor intrusion, Brownfields).

Recommendation #6: In a time of shrinking resources and considering the multidisciplinary nature of today's problems, collaboration and leveraging are critically important. Consider opportunities for collaboration and leveraging at the national and international levels. Enhance the use of Web-based support systems for facilitating multi-facility research efforts. Look for opportunities to collaborate with EPA research efforts in Homeland Security and in risk communication.

ORD Response: Collaboration will be pursued with greater effectiveness with the goal of leveraging to replace programs that are terminated (e.g., grants, technology demonstrations). ORD initiated a program director level, federal agency collaboration effort. A matrix of MYPs versus media shows the focus of the Land MYP and the leveraging of ORD research to support OSWER.

Recommendation #7: Little information was presented on connection between short-term outcomes (use of advice and guidance documents) and long-term outcomes (faster, cheaper, better cleanups, or waste minimization). Consider how the linkages could be made more clear or enhanced in the Land MYP.

ORD Response: The logic diagram in the MYP will be enhanced to highlight the linkage between short-term outcomes and long-term outcomes. The PART measures will be included in the revised MYP. There is a contract in place to document outcomes of ORD products at four sites. ORD needs to summarize technology transfer impacts.

Recommendation #8: Describe or develop mechanisms for ensuring that the ORD-planned research is not duplicating efforts being conducted by other government or state agencies or by private industry. This could be guided by external peer review by experts drawn from universities, NGOs, state agencies, and private industries.

ORD Response: The BOSC Subcommittee and program staff did not discuss this issue during the review. ORD provided comments to the BOSC asking that this section be edited but those edits were not made. ORD's response provided examples that show the valuable role of ORD scientists at the specific sites mentioned by the BOSC Subcommittee as duplicative. There needs to be better mechanisms for resolving factual issues between BOSC Subcommittees and ORD.

Recommendation #9: Characterizing uncertainty in the assessment techniques and models developed by the Land Research Program is especially important as environmental decisions need to be informed by the uncertainties in the analyses. Consider how to characterize and communicate uncertainties inherent in assessment methods and models. Explore collaborations with ORD efforts that focus on the analysis and communication of uncertainty. Integrate this information into Agency guidance and rules.

ORD Response: The National Center for Environmental Assessment (NCEA) Tech Support Centers were included in the BOSC review; the Integrated Risk Information System (IRIS) and uncertainty comments must be addressed by NCEA.

Recommendation #10: New scientists will be needed to replace those who are retiring and to provide expertise in emerging areas. The MYP should address the current and future processes for replacing retiring expertise and developing new scientists with emphasis on emerging areas. Increase support of university-based research to involve these stakeholders and train future generations of environmental researchers.

ORD Response: ORD grants, fellowships, and workforce planning address the development of new scientists.

Dr. Wentsel concluded his presentation by stating the importance of the BOSC review. It provided advice on improving the program, the peer review of the draft MYP will improve that document, and the review was key to addressing the R&D investment criteria in the 2006 PART response. The PART rating for the program will likely be "adequate."

Dr. Johnson asked why the program would be focusing only on the fate and transport of nanomaterials. Dr. Wentsel replied that fate and transport probably will be only one focus of the research; health effects research will be conducted under another program. Dr. Johnson stated that tomorrow's presentation on nanotechnology will describe research across ORD and not just the Land Research Program. With respect to Dr. Wentsel's comments about duplicative efforts, Dr. Johnson pointed out that Dr. Wentsel referred to ORD's efforts as valuable but he did not address whether they were duplicative. Dr. Johnson agreed that there should be a mechanism for ORD to work with the BOSC to correct errors in the reports.

Dr. Weiss asked if the BOSC review actually helped improve the program's science or just helped it prepare for the PART review. Dr. Wentsel replied that preparing for the BOSC review was very helpful

in responding to the PART review. The information that was gathered for the BOSC review (e.g., bibliometric analysis) also was used for the PART review. He also thought the BOSC's suggestions will improve the program. There were significant suggestions concerning the MYP that will make a big improvement in that plan and the program.

Dr. Daston commented that customers from the program and regional offices were invited to provide testimonials at the review meeting. This was very helpful. Was this difficult to do or did you already have links to these customers? Dr. Wentsel replied that it was relatively easy. He contacted the Hazardous Substance Technical Liaisons in the regions and the RCTs to identify individuals who could provide the testimonials.

Dr. Harding said that she was a vettor of this report. One of her comments was that the report had many recommendations and critical comments; however, the Subcommittee members thought the program was a successful program.

Dr. Giesy asked if it was possible to receive a PART rating that is above adequate. Dr. Wentsel responded that it will take time because during the first review, the program negotiates measures with OMB and then the program adopts those measures. Therefore, progress cannot be demonstrated until the next review. He believes that the program's rating will be better in the next PART review. Dr. Giesy asked about the advice the program needs to improve its rating. Dr. Johnson said that the work group is laying the ground work so that OMB's reviews can be more reflective of the value of ORD's programs.

Computational Toxicology Subcommittee Letter Report

Dr. Daston stated that this was the second review conducted by the Subcommittee of the Computational Toxicology Research Subcommittee. This research program is conducted by the National Center for Computational Toxicology (NCCT). It is a new program that has been in existence for 18 months. In the first review, the Subcommittee provided the program feedback on strategic directions. The second review took place after the Center had been in operation for 16 months; therefore, unlike the first review, this second review could examine the research that was being conducted by the program. A draft letter report of this second review was prepared by the Subcommittee and it was distributed to the BOSC members in the notebook for this Executive Committee meeting. The Subcommittee was impressed with the progress of the Center—both organizationally and scientifically. The Center now includes about 20 staff. The Subcommittee members thought that NCCT has appropriately hired individuals with expertise in computer modeling, bioinformatics, and biological modeling. These people will work with other experts in the Agency who have large data sets.

In the first review, the Subcommittee recommended that the Center establish Communities of Practice (CoPs) to get others involved in NCCT's efforts who are not part of the organization. The Center has done a good job of creating these CoPs. During the second review, the Subcommittee received reports on three active CoPs—chemoinformatics, biological modeling, and chemical prioritization. Information also was provided on one proposed CoP—cumulative risk. The success of the Center will depend on collaboration and outreach. There were two STAR grants awarded for bioinformatics centers and the Subcommittee believes that EPA's investment in these two centers will yield a great deal for the NCCT. The Center needs to figure out a way to coordinate its activities with the two bioinformatics centers so that NCCT gets the maximum benefit from these grants.

There is an immediate need for tools for database queries. NCCT has approval to hire several people with informatics expertise, which is evidence that the Center is being responsive to the recommendations made by the Subcommittee in June.

Dr. Daston noted that the program has a nice cascade of short- and long-term deliverables. It is clear that the development of chemoinformatics tools and prioritization tools is underway and will be applied by

risk assessors and regulators within the next few years. The information databases such as DSSTox and prioritization models such as ToxCast will be important tools for the Office of Pesticides (OP) and the Office of Toxic Substances (OTS), and will demonstrate the use of computational toxicology in an applied setting. There is a much steeper slope for achieving the long-term goals of the program, such as development of the virtual liver tool. During the next review of the program, the Subcommittee will look closely at the virtual liver and the other LTGs. Although these tools will not come to fruition soon, the Subcommittee members believe that such research is necessary to make future progress.

During the review, the Subcommittee devoted some time to discussing communications with the regional offices and stakeholders (Question 8).

Overall, the Subcommittee members believe that this is a great program that is making great progress. Dr. Daston added that he has been working with EPA scientists for many years, and he has never seen a group that is more passionate about their work as the NCCT staff.

Dr. Johnson asked Dr. Ryan to serve as a vettor of the draft letter report. He requested that the members keep in mind that the BOSC Subcommittee is participating in the molding of the Center, but because of the newness of the NCCT, this review is different from the other program reviews conducted by the BOSC.

Dr. Henderson asked if there is a plan to get the information and tools generated by the NCCT transferred to those who could use them. Dr. Daston replied that there is a long-term plan to do that.

Program Review Subcommittee Updates

Human Health Risk Assessment Research Program Review

Dr. Daston, Chair of the Human Health Risk Assessment Subcommittee, reported that there has been some progress on recruiting the expertise needed for the Subcommittee. Its members will include risk assessors, individuals who apply risk assessments, and model developers. The Subcommittee will be weighted toward state officials who conduct risk assessments and apply the information developed by EPA in doing their jobs. He stated that EPA has not provided a draft charge for the Subcommittee because the program staff has been busy responding to the PART review.

Public Comments

At 4:00 p.m., Dr. Johnson interrupted the reports on the Program Review Subcommittees to call for public comments. No comments were provided.

Program Review Subcommittee Updates (Continued)

Safe Pesticides/Safe Products Research Program Review

Dr. Harding, Chair of the Safe Pesticides/Safe Products Subcommittee reported that Dr. Ryan has agreed to serve as the Vice Chair of the Subcommittee. Heather Drumm is the DFO for the Subcommittee and she has been busy working on recruiting individuals who have the expertise required for the Subcommittee. As of October 18, the members had been identified and the nomination package was ready to go forward for approval. The areas of expertise covered by the Subcommittee members include mammalian toxicology, ecotoxicology and ecology, predictive toxicology, database development, ecological modeling, biotechnology, and engineering. The materials from the program will probably be sent to the Subcommittee members in fall 2006. An administrative conference call will be held to review the draft charge questions and to divide the responsibilities for the review. There probably will be two conference calls held in January 2007, and the face-to-face review meeting will be held in February 2007.

Dr. Harding hopes to have a draft report prepared for submission to the BOSC at the May Executive Committee meeting.

Sustainability Research Program Review

Dr. Giesy, Chair of the Sustainability Research Subcommittee, reported that some good candidates to serve on the Subcommittee have been identified. The areas of expertise to be covered include chemistry, engineering, economics, and ecology. The Subcommittee also needs a consultant with expertise in sustainability, green chemistry, or alternative practices. The first conference call likely will be held in January 2007, the second conference call in February, the face-to-face meeting in March, and the final conference call in April 2007. Dr. Giesy hopes to present the draft report to the BOSC at its Executive Committee meeting in May 2007.

Ms. Kowalski commented that the packages for both the Safe Pesticides/Safe Products and Sustainability Subcommittees have been submitted for approval and she hopes that they will be approved before January 2007. Dr. Harding asked if she can schedule an administrative conference call before January and Ms. Kowalski replied in the affirmative.

Homeland Security Research Program Review

Dr. Sayler, Chair of the Homeland Security Research Subcommittee, reported that the formation of the Subcommittee is moving slowly. Greg Susanke is the DFO for the Subcommittee and he has been working to recruit Subcommittee members. The expertise required for the Subcommittee includes chemical warfare, biological and chemical decontamination, and civil engineering. It probably will take 12 months to form the Subcommittee because the security process for the members takes considerable time. Dr. Sayler hopes to hold the face-to-face meeting in October 2007, and submit the report for review by the Executive Committee at its January/February 2008 meeting.

Dr. Sayler reminded the BOSC members that the Agency received a 1-year authorization for a virtual National Homeland Security Research Center (NHSRC) after 9/11. Subsequently, the Agency received authorization to make the Center permanent. No MYP has been drafted for the program yet so Dr. Sayler was not certain what information will be provided to the Subcommittee for the review. Dr. Johnson commented that this is actually a program and not a Center review; however, for this program the footprint is the same as that of the Center. The process for the review will be the same as that used for the other program reviews. Dr. Demerjian asked if Dr. Sayler was still seeking names of potential Subcommittee members. Dr. Sayler responded that all names should be sent to him.

Standing Laboratory/Center Subcommittees

Common Process for Standing Subcommittees

Ms. Kowalski stated that the draft proposal for implementing the BOSC Standing Subcommittees that was distributed at this meeting is just a compilation of the Executive Committee's discussions on this topic. This proposal is intended to be used as an umbrella for the Standing Subcommittees. There are no specific charge questions included in the proposal. The charge questions developed by Dr. Daston and Dr. Robert Kavlock (EPA/ORD) could be inserted in the draft. At the July meeting, Jeff Morris (EPA/ORD) informed the Executive Committee that the Laboratory and Center Directors would like as much flexibility as possible in the reviews conducted by the Standing Subcommittees. They would like the Subcommittees to provide real-time advice and review a variety of products. Ms. Kowalski stated that the draft proposal is very generic. Because this will be a dynamic process, this proposal is simply a set of guidelines for operation of the Standing Subcommittees; it is not intended to constrain the Subcommittees. Two pilot Standing Subcommittees are being formed—one for NCER and one for

NERL. Dr. Philbert has agreed to serve as the Chair of the NCER Subcommittee and Dr. Ryan as the Chair of the NERL Subcommittee.

Dr. Weiss asked how often these Subcommittees will meet. Ms. Kowalski replied that the intent is to form a Standing Subcommittee for each laboratory/center that can participate in a dialogue with the Laboratory/Center Director. Dr. Johnson said that the expectation is that the reviews conducted by the Standing Subcommittees would result in letter reports. The Directors have different needs so flexibility is required to accommodate these differences. Dr. Windom suggested formalizing the process for selecting Chairs and Vice Chairs for these Standing Subcommittees who do not have terms on the BOSC that expire simultaneously. This approach will ensure continuity and a smooth transition for the Subcommittee when one of the two members leaves the BOSC. Dr. Sayler asked if there is a requirement that the Subcommittee Chair be a member of the BOSC. Dr. Johnson confirmed that the Chair does not have to be a member of the BOSC. Dr. Sayler asked if the Subcommittee is a FACA and Ms. Kowalski responded that it is a FACA. She noted that the need for flexibility comes from Dr. Larry Reiter's desire to bounce ideas off the Subcommittee to get input from the individual members. (EPA's FACA Attorney defines this as "information exchange.") A summary of these information exchange meetings will be prepared and the Executive Committee members will be allowed to comment as well. Such interaction will not result in consensus advice from the Subcommittee. If consensus advice is offered, the information exchange meetings would have to be open to the public in accordance with FACA requirements.

Dr. Johnson pointed out that the Computational Toxicology Subcommittee works somewhat different than the other Subcommittees. It prepares letter reports that are transmitted to ORD through the Executive Committee Chair. Ms. Kowalski commented that the Standing Subcommittees will provide two types of advice—for one type there will be a consensus report and for the other type (information exchange) there will not be a report. The NERL Director would like its Subcommittee to provide both types of advice. The type of advice covered under FACA will include the review of documents, plans, and other products. The other type of advice would be on emerging topics, something that is undeveloped, or something in which the laboratory/center has not yet invested. The members would provide their individual opinions in the latter case, and no letter report would be prepared, only a meeting summary. The meeting summary will be submitted to the Executive Committee, and the members will have an opportunity to weigh in with their opinions. Dr. Giesy asked if such information exchange meetings of the Standing Subcommittee would be open to the public. Ms. Kowalski replied that the meeting notice would be posted in the *Federal Register* even though this is not required. She explained that the FACA attorney advised her to post notices for such meetings. Dr. Ryan asked about the differences between the two types of meetings and Ms. Kowalski responded that the major difference is the lack of consensus for the meetings. She suggested that each meeting or conference call be one type of advice or the other. She added that EPA cannot quote the individual comments in the way that the Agency can quote the consensus reports/advice.

Because these are pilot Standing Subcommittees, Ms. Kowalski suggested inviting the members to serve a 1-year term so that the Chair and Vice Chair can determine if the mix and balance of expertise are appropriate. Because there are resource limitations, the number of members should be reasonable.

Dr. Henderson commented that she serves on a committee for the American Cancer Society that operates in a similar manner. The Director asks members to provide their opinions in response to his questions. Everyone provides their opinions but the group does not reach a consensus. There also are minutes produced for these meetings.

Dr. Giesy expressed his concern about providing individual opinions; there is a level of indemnification when providing consensus advice. Dr. Weiss asked Ms. Kowalski to explain how this type of advice benefits the laboratories and centers. Ms. Kowalski stated that the meeting summary could report individuals' opinions without attributing them to the individual. Dr. Giesy asked if an individual can respond with an opinion if he has a conflict. Ms. Kowalski replied that because these exchanges would deal with emerging concepts, it is unlikely that EPA would be funding any research on the topic of

discussion, minimizing the likelihood of conflicts of interest. The DFO, however, would have to be attentive to that possibility. Dr. Weiss reiterated her question about the advantage of this type of advice to EPA. Dr. Daston responded that some of the Laboratory/Center Directors would like to contact the Subcommittee to obtain "advice on the fly." He does not see how this type of advice can be obtained effectively under the restrictions imposed by the FACA attorney. There are many downsides to this approach and few upsides in his opinion. Unless this can be accomplished outside the FACA restrictions, Dr. Daston believes that the Subcommittees should just offer consensus advice. Dr. Sayler said that he recently served on a peer review panel for NERL. It was a non-FACA process and the reviewers could provide frank, timely advice.

Dr. Johnson asked for suggestions for moving forward on this issue. Dr. Harding said she was having trouble distinguishing between emerging areas and mature programs; for example, would the Subcommittee recommend that the laboratory invest in the emerging programs at the expense of programs that the BOSC has evaluated and recommended their continuation? She asked if there would be a DFO at the non-consensus meetings, and Ms. Kowalski replied that a DFO would be present at all meetings. Dr. Johnson proposed eliminating the non-consensus type of advice. Dr. Giesy suggested that if a Director wants the advice of the individual Subcommittee members, he can call them separately and solicit that advice. Ms. Kowalski agreed to find out if that would be permitted. She noted that for a program review, individual advice cannot be solicited, but she was not certain if individuals could be contacted to respond to a specific question when the inquiry is not part of a program or other review.

Ms. Kowalski distributed copies of the expertise needed for the NCER and NERL Standing Subcommittees. For the NCER Subcommittee, the following expertise is needed: (1) air/global, (2) toxics/computational toxicology/endocrine disruptors/biotechnology/waste management, (3) decision making and valuation, (4) water quality/ecosystem services/drinking water, (5) sustainability, (6) technology, and (7) nanotechnology and human health. For the NERL Subcommittee, the following expertise is needed: (1) human exposure science (RTP mainly), (2) ecological exposure science (Cincinnati, Las Vegas, Athens), (3) air quality modeling (RTP mainly), (4) microbiology and microbial ecology (Cincinnati mainly), (5) multimedia fate and transport (Athens mainly), (6) remote sensing/spatial analysis/landscapes (Las Vegas mainly), and (7) watersheds and water quality modeling (Athens mainly).

Dr. Harding asked if there will be more discussion on Friday of the program review tool; Dr. Johnson replied that the draft document will be revised by the BOSC members serving on the work group and the revised proposal will be circulated to the Executive Committee. It will probably be approved by conference call after October. Ms. Kowalski said that that Executive Committee can approve the revised charge questions during this meeting unless the members need more time to review the changes. Dr. Johnson asked the members to decide if they are ready to vote on the charge questions on Friday morning. He mentioned that there may be some additional changes after the pilot review, and OMB and ORD may provide feedback as well.

In response to an earlier request, Ms. Kowalski distributed a copy of the transmittal letter for the STAR/GRO Program Review Report. Dr. Johnson then recessed the meeting for the day.

Friday, October 20, 2006

Dr. Johnson called the meeting to order at 9:03 a.m. He asked members to submit comments on the areas of expertise for the NCER and NERL Subcommittees to Ms. Kowalski.

BOSC Issues/ORD Update

Dr. Teichman reported that another NPD has been selected and will be approved shortly. ORD has filled two of its six Title 42 positions—Dr. Richard Judson has accepted the position of bioinformatician with

the NCCT, and Dr. Imran Shah will fill the position of computational systems biologist in the NCCT. Dr. Teichman explained that the Title 42 positions allow EPA to hire "super" scientists at a higher payscale than normally allowed for government staff. In addition, Dr. Stephen Edwards has accepted the position of systems biologist within the National Health and Environmental Effects Research Laboratory (NHEERL) in RTP. The biosketches for these esteemed scientists are on the ORD Web Site.

Dr. Teichman thanked Drs. Johnson and Windom for their years of dedication to the BOSC and presented each with a gift of EPA's appreciation for their service.

ORD Briefing on Methamphetamine Laboratory Remediation

Dr. Teichman stated that the Methamphetamine Remediation Research Act of 2005 authorizes $3 million per year for FY 2006 – FY 2009 for ORD to: (1) prepared voluntary guidelines for remediation of former methamphetamine laboratories, (2) establish a research program, (3) convene a technology transfer conference, and (4) collaborate with the National Institute of Standards and Technology (NIST) to develop detection technologies and conduct a residual effects study. EPA's Office of Science Policy (OSP) has provided "technical assistance" to committee staffers, including emphasizing that such guidelines are typically the domain of the program offices.

The Synthetic Drug Control Strategy ("Synthetics Strategy") was prepared by the Interagency Working Group and released by the White House Office of National Drug Control Policy (ONDCP) on June 1, 2006. Its primary emphasis was the reduction of methamphetamine production. The strategy also addresses the challenge of responding to the aftermath of methamphetamine production ("Aftermeth"). One focus is conducting research to support future revisions of federal methamphetamine laboratory remediation guidelines.

The EPA/Drug Enforcement Agency (DEA) milestones identified in the Synthetics Strategy include: (1) December 2006—complete Laboratory Aftermeth Research Strategy ("Research Strategy"), (2) January 2008—publish guidelines identifying the best practices for the remediation of former methamphetamine laboratories, and (3) aim to release draft federal health-based guidelines for remediation. The intent of the Research Strategy is to: (1) inform efforts to update federal methamphetamine remediation guidelines; (2) identify research related to addressing the concentration of contaminants that should be met before the space is reoccupied and the most cost-effective remediation techniques; and (3) provide a logical, risk-based framework to solicit comments on the highest priority research needs.

The Research Strategy does not: (1) identify research needed to assess and mitigate health and safety risks to methamphetamine cooks, others in their vicinity while cooks are ongoing, first responders securing sites, or those engaged in remediating methamphetamine laboratories; (2) assess and mitigate health and safety risks to methamphetamine users and others in their vicinity; and (3) ensure the proper transport and disposal of hazardous wastes generated as part of methamphetamine cooks.

The Research Strategy relies on a risk assessment/risk management framework that includes characterizing indoor/outdoor sources, determining potential effects, estimating exposures, assessing risks, and evaluating mitigation techniques. Indoor/outdoor sources will be characterized by identifying and quantifying correlations between levels of methamphetamine and levels of its byproducts, calculating changes over time for indoor levels, measuring and modeling transport and fate in environmental media, developing a database of field-collected data, and identifying cost-effective, field measurement methods. Drilling down for a closer look at the Research Strategy, Task 1.1 under Characterizing Sources is to "perform multiple controlled cooks (e.g., one cook on each of three consecutive days) using the lithium/ammonia, red phosphorous, and hypophosphorous methods in houses representative of common building materials and including typical furnishings. Measure methamphetamine (both methamphetamine base (gas) and methamphetamine hydrochloride (particulate)) and its byproduct concentrations in the air

and on surfaces during the cooks, and one day, one week, one month, three months, and six months after the cooks, simulating normal household activities and maintaining normal ventilation conditions."

Potential effects will be determined by comparing measured and modeled contaminant levels to existing human toxicity data considering routes of exposure (inhalation, ingestion, and dermal), and providing new toxicity data to address observed data gaps/needs (exposure routes anticipated to pose the greatest risks and inhalation exposures to mixtures emitted by the most prevalent cook methods).

Exposures will be estimated by developing reasonable and high-end acute and chronic exposure scenarios for adults and susceptible subpopulations (children, elderly, and people with compromised health). Acute and chronic risks from residual exposures will be assessed for adults and susceptible subpopulations (children, elderly, and people with compromised health).

Mitigation techniques will be evaluated by performing laboratory and field tests to develop and evaluate cleaning/decontaminating efficacy for: non-porous surfaces, porous surfaces, and heating, ventilating, and air-conditioning (HVAC) systems. Experiments will be conducted for assessing extent of contamination in surrounding media, and cost-effective approaches for decontamination. Fate and transport modeling of soil surfaces, vadose zone, and groundwater will be validated, and bioremediation and other approaches will be evaluated.

A draft of the Research Strategy was circulated to the ONDCP Inter-Agency Working Group on September 15, 2006). It will be circulated broadly to external stakeholders and a workshop will be held in fall 2006 to solicit detailed input. The strategy is expected to be finalized by December 2006.

Dr. Clark asked about the average size of a cook and Dr. Teichman replied about 5 to 10 pounds. Dr. Teichman added that EPA's role is to identify the effects of exposure in the indoor environment. Dr. Harding asked if states have done any research on this topic. Dr. Teichman responded that only 30 states have guidelines and all but one of the states base their standards for reoccupying on detection of methamphetamine; only Colorado has tried to look at the different chemicals produced from a cook and their acute effects. The National Jewish Medical Center in Denver has done some work on this for DEA. California also is working in this area. The longer-term effects of cooks are unknown. Currently, most sites are given a clean certification if the methamphetamine concentration is below a certain level. Typically, the curtains and carpet and removed and thrown away, and hard surfaces are cleaned. There is no follow-up, however, to see if the long-term concentration remains below the acceptable level. Dr. Sayler asked if anyone is looking at metabolites. Dr. Teichman replied that EPA will be using models to estimate that information. Currently, there are no data on the effects on children. Dr. Daston asked about the quality of the toxicology data on low-level exposure. Dr. Teichman responded that methamphetamine is used to help children with Attention Deficit Disorder (ADD) at levels higher than those found in these meth laboratories. Dr. Daston commented that there are data on pharmacologically active levels, but EPA needs data for lower levels.

Dr. Teichman stated that the number of laboratories busted in the United States is on the decline, but the problems associated with these labs are far from over. Most of the focus has been on controlling the source, but little effort is expended on researching the risks of smoking methamphetamine in homes, or the risk of people who enter those areas.

Dr. Johnson thanked Dr. Teichman for his presentation, stating that the Board may want to revisit this topic at a later date.

ORD Briefing on Nanotechnology

Dr. Nora Savage (EPA/ORD) explained that the National Nanotechnology Initiative (NNI) is a federal R&D program established to coordinate the multiagency efforts in nanoscale science, engineering, and technology. Twenty-five federal agencies participate in the Initiative, 13 of which have an R&D budget for nanotechnology. Interagency management of the NNI occurs within the framework of the National Science and Technology Council (NSTC), Committee on Technology (CT). The NSTC is a Cabinet-level body and is the principal means by which the President coordinates the diverse science and technology programs across the Federal Government. The NSTC's Nanoscale Science, Engineering, and Technology (NSET) Subcommittee coordinates the plans, budgets, programs, and reviews for the NNI. EPA is one of the federal agencies participating in the NNI as a member of the NSET Subcommittee.

The NNI definition of nanotechnology includes: the understanding and control of matter at dimensions of roughly 1 to 100 nanometers; unique phenomena of nanomaterials enable novel application; and imaging, measuring, modeling, and manipulating matter at this length scale.

Seven federal agencies, including EPA, are conducting NNI Environment, Health, and Safety Research. Examples of sponsored research activities for each agency was provided. The National Science Foundation (NSF) is funding basic research on the environmental effects of nanoparticles, nanoparticles in air pollution, water purification, and nanoscale processes in the environment. NSF also funds research on the potential implications of nanotechnology – from environmental and social perspectives. EPA is investigating the toxicology of manufactured nanomaterials; the fate, transport, and transformation of these materials; human exposure and bioavailability, and life cycle analyses. The Department of Defense (DOD) is sponsoring research on developing a physicochemical characteristics and toxicological properties of nanomaterials computational model that will predict toxic, salutary, and biocompatible effects based on nanostructured features. One of the investigations by the National Toxicology Program (NTP) concerns the potential toxicity of nanomaterials, titanium dioxide, several types of quantum dots, and fullerenes. The Department of Energy (DOE) funds research that examines the transport and transformation of nanoparticles in the environment, exposure, and risk analysis as well as health effects. The National Institutes of Health (NIH) supports research studying nanomaterials in the body, cell cultures, and laboratory use for diagnostic and research tools. NIST is developing measurement tools, tests, and analytical methods for nanomaterials.

The 2007 requested budget for NNI Environment, Health and Safety Research is $44.1 million, out of the total $1,054 million for EHS research. The EHS budget is allocated among the agencies as follows: NSF $25.7 million, EPA $8.0 million, NIH $4.5 million, National Institute for Occupational Safety and Health (NIOSH) $3.0 million, NIST $1.8 million, and DOD $1 million.

Nanoscale materials exhibit some unique properties. Chemical reactivity of nanoscale materials can vary greatly from materials in the more macroscopic form, e.g., gold nanoparticles are very reactive and can be red in color. There is a vastly increased surface area per unit mass. Quantum effects can also be observed and result in unique mechanical, electronic, photonic, and magnetic properties. Such novel properties can be observed not only can bulk materials are reduced to nano-scale, new chemical forms of common chemical elements can also be produced. For example, fullerenes, nanotubes of carbon and tubes, wires and cubes of other material forms.
NNI agency resources include the National Characterization Laboratory (NCL) at the National Cancer Institute, NIH; the Nanoparticle Information Library (NIL) at NIOSH; the DOE Nanoscale Science Research Centers, and the NSF's National Nanotechnology Infrastructure Network (NNIN).

The objectives of the NCL are to: (1) identify and characterize critical parameters related to nanomaterials' compatibility (structure-activity relationships), (2) establish and standardize an assay cascade for nanomaterial characterization, (3) examine the biological characteristics of multi-

component/combinatorial platforms, and (4) engage and facilitate academic and industrial-based education and knowledge sharing. The NCL is conducting a number of studies applicable to environmental risk characterization, including: (1) general cytotoxicity assays—determining concentration-response relationships, (2) mechanistic studies—identifying apoptosis, oxidative stress and cytochrome P450 induction/suppression as potential mechanisms, (3) *in vivo* toxicology studies—identification of target organs, and (4) general absorption, distribution, metabolism, and excretion (ADME) studies—define $t_{1/2}$, clearance mechanisms (i.e., metabolism, biliary excretion, renal clearance, etc.). More information can be found on the Web at http//:www.ncl.cancer.gov.

The NIOSH NIL is a Web-based library with the goal of helping to organize and share information on nanomaterials, including their health and safety-associated properties. The information incorporated in the searchable online database includes: nanomaterial composition; method of production; particle size, surface area, and morphology (including scanning, transmission, or other electron micrographic images); demonstrated or intended applications of the nanomaterial; availability for research or commercial applications; associated or relevant publications; and points of contact for additional details or partnering. NIOSH has released this resource in prototype form for public review and comment. The Web address for NIOSH's NIL is http://www.cdc.gov/niosh/topics/ nanotech/NIL.html.

DOE's Nanoscale Science Research Centers will provide researchers with state-of-the-art capabilities to explore, fabricate, and study nanoscale materials. Research proposals will be submitted (1-2 pages), which will be reviewed by independent proposal evaluation boards. Each Center will have a different focus and they will be located at the DOE facilities at the Argonne, Brookhaven, Lawrence Berkeley, Oak Ridge, and Los Alamos/Sandia National Laboratories. Dr. Johnson commented that NSF also has nanotechnology research centers. More information can be found on the Web at http://www.er.doe.gov/ bes/brochures/files/NSRC_brochure.pdf.

The National Nanofabrication Infrastructure Network (NNIN) provides laboratory access at 13 university centers. Established in 1993 by the National Science Foundation, the network (formerly called the National Nanotechnology Users Network or NNUN) is growing to support the future infrastructure needs for research and education in the burgeoning nanoscale science and engineering field. The facilities comprising this network are diverse both in capabilities and research areas served as well as in geographic locations. The network has the flexibility to grow or reconfigure as needs arise. More information can be found on the Web at http://www.nnin.org.

Additional nanotechnology information is available on the NNI Web Site (http://www.nano.gov), including: news on NNI activities, workshops, and reports; the latest news on nanotechnology (subscription to listserve with daily updates); ongoing announcements of solicitations; up-to-date reporting of nanotechnology workshops and conferences; and information for educators (kindergarten to post graduate). NNI Publication documents are also available at the NNI web site, including the NNI Strategic Plan and the Environmental, Health, and Safety Research Needs for Engineered Nanoscale Materials.

Dr. Savage identified a number of environmental challenges (e.g., potential toxicity, bioavailability, bioaccumulation) and opportunities (e.g., remediation, monitoring/detection, pollution prevention) associated with engineered nanomaterials. Some of the potential environmental benefits of nanotechnology include: (1) improved monitoring/detection capabilities; (2) ultra-green manufacturing and chemical processing (eliminate toxic constituents); (3) waste minimization via designed-in pollution prevention at the source (less material to dispose of, atom-by-atom construction); (4) reduced energy usage; (5) commercially viable alternative clean energy sources (fuel cells, solar, wind); (6) inexpensive, rapid remediation and treatment technologies; and (7) sustainability.

Nanotechnology also has the potential for environmental harm. Dr. Savage presented some possible human health and ecosystem implications for engineered nanomaterials: (1) potential toxicity and accompanying mechanism questions; (2) harm to the environment and/or ecosystem through manufacture,

use, and/or disposal; (3) unknown transport, transformation, and fate information; (4) potential bioaccumulation, biotransformation, and bioavailability issues; and (5) questions concerning dose and response.

There are two types of extramural research on nanotechnology being conducted by EPA—research on nanotechnology applications which involves using nanotechnology to address existing or future environmental problems, or prevent future problems (approximately $12.2 million to date); and research on nanotechnology implications to address the interactions of nanomaterials with the environment, and any possible risks that may be posed by engineered nanomaterials (approximately $17.4 million to date, excluding ultrafine).

Dr. Savage provided a list of nanoscale materials some of which are engineered (e.g., metal oxides, quantum dots, nanowires), some of which are incidental (e.g., particles from combustion, industrial processes, vehicles, and construction), and some of which are natural (e.g., particles from plants, trees, oceans, and erosion). There are a number of nanoproducts currently on the market in display screens (nanotubes), Hummers (nanocomposites), refrigerators (nanoparticle-coated), and tennis rackets (carbon fibers).

EPA is interested in nanotechnology for several reasons. Among these is the promise for improved environmental protection—cleaning up past environmental problems, improving present processes, and preventing future problems, the potential harmful effects to human health and the environment; the impact nanotechnology will have on the Agency's regulatory responsibilities; and the need to consider the environmental benefits and impacts from the beginning, as new technologies develop.

The Science Policy Council (SPC) convened the cross-Agency Nanotechnology Workgroup in December 2004. The workgroup was charged with developing a white paper to examine the implications and applications of nanotechnology for the consideration of Agency managers and staff. The paper was open for public comment from December 2005 through March 2006, and a peer review meeting to review the paper was held April 19-20, 2006, in Washington, DC. The white paper is expected to be finalized soon.

In December 2005, EPA issued the STAR solicitation "Environmental and Human Health Effects of Engineered Nanomaterials." This was a joint solicitation with NSF, NIOSH, and the National Institute of Environmental Health Sciences (NIEHS). EPA will award 21 grant awards totaling $7.3 million; with the awards made by the other agencies, a total of 29 awards by all agencies will be made totaling $10.3 million.

In 2006, NIEHS issued a solicitation "Environmental and Human Health Effects of Nanomaterials," in which the Agency and NIOSH are partners. The solicitation opened September 29, 2006 and closes January 12, 2007. Approximately $7 million are available for $0.5 million/year awards for 4 years.

The STAR grants have investigated exposure and toxicity, as well as environmental toxicity, fate and transformation, and life cycle analyses. A variety of material classes have been studied including carbon nanotubes, fullerenes, metals, and other (fibers, dendrimers, and quantum dots). With respect to exposure and toxicity, these grants have focused on cytotoxicity, dermal exposure, general toxicity, pulmonary exposure, and translocation/ disposition. With respect to environmental toxicity, fate and transport, the grants have addressed aquatic fate, environmental toxicity, fate in air, fate in soils/sediments, and cross-media fate/transport.

Three STAR grantees meeting proceedings documents have been published by EPA to date and they are available on the Web at http://www.epa.gov/ncer/nano. The 2006 U.S. EPA STAR Nanotechnology Environmental Applications and GRO Progress Review Workshop will be held November 8-9, 2006 at the Crowne Plaza Washington National Airport, and the 2006 U.S. EPA, NSF, and NIOSH STAR Nanotechnology Environmental Implications Progress Review Workshop will be held November 13-14, 2006 at the same location.

The path forward for EPA will be guided by the ORD Nanotechnology Research Strategy. In FY 2007 and FY 2008, EPA will focus on the following high priority areas: environmental fate, transport, and transformation; exposure; monitoring and detection methods; and effects assessment methods consistent with and derived via exposure information. Subsequently toxicity research will be addressed once the material forms at relevant points of exposure have been identified. EPA's nanotechnology budget request for FY 2007 is $8.6 million, with $5 million for extramural (STAR) and $ 3.6 million for in-house research at EPA's laboratories/centers.

Specifically, EPA's research priorities are to: (1) identify, adapt, and, where necessary, develop methods and techniques to measure nanomaterials from sources and in the environment; (2) enhance the understanding of the physical, chemical, and geochemical reactions nanomaterials undergo and the resulting transformations in air, soil, and water; (3) characterize persistence and effects of nanomaterials through their life cycle in the environment; (4) provide the capability to predict significant exposure pathway scenarios; (5) provide data for use in human health and ecological toxicity studies; and (6) provide data for the development of the most relevant testing methods/protocols to determine toxicity of nanomaterials.

EPA's Office of Pollution Prevention and Toxics (OPPT) is considering a Nanoscale Materials Stewardship Program for reporting information pertaining to existing chemicals that are engineered nanoscale materials as well as for compounds that are molecularly similar to bulk but with different chemical and physical properties at the nanoscale. OPPT received input from a public meeting held in June 2005, and from its FACA, the National Pollution Prevention and Toxics Advisory Committee. The stewardship program would apply to engineered nanoscale materials in commerce and those "soon to enter commerce." EPA convened a public meeting on risk management practices under this program in Washington, DC, October 19-20, 2006.

EPA is involved in a number of international RFA activities. EPA, NIEHS, NSF, and NIOSH are working on a joint RFA with the European Commission to be released in 2007. EPA also is working on a joint RFA with the University of Singapore. EPA staff worked with the United Nations Environment Programme on a chapter concerning nanotechnology and the environment that will be included in the 2007 GEO Yearbook. The Agency is finalizing a Memoranda of Understanding (MOUs) with China and the European Commission to cooperate in science and technology areas, including nanotechnology.

The Organization for Economic Co-operation and Development (OECD) sponsored a workshop on the Safety of Manufactured Nanomaterials, which was hosted by the United States in Washington, DC, December 7-9, 2005. This workshop covered: definitions, nomenclature, and characterization; environmental and human health effects; and regulatory frameworks. The 39th Meeting of the Chemicals Committee was held February 15-17, 2006, in Paris. This meeting resulted in an agreement to establish a Working Party on the Health and Environmental Safety Implications of Manufactured Nanomaterials. The goal is to help share the burden and make approaches more consistent internationally. The first Working Party meeting was held October 26-27, 2006 in London.

There are many activities in the area of nanotechnology and the environment in other countries. A German research consortium is investigating the effects of nanoparticles at the research and development stage in an effort to determine their effect on human health and the environment. The INOS research project (Identification and Assessment of the Effects of Engineered Nanoparticles on Human and Environmental Health) is scheduled to last 3 years, and it has received financial support of more than €1 million from the German government. It will include the creation of a scientific database for information about the potential risks of nanoparticles and will provide support for small and mid-sized businesses typically involved in nanotechnology. The United Kingdom currently is launching a voluntary reporting program, similar to the OPPT Stewardship Program. A consultation was opened in March by the Department for Environment, Food, and Rural Affairs (DEFRA) and comments on the program were requested by June 23. The proposed start date was summer 2006. The program will focus on engineered

nanomaterials that are "free" (not in matrix). The program will be iterative and data submission details may change. Australia is also considering a similar program.

The National Center for Environmental Research (NCER) has a Web site that highlights the Agency's extramural research in nanotechnology and provides useful information on related research at EPA and in other organizations (http://www.epa.gov/ncer/nano). An Agency-wide nanotechnology site is currently under development.

Dr. Savage concluded her presentation by stating that EPA is working with many organizations to improve the Agency's understanding of the applications and implications of nanomaterials.

Dr. Johnson mentioned that there is a bill in Congress to provide funding to EPA for the creation of nanotechnology centers. He added that the 2003 Act authorized EPA to work on nanotechnology, but there was no funding appropriated to the Agency for this research. Dr. Henderson commented that one company is using nanoscale iron particles to treat sites contaminated with trichloroethylene (TCE). The approach was tested at DOE facilities and yields no harmful byproducts. Nanotechnology will enable us to create needed products without the unwanted byproducts and waste. Dr. Philbert asked if Dr. Savage had any idea how many products contain nanomaterials in a polymer matrix or other nondegradable matrix. Dr. Savage replied that this is the case for the Hummer bumper; the nanomaterials are in the bumper of the automobile. Dr. Windom asked if EPA is following the use of nanomaterials as antifouling agents for ships (to prevent barnacles from adhering to ship surfaces). Dr. Savage responded that one of the Small Business Innovation Research (SBIR) Program awardees is investigating such a product. The summary of this SBIR project is available on the Web at http://www.epa.gov/ncer/sbir. Dr. Demerjian said that the heart of the issue is that nanomaterials may be a carrier of certain components; therefore, it is important to know if nanomaterials are invasive and we need to know their fate and exposure routes. EPA needs to develop "smart" monitoring technologies. The Agency should take the lead in environmental exposure. Dr. Demerjian believes that this is one of the most pressing environmental problems for the next decade. He asked why it has taken so long to finalize the white paper. Dr. Savage replied that the FACA and peer review process takes substantial time. Dr. Windom asked if EPA is working on methodologies to detect nanomaterials in the environment. Dr. Savage replied that there is some work in this area; Dr. Sayler added that the DOE Centers have substantial detection and characterization capability. Dr. Savage noted that there are not good methods for detection of nanomaterials in the field. Dr. Philbert mentioned an article to appear in *Nature* in November that identifies five grand challenges, one of which is nanomaterials exposure. He expressed some concern about the fact that only $4-5 million of EPA's nanotechnology budget is expended on implications research. Much more funding should be devoted to this issue.

Dr. Johnson thanked Dr. Savage for her briefing and stated that the BOSC may want to revisit this topic in the future.

SAB Activities

A three-page table of SAB activities for FY 2006 and FY 2007 was distributed with the meeting materials. Dr. Johnson said that he had reviewed the table searching for opportunities for the BOSC to work with the SAB. He did not see any specific opportunities but asked that Board members who see something that sparks their interest notify Ms. Kowalski or Dr. Clark. The BOSC will have a second opportunity to participate in the review of ORD's budget in February 2007. Dr. Johnson distributed a list of the programs/projects that are listed in the budget. The BOSC has 10 programs/projects on the list and there are pending reviews for 3 more. Also, the BOSC plans to address an additional item on the list in the future. Members of the BOSC could participate in the SAB subgroups reviewing the budget. Dr. Johnson asked Dr. Clark to send a letter to Dr. Vanessa Vu (EPA/SAB) indicating the areas on which the BOSC has worked and the names of the BOSC members who can participate on those particular subgroups. Dr. Johnson said that he worked on the Drinking Water budget last year and was able to

provide some useful insights because he had participated in the program review. Dr. Johnson asked if any of the members objected to participating in the budget review. There were no objections.

Program Review Tool Workgroup Proposal (Continued)

Based on yesterday's discussion, Dr. Daston revised the definitions of the three adjectives that will be used to assign a qualitative score that reflects the program's progress toward achieving its LTGs. A handout with the revised definitions was distributed to the BOSC members. For each LTG, a qualitative score will be assigned that reflects the quality and significance of the research as well as the extent to which the program is meeting or making measurable progress toward the goal. The revised definitions are as follows:

- ***Exceptional:*** *indicates that the program is meeting all and exceeding some of its goals, either in the quality of the science being produced or the speed at which research results, tools, and methods are being produced, or both. An exceptional rating also indicates that the program is addressing the right questions to achieve programmatic goals. The review should be specific as to which aspects of the program's performance have been exceptional.*

- ***Satisfactory:*** *indicates that the program is meeting most or all of its goals. Satisfactory programs live up to expectations in terms of addressing the appropriate scientific questions to meet program goals, and that work products are being produced and milestones are being reached in a timely way. The quality of the science being done is competent or better.*

- ***Unsatisfactory:*** *indicates that the program is failing to meet a substantial fraction of its goals, or if meeting them that the achievement of milestones is significantly delayed, or that the questions being addressed are inappropriate or insufficient to meet the intended purpose. Questionable science also is a reason for rating the program as unsatisfactory for a particular long-term goal. The review should be specific as to which aspects of a program's performance have been inadequate.*

Dr. Giesy asked if these qualitative ratings will be acceptable to OMB. Dr. Johnson responded that OMB has agreed to this approach and has been involved with its evolution. He noted that ORD has to agree with these definitions, adding that ORD also has been involved in the development process. Dr. Teichman will work with OMB to ensure that there is harmonization across agencies so that these ratings align with those being used in other agencies. Dr. Daston emphasized that these qualitative ratings will be provided in context of a narrative.

Dr. Johnson reminded the BOSC that the three questions addressing the LTGs will be in a separate section from the other questions used for the program review and there will be explicit instructions that these questions are to be addressed at the LTG level and not the program level. When there were no additional comments or questions, Dr. Johnson called for a motion to approve the Program Review Tool Workgroup proposal. Dr. Weiss made a motion to approve the proposal as revised by Dr. Daston, and Dr. Sayler seconded the motion. The revised proposal was unanimously approved by the BOSC.

Vettor Comments on Computational Toxicology Letter Report

Dr. Ryan reviewed the draft letter report prepared by the Computational Toxicology Subcommittee and had a few comments. In the second paragraph that starts "This is the second annual…" the third sentence states that the Center became operational in February 2005. The second review took place in June 2006, which was 16 months after the Center was operational so it does not appear that the Center is reviewed annually. He suggested rewording that sentence.

Dr. Ryan asked that a definition of Community of Practice be added to the report. Also, he requested that the acronyms used in the letter report be defined the first time they appear in the report. He had no other comments.

Dr. Johnson stated that the letter report should clearly indicate the charge to the Subcommittee and where it came from, what the Center has done in response to the first letter report, and any recommendations for improving the Center. Ms. Kowalski mentioned that there was a response from ORD to the first letter report. That response is posted on the BOSC Web Site and the Web address could be included in the letter report.

Dr. Johnson had a few editorial changes that he agreed to provide to Dr. Daston. He asked that anyone else with editorial comments on the letter report submit them to Dr. Daston. When no additional substantive comments were provided, Dr. Johnson called for a motion to approve the report with the recommended changes. Dr. Harding made a motion to approve the report with the requested changes, and Dr. Demerjian seconded the motion.

Comments of New Members on BOSC Process

Dr. Philbert said that he appreciates the honor of serving on the BOSC. The work of the Board is very important, but he is not yet clear on how this Board interacts with the work of EPA and the people in the "trenches." There appears to be a great deal of high level activity and he is concerned that many EPA staff members would not view this as helpful. He commented that there are many new acronyms with which he is unfamiliar. It would be very helpful to have a list of commonly used acronyms prior to the next meeting. Ms. Kowalski agreed to prepare that list and distribute it to the members.

Dr. Weiss stated that it was an interesting meeting and most of the subject matter was new to her. She was impressed with the variety and range of expertise of the members. She hopes that the work of the BOSC will be valuable to EPA and ORD. She has heard from others that the BOSC reports are very useful and that was reiterated by EPA staff during the presentations of the ORD responses to the reports. She welcomed the opportunity to contribute at future meetings.

Dr. Demerjian said that he served as a member of the PM/Ozone Subcommittee so he got to experience a BOSC review first hand. He received positive feedback from the ORD staff members involved with that review. Because the BOSC is a broad, multidisciplinary group, it is a rewarding learning experience for him. He suggested that more of the materials be included in the meeting notebook when it is sent out prior to the meeting. It is important to inform new members about the BOSC Web Site and what is posted on that site. It also might be helpful for presenters to spend a few minutes explaining the focus of their organizations and how the piece they are presenting fits into the overall scheme. This would help provide some perspective.

Dr. Ryan commented that he currently is rotating off the National Children's Study Board. For the first year on that Board, he felt like he was drowning; the experience has been less overwhelming with the BOSC. He is already starting to get a grasp of what the Board does and how it operates. He agreed with Dr. Demerjian that it would be helpful to get more of the materials in advance of the meeting.

Dr. Johnson thanked the new members for their comments. He mentioned that there is a matrix of all the activities and assignments for the BOSC members that helps track status and workload. He agreed that it would be helpful to have an orientation package for new members that would familiarize them with the Board. The BOSC recently developed a handbook to guide Chairs in conducting program reviews.

Dr. Teichman commented that there are 8 NPDs who coordinate 16 major research programs. Gaining an understanding of that structure will be helpful to the new members. The NPDs do not have budgets; they work with the Laboratory and Center Directors to ensure that the major research issues are addressed.

Dr. Johnson commented that the Board will hear from the NPDs that the BOSC's reports are helpful and used to inform the budget process. He noted that BOSC reports have been cited to justify budget requests. The BOSC's primary goal is to help ORD to continually improve its programs. All of the BOSC's reports and the ORD responses to those reports are posted on the BOSC Web Site.

Dr. Johnson stated that all Board members are expected to review each report prepared by a BOSC Subcommittee. The reports are reviewed at an Executive Committee meeting; two vettors are assigned to lead a discussion of the report review. Each member provides comments. The Subcommittee Chair then works with the Subcommittee members to revise the report and address the comments of the Executive Committee. The vettors then review the revised report to ensure that all of the comments have been addressed appropriately. Dr. Johnson noted that some reports require several rounds of revision but the final product is always a better report.

Ms. Kowalski thanked the new members for their comments. She agreed that more of the materials should be distributed before the meeting. She usually tries to send out the notebooks 2 weeks before the meeting. For this meeting, however, many of the materials came in too late to be included in the notebooks. Rather than including the entire report in the notebooks, Ms. Kowalski suggested including only the Summary section and the link to the BOSC Web Site where the entire report is posted. She mentioned that she tried to hold an orientation meeting for the new members at the June Executive Committee meeting, but only two new members attended that meeting. She will work with Dr. Clark to prepare an orientation package that can be distributed to new members.

Dr. Johnson said that Ms. Kowalski will distribute the STAR/GRO Report transmittal letter to the BOSC members for comment. All comments should be sent to Ms. Kowalski and she will forward them to Dr. Clark.

Future Discussion/Future Business

Human Health Research Program Mid-Cycle Review

The Human Health Research Program mid-cycle review will be held January 24, 2007, the day after the January 22-23, 2007 Executive Committee meeting. Dr. Clark explained that the program was reviewed in February/March 2005. He participated in that review and will be coordinating the mid-cycle review. For the 2005 review, the Subcommittee members participated in three conference calls and a 3-day face-to-face meeting. The report was drafted by the Subcommittee following the meeting, reviewed by the BOSC Executive Committee, revised as needed, finalized and approved by the BOSC, and submitted to EPA. ORD prepared a response to the report describing what the program would do in response to the BOSC's recommendations. At the mid-cycle review, the Subcommittee will meet with the NPD and Laboratory/Center Directors and discuss the program's response to the BOSC's report, changes in the program, and enhancements and new developments. There will be one conference call in advance of the mid-cycle review. The entire Subcommittee, with the exception of one member, has been reconstituted to participate in the mid-cycle review. The review will be conducted on January 24 and the members of the Executive Committee are invited to attend, but attendance is not mandatory. Heather Drumm is the DFO for the Subcommittee. Dr. Clark anticipates that there will be a discussion with ORD staff in the morning and time for the Subcommittee to write the letter report in the afternoon. The review will be structured around a few charge questions. A Subcommittee conference call will be scheduled in the early spring to review and finalize the draft report so that it can be presented to the BOSC at the May meeting. He hopes that the report will be transmitted to ORD in May 2007.

Dr. Johnson commented that mid-cycle reviews will be conducted for all of the programs that have been reviewed by the BOSC; this is the first of that type of review. Dr. Clark thought that the new members

may gain some insights into ORD and how it functions by participating in the mid-cycle review because the Human Health Program is such a large program that involves several ORD laboratories/centers.

Next BOSC Meeting

The next BOSC meeting will be January 22-23, 2007 in the Washington, DC, area. The following meeting will be held May 24-25, 2007, and the Ecosystems Research Program mid-cycle review is scheduled for May 23, 2007. Ms. Kowalski will send out an e-mail requesting availability in September so that she can schedule the September BOSC Executive Committee meeting. Dr. Philbert indicated that Mondays and Wednesdays are difficult for him. Ms. Kowalski mentioned that the May meeting is usually held at one of the EPA laboratories/centers. She asked that members send suggestions to her concerning the preferred location for the May meeting. She reminded the members that the Board met in RTP, North Carolina (NERL and NHEERL) in 2004; Cincinnati, Ohio in 2005; and Las Vegas, Nevada in 2006. Ms. Kowalski will send out a description of the ORD laboratories/centers and their locations so that members can provide their input.

Dr. Johnson distributed a matrix of BOSC FY 2005 and FY 2006 activities. He noted that the Standing NERL and NCER Subcommittees, the new program reviews, and the mid-cycle reviews are all ongoing. He asked members to submit any new ideas of topics/activities to be addressed by the BOSC to Dr. Clark. Dr. Weiss asked if there was any information on how the budget is allocated among the programs. Dr. Johnson replied that he would request some budget data from ORD.

When no additional items of business were identified, Dr. Johnson said that he had really enjoyed working with all of the BOSC members, many of whom he had worked with for many years. He will miss these interactions. Dr. Johnson adjourned the meeting at 11:32 a.m.

Action Items

- ✧ Beverly Campbell will include line numbers in all future draft minutes to facilitate their review, discussion, and approval.

- ✧ Ms. Kowalski will distribute copies of the transmittal letters for the BOSC program review reports to the BOSC members.

- ✧ Ms. Kowalski will be contacting each BOSC member to walk them through accessing the My Pay system.

- ✧ Members need to change their passwords to the My Pay system after they gain access. All members must access the system before the end of the calendar year.

- ✧ Ms. Kowalski will send out the annual request for BOSC members to update their biosketches and CVs. She also will be requesting updates of the confidential financial disclosure forms. If a member completed those forms in the last 4 months, they will not be required to update them at this time. Members also must complete their ethics training each year.

- ✧ Dr. Johnson agreed to send Dr. Farland a card with a note expressing the BOSC's appreciation for his years of service as the EPA Liaison to the BOSC.

- ✧ BOSC members should provide their comments on the revised Program Review Tool Workgroup guidance to Ms. Kowalski or Dr. Johnson by October 31, 2006, so that Dr. Johnson can incorporate them into the draft before departing the BOSC. The new guidance will be used for a pilot review of the Safe Pesticides/Safe Products Research Program. Ms. Kowalski will distribute the revised guidance document to the Executive Committee members.

- ✧ Ms. Kowalski will determine if a Laboratory/Center Director seeking advice from the Standing Laboratory/Center Subcommittee can contact individual members separately to obtain that advice.

- ✧ BOSC members should submit comments to Ms. Kowalski on the lists of expertise for the NERL and NCER Standing Subcommittees.

- ✧ Dr. Clark will send a letter to Dr. Vanessa Vu indicating the areas on which the BOSC has worked and the names of the BOSC members who can participate on subgroups to review the ORD budget in February 2007.

- ✧ Ms. Kowalski will distribute a list of commonly used acronyms to the new BOSC members prior to the next Executive Committee meeting.

- ✧ Dr. Johnson and other members should provide editorial comments on the Computational Toxicology Letter Report to Dr. Daston.

- ✧ Dr. Daston will revise the Computational Toxicology Letter Report based on the comments of the BOSC members.

- ✧ Ms. Kowalski will work with Dr. Clark to prepare an orientation package that can be distributed to new BOSC members.

- ✧ Ms. Kowalski will distribute the STAR/GRO Report transmittal letter to the BOSC members. All comments of the letter should be submitted to Ms. Kowalski and she will forward them to Dr. Clark.

- ✧ Ms. Kowalski will send out a description of the various ORD laboratories/centers and their locations so that members can provide their input on the location for the May 2007 meeting.

- ✧ BOSC members should submit to Dr. Clark any new ideas of topics/activities that they would like the BOSC to address in the future.

- ✧ Dr. Johnson will request from ORD a budget breakdown for the various programs. Ms. Kowalski will distribute the budget information to the Executive Committee.

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B·O·S·C
BOARD OF SCIENTIFIC COUNSELORS

33rd EXECUTIVE COMMITTEE FACE-TO-FACE MEETING
DRAFT AGENDA
October 19-20, 2006
Grand Hyatt Hotel
1000 H Street, NW
Washington, DC
Tel: (202) 582-1234

Thursday, October 19, 2006

8:00 a.m. – 8:30 a.m.	Registration	
8:30 a.m. - 9:00 a.m.	Welcome and Introductions - Review of June Meeting Minutes - Review of September Meeting Minutes - Reports Transmitted to ORD - Overview of Agenda	Dr. James H. Johnson, Jr. Chair, Executive Committee
9:00 a.m. – 9:15 a.m.	BOSC DFO Remarks - Administrative Issues	Ms. Lori Kowalski, Office of Research and Development
9:15 a.m. - 9:45 a.m.	AA/ORD Remarks	Dr. Kevin Teichman, Acting Deputy Assistant Administrator for Office of Research and Development
9:45 a.m. – 11:00 a.m.	Program Review Tool Workgroup - Draft Proposal	Dr. James H. Johnson, Jr. Chair, Executive Committee
11:00 a.m. – 11:15 a.m.	Break	
11:15 a.m. – 12:00 noon	ORD Responses to Recent BOSC Reports (Global)	ORD Technical Lead
12:00 noon – 1:00 p.m.	Lunch	
1:00 p.m. – 2:30 p.m.	ORD Responses to Recent BOSC Reports (Continued) (WQ, Land)	ORD Technical Leads
2:30 p.m.- 3:15 p.m.	Subcommittee Reports - Computational Toxicology (draft letter report)	Dr. George Daston, Subcommittee Chair

	Program Review Subcommittees:	
	- Human Health Risk Assessment Program Review	Dr. George Daston, Subcommittee Chair
	- Safe Pesticides/Safe Products Program Review	Dr. Anna Harding, Subcommittee Chair
	- Technology for Sustainability Program Review	Dr. John Giesy, Subcommittee Chair
	- Homeland Security	Dr. Gary Sayler, Subcommittee Chair
3:15 p.m. – 3:30 p.m.	Break	
3:30 p.m. – 4:00 p.m.	Subcommittee Reports (Continued) Standing Subcommittees:	
	- Common Process Outline	Ms. Susan Peterson, Office of Research and Development
	- National Center for Environmental Research (NCER)	Dr. Martin Philbert, Subcommittee Chair
	- National Exposure Research Lab (NERL)	TBD, Subcommittee Chair
	- Human Health Mid-Cycle Review	Dr. James Clark, Subcommittee V-Chair
4:00 p.m. – 4:15 p.m.	Public Comment	
4:15 p.m. – 5:00 p.m.	ORD Briefing on Methamphetamine Lab Remediation	Dr. Kevin Teichman, Acting Deputy Assistant Administrator for Office of Research and Development
5:00 p.m.	Adjourn	

Friday, October 20, 2006

9:00 a.m. – 9:30 a.m.	BOSC Issues - ORD Update	Dr. Kevin Teichman, Acting Deputy Assistant Administrator for Research and Development
9:30 a.m. – 10:30 a.m.	ORD Briefing on Nanotechnology	Dr. Nora Savage, Office of Research and Development
10:30 a.m. – 11:00 a.m.	SAB Activities	Dr. George Lambert. SAB Liaison to the BOSC
11:00 a.m. – 12:00 noon	Future Discussion/Future Business - Meetings in May, September 2007 - Additional Mid-Cycle Reviews	Dr. James H. Johnson, Jr. Chair, Executive Committee
12:00 noon	Adjourn	