

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

**BOARD OF SCIENTIFIC COUNSELORS
ENDOCRINE-DISRUPTING CHEMICALS SUBCOMMITTEE**

**Conference Call Summary
November 2, 2004
12:00 noon – 2:00 p.m. EST**

Welcome, Overview, Introduction, and Agenda Review

Dr. Anna K. Harding welcomed the members of the Endocrine-Disrupting Chemicals (EDC) Subcommittee to their first conference call and thanked them in advance for the time they will devote to future calls and the program review. She also thanked other participants on the call, in particular, Dr. Elaine Francis, Ms. Jennifer Robbins, and Dr. Neil Stiber, for their help in keeping the subcommittee on course during the review process.

Dr. Harding explained that the subcommittee's purpose is to provide an independent expert review of the EDC Research Program within the Office of Research and Development (ORD). The objective of the program review is to evaluate the relevance, quality, performance, and scientific leadership of the EDC Research Program. The review will examine the progress made to date and the future direction of the EPA research in this program. This pilot program review differs from previous Multi-Year Plan (MYP) reviews because it includes a retrospective as well as a prospective evaluation. The BOSC Executive Committee agreed in May to undertake two pilot program reviews—the Endocrine Disruptors Program and the Global Change Program reviews. The results of these pilots will guide future BOSC program reviews.

Beginning with the subcommittee members, the participants introduced themselves:

- ✧ Dr. George P. Daston, from Procter & Gamble, is a developmental toxicologist whose research involves the chemical mechanisms of birth defects.
- ✧ Dr. Glen R. Boyd, from the Department of Civil and Environmental Engineering at Tulane University, studies EDCs and pharmaceuticals and their effects on water and wastewater treatment.
- ✧ Dr. George W. Lucier, formerly with the National Institute of Environmental Health Sciences, conducted a research program on hormone receptor mechanisms and receptor-mediated processes important to issues in risk assessment.
- ✧ Dr. Stephen H. Safe, from Texas A&M University, conducts molecular biology and cancer research with ligand-activated receptors and endocrine disruptors.
- ✧ Dr. Juarine Stewart, from the School of Computer, Mathematical and Natural Sciences at Morgan State University, conducts research in xenobiotic metabolism in mammals.

- ✧ Dr. Donald E. Tillitt, from the U.S. Department of the Interior, U.S. Geological Survey, is involved in research on environmental toxicology and is working on dioxins, PCBs, and endocrine disruptors.
- ✧ Dr. Glen Van Der Kraak, from the University of Guelph, works on aspects of reproductive development in fish and control of ovarian follicular growth and maturation in both the laboratory and field settings to examine the effects of endocrinoactive compounds.
- ✧ Dr. Anna Harding, from Oregon State University, conducts research that focuses on water quality and public health outcomes, chemical contamination, and at-risk populations.

EPA participants in the call included the following individuals:

- ✧ Dr. Neil Stiber, from ORD, is the Designated Federal Officer (DFO) for the EDC Subcommittee.
- ✧ Dr. Elaine Francis is the National Program Director for the EDC Research Program at EPA.
- ✧ Ms. Robbins, from ORD's budget office, deals with accountability issues, in particular the research and development (R&D) criteria of the Office of Management and Budget (OMB).
- ✧ Dr. James Avery, from the Office of Science Policy (OSP), is the multimedia research coordinator for ORD.
- ✧ Dr. Larry Reiter, Director of the National Health and Environmental Effects Research Laboratory (NHEERL), has executive lead responsibility for the EDC Research Program at ORD.

Other participants included Patricia Bittner (U.S. Consumer Product Safety Commission), Jami Montgomery (Water Environment Research Foundation), Beverly Campbell (The Scientific Consulting Group, Inc.), Claudia Olivieri (BASF Agricultural Products), Karin Bentley (DuPont Crop Protection), and Catherine Holmes (BASF Agricultural Products).

Dr. Harding reviewed the agenda and called the participants' attention to the presentation slides on EPA's EDC Research Program.

Administrative Procedures

Dr. Stiber presented background information about the BOSC, a federal advisory committee that provides independent scientific peer review and other advice to EPA's ORD. The EDC Subcommittee was established by the BOSC Executive Committee to review the EDC Research Program at ORD. The subcommittee is being asked to respond to charge questions developed by ORD and provide a report for the Executive Committee's deliberations. The Executive Committee will evaluate the subcommittee's report, revise it if necessary, and submit it to ORD. The role of the BOSC in general is to provide advice and recommendations to ORD, but the right of decision-making and program implementation remains with the Agency.

Dr. Stiber reviewed the subcommittee meeting schedule, which includes a second conference call on December 1, a face-to-face meeting on December 13–15, and a third conference call on January 5, 2005. Additional meetings can be scheduled if necessary. After the face-to-face meeting, the subcommittee should be able to produce a draft report. Following the January 5 conference call, the draft final report will be presented to the BOSC Executive Committee.

As the DFO for the subcommittee, Dr. Stiber serves as the liaison between the subcommittee and the Agency. He is responsible for ensuring the subcommittee's compliance with the requirements of the Federal Advisory Committee Act (FACA). FACA rules include the following:

- ❖ All meetings on substantive issues are open to the public, including group communications that involve at least one-half of the subcommittee members; however, issues that are solely administrative are exempt from this requirement.
- ❖ A *Federal Register* notice must announce all meetings 15 calendar days in advance.
- ❖ The DFO must approve the agenda and attend all meetings.
- ❖ The Chair of the subcommittee must certify the meeting minutes within 90 days of the meeting.
- ❖ All advisory committee documents must be made available to the public.
- ❖ The subcommittee provides advice to the BOSC Executive Committee and does not report directly to ORD.

The DFO also ensures that all appropriate ethics regulations are satisfied, and each of the members of the subcommittee has filed a standard government financial disclosure report. These reports are reviewed by the Deputy Ethics Officer of the OSP and by the DFO to ensure that all ethics requirements are met.

To ensure the accuracy of the minutes taken by the contractor, Dr. Stiber asked the participants to identify themselves before making comments. He also stated that public comments, limited to 3 minutes, can be made at the end of the call. Dr. Stiber asked public participants who wish to make comments to send him an e-mail (stiber.neil@epa.gov) during the conference call or identify themselves at the end of the call and express their interest in making a public comment.

The charge presented to the subcommittee by the BOSC Executive Committee consists of five questions and subquestions designed to ensure that the subcommittee's feedback will be useful to the Agency. The questions address a broad range of topics, including management and scientific issues. They are intended to be both prospective and retrospective in nature. The subcommittee's review will depend on the broad spectrum of expertise that the participants bring to the table. Today's meeting is meant to address any questions and clarify any ambiguities about the charge. Additional materials to benefit the review process will be identified. By the end of the meeting, the goal is to have a draft outline of the report, which will follow the charge questions closely, and to define writing assignments.

EPA's EDC Research Program

Dr. Francis emphasized that her intent is to provide the subcommittee with the information it needs to evaluate the EDC Research Program. Her presentation covered the following topics: (1) the approach behind the program review, (2) the background materials, (3) a brief overview of the EDC Research Program, and (4) questions and answers.

Program Review Approach

The program review is intended to provide guidance that will help ORD: (1) assess the progress and direction of the EDC Research Program; (2) plan, implement, and strengthen the program; and (3) make research investment decisions over the next 5 years. The program review should be consistent with the guidance documents from the OMB and the Office of Science and Technology Policy (OSTP) regarding federal investment criteria.

Certain formats were proposed for the program review. It is being modeled after the successful systemic reviews conducted at the division level by NHEERL. According to this model, a series of introductory/welcome presentations will be followed by a brief overview of the EDC Research Program and then an overview of the long-term goals (LTGs). The research program is structured around the LTGs. An overview of each of the three LTGs will be followed by an extensive poster session of the research conducted by intramural researchers, program and regional office scientists, and grantees. There will be time to discuss the posters following the poster sessions. The meeting will conclude with presentations from Agency program and regional offices that use the science resulting from the research program. Closing remarks will be followed by a report-out from the BOSC EDC Subcommittee. The proposed framework includes time for discussions throughout the meeting as well as time for public comment.

Background Materials

A variety of materials will be distributed to the subcommittee members before the meeting in December. These materials include the Research Plan for Endocrine Disruptors, the MYP for Endocrine Disruptors, a bibliography of publications by intramural and extramural researchers, a synopsis of EDC research and screening programs, proceedings and abstracts from recent EDC workshops, abstracts of the posters to be presented at the December meeting, and biographical sketches of the intramural and extramural researchers.

The Research Plan for Endocrine Disruptors was peer reviewed in 1997 and published in 1998. It identified nine critical research questions and served as the blueprint for the EDC Research Program. The plan has been found to be consistent with subsequent research needs reports. The broad areas of evaluation to be considered by the BOSC in this review are program design, progress, and relevance.

The MYP for Endocrine Disruptors identifies parts of the research plan that will be addressed by EPA over the next 5 to 8 years, the specific laboratories or centers that will do the work, and the timeframe for completing the work. The MYP also identifies the three LTGs and 10 research questions (one was added to the 9 original questions). The 10 questions are aligned under the LTGs. In addition, a series of Annual Performance Goals (APGs) and Annual Performance Measures (APMs) have been developed. The areas to be addressed relevant to the charge issues are program design, progress, and relevance.

A bibliography has been prepared that includes about 400 peer-reviewed publications. The bibliography reflects the publications from intramural laboratories and centers as well as extramural Science To Achieve Results (STAR) research. The bibliography offers the

subcommittee members insights into the progress, leadership, and relevance of the research program.

The subcommittee members also have been given a synopsis of EDC research and screening programs, including the logic model showing the interrelationship between the research program and the screening and testing program. This information feeds into the draft charge question pertaining to relevance.

Other background materials are the proceedings and abstracts from two recent workshops. A 2002 workshop resulted in abstracts from intramural and extramural researchers and program and regional office scientists. The proceedings of an internal EPA workshop in 2003 include a summary of presentations from EPA researchers and program and regional office scientists. Both the proceedings and abstracts relate to the draft charge question regarding program progress, relevance, and leadership.

Before the December face-to-face meeting, the subcommittee members will receive abstracts of the posters to be presented, including the science questions being addressed, approaches, and outcomes and impacts. The revised NHEERL Implementation Research Plan will describe the progress of the research and a blueprint for future research. These background materials will help address issues related to program design, progress, and leadership.

Biographical sketches of intramural and STAR researchers and scientists will be helpful when addressing the question of leadership. Background information will be provided on resource allocation over time and across the LTGs for both the intramural and extramural programs. The information also will facilitate the understanding of the ORD process for identifying priority research areas and the National Center for Environmental Research (NCER) process for selecting competitive grant awards. These materials will help the subcommittee members understand the program resources.

At the December meeting, the subcommittee members will receive copies of the miniaturized posters, copies of the oral presentation slides, and summaries of the STAR projects.

Overview of the EDC Research Program

Dr. Francis gave a brief overview of EPA's Research Plan for Endocrine Disruptors. EDCs were identified as an emerging public health and environmental issue in 1994. EPA organized and hosted two international research needs workshops in 1995 and published an interim guidance document in 1997. The peer-reviewed Research Plan was published in 1998, and the MYP was developed in 2001.

The three LTGs identified in the MYP are to: (1) provide a better understanding of the science underlying the effects, exposure, assessment, and management of endocrine disruptors; (2) determine the extent of the impact of endocrine disruptors on humans, wildlife, and the environment; and (3) support EPA's screening and testing program. The 10 key research questions are aligned under the LTGs, but several of them overlap.

The EDC Research Program is multidisciplinary in nature; it includes human health and ecosystems, exposures, risk assessment, and risk management. The research is a combination of problem-driven and core research. Several areas are important to program offices in meeting congressional mandates related specifically to screening and testing. Other areas are important to regional offices, and some research is of interest to tribes. Work also is being done to improve the basic understanding of EDCs. In addition, the EDC Research Program is pertinent to other ongoing research.

The MYP and the Research Plan are closely linked documents. Key MYP questions are taken from the Research Plan, and 33 subissues are covered in the Research Plan. The MYP includes a timeframe with performance goals and performance measures.

Dr. Francis ended her presentation by referring to the challenge that the BOSC subcommittee faces in reviewing the EDC Research Program. A team of 12 scientists is available to provide the subcommittee with the information it needs for the program review.

Questions and Answers

In response to a question from Dr. Lucier about the scope of the subcommittee's work, Dr. Francis stated that the subcommittee is expected to review the work of the grantees as presented in the abstracts. Dr. Lucier mentioned that the subcommittee will have to consider how well the different components of EPA leverage against one another's missions and goals for the EDC Research Program. Dr. Francis explained that a number of the posters will show an aggregate of a body of research that cuts across several laboratories/centers. For example, one poster will integrate a number of projects involving concentrated animal feeding operations in three different laboratories. Regarding information on resources available to scientists, Dr. Lucier asked whether the information would be limited to in-house resources or would include contracts. Ms. Robbins responded that information would include all resources.

Dr. Harding remarked that at the May BOSC Executive Committee meeting, a discussion took place about the materials to be provided by ORD. She stated that she was under the impression that ORD would prepare a self-assessment or self-study, following the format of the charge questions, for the subcommittee. She asked whether such a document will be provided. Dr. Francis stated that ORD originally thought it would be developing synthesis documents, but the documents will not be completed in time for the program review. The subcommittee will have all of the information, but it will not be in a single, integrated document.

Dr. Harding also asked whether two committees (one domestic and one international), which are acting as interagency working groups, have produced materials or whether they serve strictly as advisory groups. Dr. Francis replied that in 1995 the Committee on Environment and Natural Resources convened an interagency working group on endocrine disruptors. The group developed a research framework and reported on the critical needs for research based on its assessment of the state of the science at the time. Various agencies began a joint extramural grant program to address some of those needs. In 1998, the agencies issued a joint solicitation on population-level effects of endocrine disruptors. Twelve grants were awarded primarily in the area of wildlife. In 2000, the committee issued a second solicitation focusing on epidemiology.

As a result, 12 epidemiological projects were jointly funded. The committee produced a number of documents and was reconvened in 2003 to continue to work on joint workshops and solicitations. Dr. Francis, who chairs the working group, offered to make the documents available to the subcommittee, including a proceedings document from a recent epidemiology grantees symposium.

In response to an inquiry by Dr. Harding regarding the international group, Dr. Francis announced that several collaborations have been instituted with Japan; proceedings from workshops can be shared with the subcommittee. Interaction also has taken place with the European Union. In addition, individual collaborations are under way with scientists in other countries. A World Health Organization international state-of-the-science document on endocrine disruptors was published in 2002 and is available to the subcommittee. Another document that could be made available to the subcommittee is on international inventory resulting from a meeting of the G-8 ministers, but the inventory needs to be updated.

Dr. Boyd asked whether the subcommittee should focus the review exclusively on the presentations made at the December workshop. Dr. Francis replied that the subcommittee should consider all the materials provided. She noted that one of the posters at the December meeting will summarize all of the presentations given at the recent EDC meeting¹, and the proceedings from that meeting will be available to the subcommittee. Dr. Harding remarked that the epidemiologic presentations from the EDC meeting apply to the third LTG on impact to wildlife and humans. Dr. Francis pointed out that EPA is leveraging its resources with other federal agencies on that topic.

EPA Programmatic Issues

Ms. Robbins began her presentation by explaining that the independent expert reviews have been a part of ORD processes for some time but not on the program level. OMB requires prospective and retrospective evaluations at the program level to assess the quality and progress of programs. Feedback from the reviews helps ORD to measure its progress and communicate the success of its research programs, improve the management and performance of the programs, and comply with best practices for federal research programs.

The BOSC has agreed to pilot the review of the EDC Research Program. It is hoped that the charge questions address the R&D criteria as set forth by OMB. The EDC Research Program has been reviewed by OMB using the Program Assessment Rating Tool (PART). The results of this review will be released in February. External reviews, such as the one this subcommittee is conducting, help to verify the progress and improve the goals and measures of programs, verify whether clients use the research results, allow for comparison to programs with similar missions and goals, help inform decisions regarding investments in the future, and help to meet the requirements for OMB and the Government Performance and Results Act (GPRA).

¹ Endocrine Disruptors Program Progress Review Workshop -- Endocrine Disruptors: Epidemiologic Approaches (part of e.hormone 2004), U.S. EPA National Center for Environmental Research, Center for Bioenvironmental Research of Tulane and Xavier Universities, New Orleans, LA, October 30, 2004.

The OMB and OSTP released investment criteria for R&D in the federal government. The criteria include quality, relevance, and performance. These three elements must be examined, both prospectively and retrospectively, by independent review panels. Relevance means that the purpose of the research program is clear, it responds to existing problems and demonstrates an outcome-oriented design, and its benefits are clearly articulated. Quality entails OMB's emphasis on competitively awarded funding. Performance involves the goals and measures set for the program and whether they are being met.

Questions and Discussion of Charge

Dr. Daston called the attention of the subcommittee members to the fact that the review is to be conducted not just for the sake of science but also for the sake of management. After Dr. Lucier mentioned the generic quality of the questions, Dr. Harding expressed her concern about the very aggressive timeline. Is the time allotted sufficient for the review? In response, Dr. Lucier asked what level of detail is expected in the written review. Dr. Harding explained that team writing assignments will be made and the teams will review the materials and respond to the charge questions between now and December 15. At the December meeting, the subcommittee will compose a draft report. Dr. Daston referred to the need for targeted answers to the questions given the timeframe, and Dr. Stewart suggested that detailed guidance in the report might be reserved for items that need improvement. Dr. Stiber concurred with Dr. Stewart's suggested approach, but Dr. Francis remarked that the downside of the approach is that the report will highlight only where additional work is needed and omit the favorable points. She asserted that both elements are needed for "the outside community." Dr. Stewart concurred that the positive points should be included, but details are not needed.

Dr. Daston raised the question of how the report should be organized. Dr. Harding suggested organizing the report around the three major research goals put forward in the MYP or, alternatively, organizing the report around the nine questions outlined in the Research Plan. Regarding the first suggestion, teams could each take one of the LTGs and respond to all the charge questions related to that LTG. Dr. Daston stated his concurrence with this suggestion and noted that the key questions from the Research Plan could be used to focus the assessment. Dr. Francis remarked that the poster abstracts will indicate clearly which question(s) is being considered. The abstracts will be disseminated on November 22.

Dr. Van Der Kraak expressed concern about how to move forward. He asked whether the goals and research questions are articulated clearly on a single page. Dr. Harding responded that the LTGs are in the same document as the charge questions, but they also are articulated in greater detail in the MYP (pages 6 and 7) and the Research Plan. Dr. Safe was concerned about the time required to review materials with overlapping information. It was noted that confusion results because the LTGs are ordered in a different way in the MYP (page 12) and in the Charge statement. Dr. Daston read the three LTGs from the MYP. He noted that slides 13 and 14 from Dr. Francis' presentation spell out the goals and the 10 questions aligned with them. Dr. Harding stated that ORD sent every subcommittee member a binder containing the MYP and the Research Plan.

Dr. Tillitt stated that today's presentation helped to clarify the information, but he is concerned about the large amount of information. The depth and quality of the information for a prospective assessment will depend on the scientists' presentations. The writeups will be difficult to complete without that information. Dr. Francis noted that the MYP will be the best source of information for the prospective assessment. The individual abstracts will be summations that describe a culmination of progress in an integrated fashion. Dr. Tillitt reiterated that the depth, and therefore the utility, of the review will depend on that information.

Dr. Harding restated her assumption that ORD would provide a report describing some of these activities. She referred to the challenge of wading through all the material to compile it into a report. Dr. Francis referred to the competing priorities involved in the process of producing an integrated report. She repeated that all the pieces will be available, but they will not be fully integrated. Dr. Van Der Kraak asked for clarification about the process whereby the researchers will identify whether they are addressing specific questions. Dr. Francis assured the subcommittee members that the poster presentations will make very clear which LTGs are being addressed, but she pointed out that some of the goals overlap. On the abstracts and posters, the science questions being addressed will be specified. Dr. Daston remarked that when more than one LTG is being addressed in a poster, this should be specified.

Subcommittee Activities

Dr. Boyd stated that he is in favor of dividing the group into teams based on the LTGs and the members' areas of expertise. Because of the amount of material and the short timeframe, he asked for some guidelines or milestones before the next mass mailing of information occurs. Dr. Daston stated that because the timeline is so aggressive, between now and when the abstracts are distributed on November 22, the subcommittee should break into teams, read the MYP and Research Plan, fill in information on prospective research plans when the abstracts are received, and begin writing their sections of the report. Dr. Harding concurred and warned against delays in initiating the writing.

Dr. Harding announced that Dr. Daston has agreed to lead the teams on screening and testing (LTG3) and better understanding of the science (LTG1). Dr. Lucier will take the lead on the impact of EDCs on wildlife and humans (LTG2). Dr. Francis remarked that the writers will have to cover more than one area to account for the overlapping topics. The following groups were formed:

- ✧ LTG1 (better understanding of the science)—Drs. Daston, Boyd, and Tillitt
- ✧ LTG2 (impact on wildlife and humans)—Drs. Lucier, Safe, Stewart, Tillitt, and Van Der Kraak
- ✧ LTG3 (screening and testing)—Drs. Daston, Van Der Kraak, and Safe

Dr. Harding's role will be to integrate the various sections prepared by the teams into a cohesive report.

Dr. Harding will send an e-mail to the subcommittee members delineating the writing assignments. She urged the members to study the provided documents and make a first attempt at

responding to the charge questions from the materials provided. In the next 3 weeks, the teams should begin to answer some of the questions with the materials at hand; other questions will require input from the abstracts.

A question was raised about the topic of leadership. Should the subcommittee examine leadership in the program as a whole or should it look for evidence of leadership on each of the 10 charge questions? Dr. Harding responded that the former approach is preferred. The factors to be considered regarding leadership are outlined in charge question #4, which concerns the degree to which the program is identified as a leader in the field. The question was raised about whether teams would be assigned specific factors to consider or whether all of the subcommittee members would address the various factors. Dr. Francis observed that the charge questions on leadership (#4) and resources (#5) are crosscutting program issues and would be difficult to address on the basis of the LTGs. Dr. Harding suggested separating the questions involving leadership and resources and assigning them to a different individual. Dr. Stewart remarked that this had been proposed at the September meeting; she was to write the program resources section and Dr. Harding was to write the leadership section. Dr. Harding endorsed this approach and asserted that those two charge questions should be dealt with apart from the LTGs. Dr. Stewart agreed to prepare the program resources section rather than serve as a member of the team addressing LTG2.

Dr. Harding asked for suggestions on how the teams should proceed. Dr. Lucier suggested that for his team, one individual will focus on each of the four questions under LTG2. He will match the questions to the expertise of the team members. Dr. Harding summarized the discussion by stating that the three teams will work on the three LTGs, and Drs. Stewart and Harding will work on program resources and scientific leadership, respectively. Dr. Daston will lead the teams on screening and testing and better understanding of the science, and Dr. Lucier will coordinate the team on impact on wildlife and humans.

The next conference call is scheduled for December 1. Dr. Francis asked the subcommittee members to contact Dr. Stiber if they need materials or presentations for the next conference call. Dr. Harding stressed that the subcommittee will write its review from the materials provided by EPA. Dr. Stiber reiterated that the subcommittee is not expected to locate materials or conduct research; ORD will provide the materials needed to review the program.

Dr. Stiber asked if anyone from the public would like to make a comment. No public comments were presented. He asked those participants who joined the call late to send him their names and affiliations so that they can be included on the participants list.

Dr. Harding adjourned the conference call at 2:00 p.m.

List of Participants

Subcommittee Members:

Glen R. Boyd, Ph.D.

Department of Civil and Environmental
Engineering
Tulane University
Walter E. Blessey Hall
Building 11
New Orleans, LA 70118
504-862-3266
504-862-8941 fax
gboyd@tulane.edu

George P. Daston, Ph.D.

Miami Valley Laboratories
Procter & Gamble Company
11810 E Miami River Road
Cincinnati, OH 45252
513-627-2886
513-627-0323 fax
daston.gp@pg.com

Anna K. Harding, R.S., Ph.D.

Department of Public Health
Oregon State University
309 Waldo Hall
Corvallis, OR 97331-6406
541-737-3830
541-737-4001 fax
anna.harding@oregonstate.edu

George W. Lucier, Ph.D.

Consulting Toxicologist
628 Redbud
Pittsboro, NC 27312-9307
919-542-4629
lucierg@msn.com

Stephen H. Safe, Ph.D.

Department of Veterinary Physiology and
Pharmacology
College of Veterinary Medicine
Texas A&M University
College Station, TX 77843-4466
979-845-5988
979-862-4929 fax
s-safe@tamu.edu

Juarine Stewart, Ph.D.

School of Computer, Mathematical and
Natural Sciences
Morgan State University
1700 E Cold Spring Lane
Baltimore, MD 21251
443-885-4515
443-885-8215 fax
jstewart2@jewel.morgan.edu

Donald E. Tillitt, Ph.D.

Biochemistry and Physiology Branch
USGS - Columbia Environmental Research
Center
4200 New Haven Road
Columbia, MO 65201
573-876-1886
573-876-1896 fax
dtillitt@usgs.gov

Glen Van Der Kraak, Ph.D.

Department of Zoology
College of Biological Science
University of Guelph
Room 155 – Axelrod Building
Guelph, ON N1G 2W1
CANADA
519-824-4120 ext 53424
519-767-1656 fax
gvanderk@uoguelph.ca

EPA Attendees:

James Avery
Office of Science Policy

Elaine Francis
Office of Research and Development

Larry Reiter
National Health and Environmental Effects
Research Laboratory

Jennifer Robbins
Office of Research and Development

Neil Stiber, Ph.D.
Office of Research and Development

Other Attendees:

Karin Bentley
DuPont Crop Protection

Patricia Bittner
U.S. Consumer Product Safety Commission

Beverly Campbell
The Scientific Consulting Group, Inc.

Catherine Holmes
BASF Agricultural Products

Jami Montgomery
Water Environment Research Foundation

Claudia Olivieri
BASF Agricultural Products