UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

OFFICE OF
THE ADMINISTRATOR
EPA SCIENCE ADVISORY BOARD

July 11, 2005

MEMORANDUM

SUBJECT: US EPA Science Advisory Board (SAB) Polychlorinated Biphenyl (PCB)-Artificial Reef Risk Assessment Consultative Panel– Documentation for Panel Formation Determinations

FROM: Sue Shallal, Ph.D., Designated Federal Officer /Signed/
EPA Science Advisory Board Staff Office (1400F)

TO: Vanessa Vu, Ph.D., Director
EPA Science Advisory Board Staff Office (1400F)

THRU: Dan Fort, Ethics and FACA Officer /Signed/
EPA Science Advisory Board Staff Office (1400F)

This memo summarizes the steps taken in regard to forming the Polychlorinated Biphenyl (PCB)-Artificial Reef Risk Assessment Consultative Panel. It provides background information on this SAB review activity and addresses:

- The type of panel that will be used to conduct the consultation, the name of the Panel, and identification of the Panel Chair; and the types of expertise needed to address the charge;
- Conflict of Interest Considerations and Appearance of Lack of Impartiality
- How individuals were placed on the Panel.

I. Background

EPA's Region 4 Offices and the Office of Pollution Prevention and Toxics requested that the Science Advisory Board (SAB) hold a consultation followed by an advisory on the draft risk assessment being prepared by the U.S. Navy regarding the potential health and ecological risks associated with deploying a World War II carrier as an artificial reef.

The U.S. Navy and the State of Florida are planning to deploy the ex-Oriskany, a World War II era aircraft carrier, as an artificial reef in the Gulf of Mexico. In accordance with the Toxic Substances Control Act (TSCA) and its implementing Federal PCB regulations (40 CFR Part 761), the U.S. Navy has applied for and must obtain a risk-based PCB disposal approval prior to sinking the vessel with non-liquid PCBs onboard. The EPA may approve such an application if it finds the disposal action will not pose an unreasonable risk of injury to human health or the environment. To evaluate the potential transfer of non-liquid PCBs to the marine environment and the subsequent risk that they might pose to human and ecological receptors using the artificial reef, the Navy performed leaching studies of different on-board PCB containing materials followed by fate and transport modeling of the leaching results to evaluate how released chemicals might behave in the near-reef marine environment. The U.S. Navy has also developed a fate and transport model known as the Prospective Risk Assessment Model (PRAM).

Current members of the SAB have been invited to provide advice for this consultation. As mentioned in the Federal Register Notice published on May 31, 2005 (Attachment 1), an Advisory will also be conducted later this year for which additional expertise has been sought.

The purpose of a consultation is to provide non-consensus, oral advice on the preliminary assessment. Following the consultation, the SAB will conduct an advisory to provide consensus written advice on the U.S. Navy's revised assessment.

The focus of the SAB consultation and advisory includes the leaching studies, the PRAM, and characterization of potential risks to human health and to marine organisms. The SAB Panel will be asked to comment on the adequacy and completeness of the analysis presented in these documents. SAB Staff, the Director of the SAB and the Agency negotiated the final charge questions for the panel (charge questions will be posted on the SAB website).

II. Determinations

A) Type of Panel that will be used to conduct the review, the name of the Panel, and identification of the Panel Chair; types of expertise needed to address the charge:

Members of the Board and several SAB standing committees were invited to participate in this panel. By including members of the Board and several standing committees in the review of this document, the SAB staff has attempted to assemble a panel that reflects a variety of scientific views and has the necessary expertise to address the charge questions. The name of the panel will be the

Polychlorinated Biphenyl (PCB)-Artificial Reef Risk Assessment Consultative Panel (PCB-ARRA Panel). Dr. Joan Rose, a Board member, was invited to Chair the PCB-ARRA panel.

The SAB, after receiving the request to review the Navy's PCB risk assessment determined that a broad base of expertise was required. It was decided that candidates with the following expertise were needed: Toxicology; carcinogenicity; risk assessment; fate and transport modeling; exposure assessment; and aquatic ecosystems.

Identification of parties who are potentially interested in or may be affected by the topic to be reviewed:

Interested parties include, EPA, state agencies that oversee the establishment and maintenance of artificial reefs, risk assessors and those who monitor risk assessment developments and EPA's implementation of new risk assessment approaches (i.e., academicians, the regulated community, public interest groups, and others) and the U.S. Navy.

B) Whether the charge involves a Particular Matter and how conflict of interest regulations apply to members of the panel:

18 U.S.C. 208 provision states that:

> "An employee is prohibited from participating ***personally and substantially*** in an official capacity in any ***particular matter*** in which he, to his knowledge, or any person whose interests are imputed to him under this statue has a financial interest, if the particular matter will have a ***direct and predictable effect*** on that interest [emphasis added]."

For a conflict of interest to be present, all elements in the above provision must be present. If an element is missing, the issue does not involve a formal conflict of interest. However, the general provisions in the "appearance of a lack of impartiality guidelines" may still apply and need to be considered.

<u>Personal and Substantial Participation</u>:

Participating personally means participating directly. Participating substantially refers to involvement that is of significance to the matter. [5C.F.R. 2640.103(a)(2)]. For this review, panel members will be participating personally in the matter through attendance at meetings, teleconferences and other means.

<u>Direct and Predictable Effect:</u>

A direct effect on a participant's financial interest exists if. "... a close causal link exists between any decision or action to be taken in the matter and any expected effect of the matter on the financial interest...A particular matter does not have a direct effect...if the chain of causation is attenuated or is contingent upon the occurrence of events that are speculative or that are independent of, and unrelated to, the matter. A particular matter that has an effect on a financial interest only as a consequence of its effects on the general economy is not considered to have a direct effect." [5 C.F.R. 2640.103(a)(i)]. A predictable effect exists if, "...there is an actual, as opposed to a speculative, possibility that the matter will affect the financial interest." [5 C.F.R. 2640.103(a) (ii)].

Particular Matter:

A "particular matter" refers to matters that "...will involve deliberation, decision, or action that is focused upon the interests of specific people, or a discrete and identifiable class of people." It does not refer to "...consideration or adoption of broad policy options directed to the interests of a large and diverse group of people." [5 C.F.R. 2640.103 (a)(1)].

The PCB-ARRA Panel's activity qualifies as a *particular matter of general applicability* because the resulting advice will be part of a deliberation, and under certain circumstances the advice could involve the interests of a discrete and identifiable class of people but does not involve specific parties. That group of people constitutes those who are associated or involved with the potentially interested or affected parties, as identified above.

Appearance of a Lack of Impartiality Considerations

The Code of Federal Regulations [5 C.F.R. 2635.502(a)] states that:

> "Where an employee knows that a ***particular matter*** involving specific parties is likely to have a ***direct and predictable effect*** on the financial interest of a member of his household, or knows that a person with whom he has a covered relationship is or represents a party to such matter, and where the person determines that the circumstances would cause a ***reasonable person*** with knowledge of the relevant facts to question his impartiality in the matter, the employee should not participate in the matter unless he has informed the agency designee of the appearance problem and received authorization from the agency designee."

Further, 5 C.F.R. 2635.502(a)(2) states that:

> "An employee who is concerned that circumstances other than those specifically described in this section would raise a question regarding his impartiality should use the process described in this section to determine whether he should or should not participate in a particular matter."

Each potential advisory panel member was evaluated against the 5 C.F.R. 2635(a)(2) general requirements for considering an appearance of a lack of impartiality. Information used in this evaluation has come from information provided by potential advisory panel members (including, but not limited to, EPA 3110-48 confidential financial disclosure forms) and public comment.

To further evaluate any potential appearance of a lack of impartiality, the following five (5) questions were posed to all prospective advisory panel members:

- Do you know of any reason that you might be unable to provide impartial advice on the matter to come before the Panel or any reason that your impartiality in the matter might be questioned?
- Have you had any previous involvement with the issue(s) or document(s) under consideration, including authorship, collaboration with the authors, or previous peer review functions? If so, please identify those activities.
- Have you served on previous advisory panels or committees that have addressed the topic under consideration? If so, please identify those activities.

- Have you made any public statements (written or oral) on the issue? If so, please identify those statements.
- Have you made any public statements that would indicate to an observer that you have taken a position on the issue under consideration? If so, please identify those statements.

As a result of a review of these forms and the responses to the five questions above, the Deputy Ethics Official of the Science Advisory Board, in consultation with the SAB Ethics and FACA Policy Officer, has determined that there is no conflict of interest or appearance of a lack of impartiality for the members of this panel.

C) How individuals were selected as proposed candidates for the panel.
Selection criteria included: current membership to the chartered SAB or SAB standing committees; relevant expertise; willingness to serve on the Panel, and availability to meet during the proposed time period; absence of conflict of interest and absence lack of appearance of impartiality issues, and balance of expertise needs and diversity of scientific viewpoints. A detailed roster (Attachment 2) and biosketches (Attachment 3) of the members of the PCB-ARRA Panel is attached. The selected panel members are:

Dr. Joan Rose, Michigan State University, East Lansing, MI (CHAIR)
Dr. Gregory Biddinger, ExxonMobil Biomedical Sciences, Inc., Houston, TX
Dr. James Bus, Dow Chemical Company, Midland, MI
Dr. David Dzombak, Carnegie-Mellon University, Pittsburg, PA
Dr. Taylor Eighmy, University of New Hampshire, Durham, NH
Dr. Dale Hattis, Clark University, Worcester, MA
Dr. Randy Maddalena, Lawrence Berkeley National Laboratory, Berkeley, CA
Dr. Michael Newman, College of William & Mary, Gloucester Point, VA
Dr. Gary S. Sayler, University of Tennessee, Knoxville, TN
Dr. Laura Steinberg, Tulane University, New Orleans, LA
Dr. Thomas Theis, University of Illinois, Chicago, IL
Dr. Timothy Thompson, Science, Engineering, and the Environment, LLC, Seattle, WA
Dr. Lauren Zeise, CA/EPA Office of Environmental Health Hazard Assessment, Oakland, CA

Concurred,

/Signed/ July 11, 2005
Vanessa Vu, Ph.D. Date
Director
EPA Science Advisory Board Staff

ATTACHMENTS

Attachment 1: *Federal Register* Request for information on the proposed panel and notification of an upcoming meeting and solicitation of experts published May 31, 2005 (70 FR 30946-30947).

Attachment 2: Roster of individuals selected for the Panel

Attachment 3: Biosketches

ATTACHMENT 1

[Federal Register: May 31, 2005 (Volume 70, Number 103)]
[Notices]
[Page 30946-30947]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr31my05-35]

ENVIRONMENTAL PROTECTION AGENCY
[FRL-7918-7]

EPA Science Advisory Board (SAB) Staff Office; Request for Nominations of Experts for the SAB Advisory Panel for Polychlorinated Biphenyl (PCB) Risks Associated With Establishing an Artificial Reef

AGENCY: Environmental Protection Agency (EPA).
ACTION: Notice.

SUMMARY: The Science Advisory Board (SAB) Staff Office is requesting the nomination of experts for a SAB Advisory Panel for PCB risks associated with an artificial reef established from a former United States Navy ship.

DATES: Nominations should be submitted by June 21, 2005, per instructions below.

FOR FURTHER INFORMATION CONTACT: Any member of the public wishing further information regarding this Notice and Request for Nominations may contact Dr. Sue Shallal, Designated Federal Officer (DFO), SAB Staff Office, by telephone/voice mail at (202) 343-9977; by fax at (202) 233-0643; or via e-mail at: shallal.suhair@epa.gov. General information concerning the EPA Science Advisory Board can be found on the EPA SAB Web site at: http://www.epa.gov/sab.

Technical contact: The U.S. Navy's draft assessment that is the subject of this advisory activity will be available from the U.S. Environmental Protection Agency's (EPA) Region 4. For questions and information concerning these materials, please contact Craig Brown at (404) 562-8990 or brown.craig@epa.gov.

SUPPLEMENTARY INFORMATION:

Background: The U.S. Navy and the State of Florida are planning to deploy the ex-Oriskany, a World War II era aircraft carrier, as an artificial reef in the Gulf of Mexico. In accordance with the Toxic Substances Control Act (TSCA) and its implementing Federal PCB regulations (40 CFR Part 761), the U.S. Navy has applied for and must obtain a risk-based PCB disposal approval prior to sinking the vessel with non-liquid PCBs onboard. The EPA may approve such an application if it finds the disposal action will not pose an unreasonable risk of injury to human health or the environment. To evaluate the potential transfer of non-liquid PCBs to the marine environment and the subsequent risk that they might pose to human and ecological receptors using the artificial reef, the Navy performed leaching studies of different on-board PCB containing materials followed by fate and transport modeling of the leaching results to evaluate how released chemicals might behave in the near-reef marine environment. The U.S. Navy has also developed a fate and transport model known as the Prospective Risk Assessment Model (PRAM). EPA Region 4 has requested that the SAB conduct a consultation followed by an advisory on the U.S. Navy's assessment of potential human health and environmental risks from PCBs

released from the ex-Oriskany following deployment as an artificial reef. The focus of the SAB consultation and advisory includes the leaching studies, the PRAM, and characterization of potential risks.

The SAB was established by 42 U.S.C. 4365 to provide independent scientific and technical advice, consultation, and recommendations to the EPA Administrator on the technical basis for Agency positions and regulations. A SAB panel composed of current members will conduct a consultation. The purpose of a consultation is to provide non-consensus, oral advice on the preliminary assessment. Following the consultation, the SAB will conduct an advisory to provide consensus written advice on the U.S. Navy's revised assessment. The advisory will be conducted by a panel consisting of current SAB members and additional outside experts. These panels will comply with the provisions of the Federal Advisory Committee Act (FACA) and all appropriate SAB procedural policies. As such, all public meetings will be announced in the Federal Register at least 15 days prior to their scheduled times. Upon completion, the advisory panel's report will be submitted to the Chartered SAB for final approval prior to transmittal to the EPA Administrator.

Request for Nominations: The SAB Staff Office is seeking public nominations of recognized experts to serve on the advisory panel. The nominees should have expertise in one or more of the following areas: PCB chemistry; fate and transport modeling; exposure assessment; and PCB toxicity to human health and aquatic ecosystems. Process and Deadline for Submitting Nominations: Any interested person or organization may nominate individuals qualified in the areas of expertise described above to serve on the SAB Artificial Reef PCB Risk Advisory Panel. Nominations should be submitted in electronic format through the SAB Nomination Form which can be accessed through a link on the blue navigational bar on the SAB Web site at: http://www.epa.gov/sab/sab_panel_form.htm . To be considered, all nominations must include the information requested on that form. Anyone who is unable to submit nominations using this form and any questions concerning any aspects of the nomination process may contact the DFO, as indicated above in this notice. Nominations should be submitted in time to arrive no later than June 21, 2005. Any questions concerning either this process or any other aspects of this notice should be directed to the DFO. The process for forming a SAB panel is described in the Overview of the Panel Formation Process at the Environmental Protection Agency, Science Advisory Board (EPA-SAB-EC-COM-02-010), on the SAB Web site at:http://www.epa.gov/sab/pdf/ec02010.pdf.

From the nominees identified by respondents to this Federal Register notice (termed the ``Widecast''), the SAB Staff Office will develop a smaller subset (known as the ``Short List'') for more detailed consideration. The Short List will be posted on the SAB Web Site at: http://www.epa.gov/sab, and will include, for each candidate, the nominee's name and biosketch. Public comments on the Short List will be accepted during the comment period, the public will be requested to provide information, analysis or other documentation on nominees that the SAB Staff Office should consider in evaluating candidates for the Panel.

For the SAB, a balanced panel (i.e., committee, subcommittee, or panel) is characterized by inclusion of candidates who possess the necessary domains of knowledge, the relevant scientific perspectives (which, among other factors, can be influenced by work history and affiliation), and the collective breadth of expertise and experience to adequately address the charge. Public responses to the Short List candidates will be considered in the selection of the panel, along with information provided by candidates and information gathered by SAB Staff independently on the background of each candidate (e.g., financial disclosure information and computer searches to evaluate a nominee's prior involvement with the topic under review). Specific criteria to be used in evaluation of an individual Panel member include: (a) Scientific and/or technical expertise, knowledge, and experience (primary factors); (b) absence of financial conflicts of interest; (c) scientific credibility and impartiality; (d) availability and

willingness to serve; and (e) ability to work constructively and effectively in committees.

Prospective candidates will be required to complete and submit the ``Confidential Financial Disclosure Form for Special Government Employees Serving on Federal Advisory Committees at the U.S. Environmental Protection Agency'' (EPA Form 3110-48). This confidential form allows Government officials to determine whether there is a statutory conflict between that person's public responsibilities (which includes membership on an EPA Federal advisory committee) and private interests and activities, or the appearance of a lack of impartiality, as defined by Federal regulation. The form may be viewed and downloaded from the following URL address: http://www.epa.gov/sab/pdf/epaform3110-48.pdf.

Dated: May 23, 2005.

Vanessa T. Vu,

Director, EPA Science Advisory Board Staff Office.

[FR Doc. 05-10677 Filed 5-27-05; 8:45 am]
BILLING CODE 6560-50-P

ATTACHMENT 2

U.S. Environmental Protection Agency
Science Advisory Board
Polychlorinated Biphenyl-Artificial Reef
Risk Assessment Consultative Panel (PCB-ARRA Panel)

CHAIR

Dr. Joan B. Rose, Professor and Homer Nowlin Chair in Water Research, Department of Fisheries and Wildlife, Michigan State University, E. Lansing, MI

SAB MEMBERS

Dr. Gregory Biddinger, Environmental Programs Coordinator, ExxonMobil Biomedical Sciences, Inc, Houston, TX

Dr. James Bus, Director of External Technology, Toxicology and Environmental Research and Consulting, The Dow Chemical Company, Mildland, MI

Dr. Thomas L. Theis, Professor , Civil and Materials Engineering, Director, Institute for Environmental Science and Policy, University of Illinois at Chicago, Chicago, IL

Dr. Lauren Zeise, Chief, Reproductive and Cancer Hazard Assessment Section, California Environmental Protection Agency, Oakland, CA

SAB COMMITTEE MEMBERS

Dr. David Dzombak, Professor, Department of Civil and Environmental Engineering, Carnegie-Mellon University, Pittsburgh, PA

Dr. T. Taylor Eighmy, Research Professor and Director of the Recycled Materials Resource Center, Civil Engineering, University of New Hampshire, Durham, NH

Dr. Dale Hattis, Research Professor, Center for Technology, Environment, and Development, George Perkins Marsh Institute, Clark University, Worcester, MA

Dr. Randy Maddalena, Scientist, Environmental Energy Technologies Division, Indoor Environment Department, Lawrence Berkeley National Laboratory, Berkeley, CA

Dr. Michael C. Newman, Professor of Marine Science, School of Marine Sciences, Virginia Institute of Marine Science, College of William & Mary, Gloucester Point, VA

Dr. Gary Sayler, Distinguished Research Professor, The Center for Environmental Biotechnology, University of Tennessee, Knoxville, Knoxville, TN

Dr. Laura Steinberg, Associate Professor, Department of Civil and Environmental Engineering, Tulane University, New Orleans, LA

Mr. Timothy Thompson, Senior Environmental Scientist, Science, Engineering, and the Environment, LLC, Seattle, WA

SCIENCE ADVISORY BOARD STAFF
Dr. Suhair Shallal, Designated Federal Official, Science Advisory Board, US EPA, Washington, DC

ATTACHMENT 3

Polychlorinated Biphenyls-Artificial Reef Risk Assessment Consultative Panel
PCB-ARRA Panel

BIOSKETCHES

Joan B. Rose, PhD, CHAIR

Dr. Joan Rose serves as the Homer Nowlin Chair in Water Research of the Michigan State University and is currently Director of the Center for Water Sciences. Dr. Rose received her B.S., in 1976 from University of Arizona, her MS from University of Wyoming in 1980and Ph.D. in Microbiology from the University of Arizona in 1985. She served as a Professor in the College of Marine Science, USFL from 1998-2002 and Associate Professor, Department of Marine Science, USFL from 1994-1997. In 1995, Dr. Rose had a Courtesy Appointment, as Associate Professor, Department of Civil Engineering, USFL. From 1989-1994, she was an Assistant Professor, Department of Environmental and Occupational Health, USFL; and from 1986-1989, she served as Research Associate/Lecturer, Department of Microbiology and Immunology, UAZ. Dr. Rose's professional experience includes environmental virology, environmental parasitology, drinking water treatment and disinfection, microbial risk assessment, wastewater treatment and reuse, water pollution microbiology, mycology and food microbiology. Teaching experience and educational activities include virology, food microbiology, environmental and occupational health, biotechnology and public health, analysis of water and wastewater, environmental microbiology, environmental virology, water pollution microbiology and risk assessment. She was named as one of the 21 most influential people in Water in the 21st Century by Water Technology Magazine. 2000. Current service on advisory committees include 1) the Science Advisory Board of the International Commission of the Great Lakes, 2003-08, 2) Research Advisory Council for the Water Reuse Foundation, 2003-06, 3) Alan T. Waterman Award Committee, National Science Foundation, 2002-05, 4) Vice-Chair of USA National Committee for the International Water Association, 2002-05; Member of the Strategic Council for IWA 2005-08; Chair of the Specialist Group Health-Related Water Microbiology (IWA) 5) Research Advisory Board, National Water Research Institute, 2002-04, 6) Board of Directors, Association of Environmental Engineering and Science Professors, 2002-04, 7) Council Policy Committee for the American Society of Microbiology, 2001-2004, 8) Appointed to Water Science and Technology Board of National Academy of Science, National Research Council, 1998-2004. Professional society memberships include American Academy of Microbiologists, American Public Health Association, American Society of Microbiology, American Society for Testing and Materials, American Water Works Association (AWWA), Society for Risk Analysis, International Water Assoc. and Water Environment Federation. Sources of recent grant and/or contract support include NOAA, EPA, Water Environ. Research Foundation, NSF, AWWARF, CH2MHILL,, Michigan Applied Policy Research Funds, and Michigan Sea Grant. Dr. Rose is currently a member of the EPA Science Advisory Board (SAB) and the chair of the SAB Drinking Water Committee.

Gregory Biddinger, PhD

Dr. Gregory R. Biddinger is the Environmental Program Coordinator for ExxonMobil Biomedical Sciences, Inc. In his current position he has two primary responsibilities 1) strategic

planning related to the environmental aspects of ExxonMobil's business and 2) development of methods and application of *Natural Land Management* strategies on ExxonMobil's current and former operating properties. He regularly represents ExxonMobil on matters of wildlife conservation and ecological restoration. Dr. Biddinger has practiced professionally as an environmental scientist for over 25 years. He received a doctoral degree from Indiana State University (1981) in Life Science (Ecology/Physiology) and post-doctoral training in Ecotoxicology at Cornell University (1981-1983). His experience ranges from the design and implementation of strategic environmental business planning processes for ExxonMobil, to the design and establishment of ecotoxicological testing facilities for Cornell University and the Illinois Environmental Protection Agency. He has been very active in development and review of Ecological Risk Assessment methods, and in drafting international standards related to Ecotoxicology, Rick-Based Corrective Action, Environmental Management and Greenhouse Gas Accounting. Dr. Biddinger is currently a member of the USEPA Science Advisory Board (SAB) and its ad hoc Committee on Valuation of Protection of Ecosystems and Ecological Services. From 1999 - 2003, he served on the USEPA SAB Ecological Processes and Effects Committee (EPEC). In addition to his work on the USEPA SAB committees, he has been active in numerous expert panels and peer reviews for USEPA, OECD and SETAC. His other professional activities have included chairmanships with the American Society for Testing and Materials, American Chemistry Council and International Standards Organization technical committees. Dr. Biddinger was the founding chair of the Society of Environmental Toxicology and Chemistry (SETAC) Ecological Risk Assessment Advisory Group (1992-2002). Dr. Biddinger is a founding editor of the SETAC journal *Integrated Environmental Assessment and Management* His publications cover the areas of aquatic toxicology of inorganic arsenic, phthalate esters, chemical dispersants, and the use of microcosms in estimation of tropic transfer of contaminants. Dr. Biddinger has also published and edited proceedings on ecological risk assessment and risk management, including such topics as the ecological risks of contaminated sediments, decision support systems, sustainable environmental management, integrated environmental decision-making and Landscape ecology and Wildlife Habitat Evaluation.

James Bus, PhD

Dr. James S. Bus is currently Director of External Technology and a member of the Leadership Team in the Toxicology and Environmental Research and Consulting group at the Dow Chemical Company, Midland, Michigan. Prior to joining Dow Chemical in 1989, he held positions of Associate Director of Toxicology and Director of Drug Metabolism at the Upjohn Company (1986-1989), Research Scientist at the Chemical Industry Institute of Toxicology (1977-1986), and Assistant Professor of Toxicology at the University of Cincinnati (1975-1977). He currently is Adjunct Professor of Pharmacology and Toxicology (Michigan State University) and previously Adjunct Associate Professor of Toxicology (University of North Carolina). Dr. Bus received a Ph.D. in Pharmacology (Michigan State University) and a B.S. in Medicinal Chemistry (University of Michigan). He has served on a variety of external professional and science advisory groups including: President of both the Society of Toxicology and the American Board of Toxicology; US Environmental Protection Agency Office of Research and Development Board of Scientific Counselors (BOSC); National Academy of Sciences Committee on Emerging Issues and Data on Environmental Contaminants; National Toxicology Program Board of Scientific Counselors (Bioassay Review Subcommittee); ACGIH Chemical Substances TLV Committee; Director of the International Union of Toxicology; Board of Trustees and Emerging Issues Committee of the

International Life Sciences Institute, Health and Environmental Sciences Institute (ILSI-HESI); Board of Directors and Co-Chair of the Science Program Committee of the CIIT Centers for Health Research; and Co-Chair of the American Chemistry Council Long-Range Research Initiative. His research interests have focused on mechanisms of chemical toxicity for pesticides and industrial chemicals, and applications of mechanistic information to improving human health risk evaluations. Dr. Bus is currently a member of the EPA Science Advisory Board (SAB).

David Dzombak,PhD

Dr. David A. Dzombak is professor of civil and environmental engineering at Carnegie Mellon University, a registered professional engineer in Pennsylvania, and a diplomate of the American Academy of Environmental Engineers. He holds a Ph.D. in civil-environmental engineering from the Massachusetts Institute of Technology. The emphasis of his research is on water and soil quality engineering, especially the fate and transport of chemicals in subsurface systems and sediments, wastewater treatment, in situ and ex situ soil/sediment treatment, and hazardous waste site remediation. He has performed a number of research projects on polychlorinated biphenyl (PCB) fate, transport, and treatment in water, soil, and sediment. Dr. Dzombak has served on the National Research Council Committee on Bioavailability of Contaminants in Soils and Sediments and on various research review panels for the Department of Defense, Environmental Protection Agency, National Institute of Environmental Health Sciences, and the National Science Foundation. He has also served on the Board of Directors and as an officer of the Association of Environmental Engineering and Science Professors; as chair of committees for the American Academy of Environmental Engineers, American Society of Civil Engineers, and Water Environment Federation; and on advisory committees for various community and local government organizations and for the Commonwealth of Pennsylvania. Dr. Dzombak was elected a fellow of the American Society of Civil Engineers in 2002. Other recent awards and honors include the Professional Research Award from the Water Environment Association of Pennsylvania in 2002, an Aldo Leopold Leadership Program Fellowship by the Ecological Society of America and the David and Lucile Packard Foundation in 2000, and the Jack Edward McKee Medal from the Water Environment Foundation in 2000. Dr. Dzombak is currently a member of the SAB Environmental Engineering Committee.

T. Taylor Eighmy, PhD

Taylor Eighmy is a Research Professor of Civil Engineering at the University of New Hampshire (UNH). Dr. Eighmy directed the Environmental Research Group (ERG), an applied environmental engineering and environmental science research center at UNH from 1987 through 2004. He is also the past director the Recycled Materials Resource Center (RMRC) from 1998 to 2004, a partnership with the Federal Highway Administration, to promote the wise use of recycled materials in highway construction. He currently is a faculty fellow for strategic program development in the Office of the Vice President for Research and Public Service at UNH. He received his B.S. in Biology from Tufts University in 1980, his M.S. in Civil Engineering from UNH in 1983, and his Ph.D. in Engineering (Civil) from UNH in 1986. His current research interests are in chemical speciation, environmental chemistry of leaching behavior, spectroscopic surface analysis, reactive barriers, and environmental microbiology. Dr. Eighmy's recent research focus has been on contaminant leaching and leaching modeling, use of surface spectroscopies to characterize surfaces where leaching first occurs,

contaminant fate and transport in beneficial use scenarios, phosphate stabilization of wastes, use of phosphate-based reactive barriers (both permeable and impermeable) for waste containment in subsurface and marine environments, and geochemical and microbial characterization of microfracture surfaces in TCE-contaminated bedrock. He served on the Advisory Board of the New Hampshire Estuaries Project from 1998 through 2004, a partnership between the New Hampshire Office of State Planning and the U.S. EPA's National Estuaries Program. He also served on the National Steering Committee of the U.S. DOE's Combustion Byproduct Recycling Consortium from 2000 through 2004. Formerly, he was appointed to and served on the New Hampshire Waste Management Council (1988-1995); the Council has solid and hazardous waste adjudicatory and rule making authority. He was a member of the International Ash Working Group (IAWG), sponsored by the International Energy Agency, and coauthored the treatise "Municipal Solid Waste Incinerator Residues" with his IAWG colleagues. He received the UNH Excellence in Research Award in 1997. His recent research was supported by FHWA, NOAA, NSF, U.S. EPA, the European Union, and the private sector. Dr. Eighmy is currently a member of the SAB Environmental Engineering Committee.

Dale Hattis, PhD

Dr. Dale Hattis is Research Professor with the Center for Technology Environment and Development (CENTED) of the George Perkins Marsh Institute at Clark University. For the past thirty years he has been engaged in the development and application of methodology to assess the health, ecological and economic impacts of regulatory actions. His work has focused on the development of methodology to incorporate inter-individual variability data and quantitative mechanistic information into risk assessments for both cancer and non-cancer endpoints. An important focus in recent years has been on age-related differences in pharmacokinetic processes and susceptibility for carcinogenesis. Specific quantitative risk assessment studies have included hearing disability in relation to noise exposure, renal effects of cadmium, reproductive effects of ethoxyethanol, neurological effects of methyl mercury and acrylamide, chronic lung function impairment from coal dust, four pharmacokinetic-based risk assessments for carcinogens (for perchloroethylene ethylene oxide butadiene and diesel particulates), an analysis of uncertainties in pharmacokinetic modeling for perchloroethylene and an analysis of differences among species in processes related to carcinogenesis. He has been reappointed as a member of the Environmental Health Committee of the EPA Science Advisory Board and for several years he has served as a member of the Food Quality Protection Act Science Review Board. In the recent past he has served as a member of the National Research Council Committee on Estimating the Health-Risk-Reduction Benefits of Proposed Air Pollution Regulations. Current major sources of research support include the Department of Energy and the U.S. Environmental Protection Agency. He has been a councilor and is a Fellow of the Society for Risk Analysis and serves on the editorial board of its journal Risk Analysis. He holds a Ph.D. in Genetics from Stanford University and a B.A. in biochemistry from the University of California at Berkeley.

Randy Maddalena, PhD

Dr. Randy Maddalena is a Scientist in the Exposure and Risk Analysis Group within the Environmental Energy Technologies Division at Lawrence Berkeley National Laboratory. He

received his BS in Environmental Toxicology (1992) and his Ph.D. in Agricultural and Environmental Chemistry (1998) from the University of California, Davis. The primary focus of his research is development, evaluation and application of models that predict chemical fate in multiple environmental media (air, water, soil, vegetation, sediment) and chemical exposures through multiple pathways (drinking water, food, feed, indoor air) for both human and ecological receptors. He also develops tools and methods for performing probabilistic risk assessment and sensitivity analysis applied to complex regulatory models. His most recent work combines the use of models and experimental data to investigate how vegetation influences the environmental fate and transport of semivolatile organic pollutants and how the uptake of these pollutants into ecological or agricultural food chains might contribute to dietary exposures. Dr. Maddalena is a Co-chair of the Society of Environmental Toxicology and Chemistry (SETAC) Advisory Group on Fate and Exposure Modeling where he serves as an Editor of the Fate and Exposure Modeling column in the SETAC Globe. He is also a member of the International Society of Exposure Analysis and a member of the SAB's Integrated Human Exposure Committee. He receives funding from the EPA's National Exposure Research Lab for research on fate and exposure models; the DOE's Fossil Energy Program for experimental work on plant uptake of petroleum related hydrocarbons; and from the EPA's Office of Air Quality Planning and Standards for his work on the TRIM.FaTE model. Dr. Maddalena also recently completed a project funded by the EPA's Office of Emergency and Remedial Response where he developed an approach for constructing inputs to probabilistic risk assessment models.

Michael C. Newman, PhD

Dr. Newman received degrees in zoology from the University of Connecticut (B.A., M.S.) and environmental sciences from Rutgers University (M.S., Ph.D.). After his postdoctoral studies, he was a research ecologist at the University of Georgia's Savannah River Ecology laboratory. He now holds a Professor of Marine Science position at the College of William and Mary's School of Marine Science after ending a three-year term as Dean of Graduate Studies of the School of Marine Science. His research emphasizes quantitative methods in ecotoxicology with topics of interest ranging from chemical measurement statistics to QSAR-like models for predicting metal ion effects to contaminant effects on population genetics to methods of predicting community level effects. He has authored approximately 100 publications on these topics including four books, Quantitative Methods in Aquatic Ecotoxicology, Fundamentals of Ecotoxicology, Population Ecotoxicology and Community Ecotoxicology. He also edited several books, Metal Ecotoxicology, Hierarchical Ecotoxicology, Risk Assessment: Logic and Measurement, Coastal and Estuarine Risk Assessment, and Risk Assessment with Time-to-Event Models. Dr. Newman is active in advisory service. He served on OECD, EPA, DOE, NAS, and state environmental regulatory and risk assessment committees and panels. He was one of two U.S. members of an OECD team charged with assessing statistical methods for analyzing toxicity data. Work with DOE involved complex-wide consideration of data quality objectives for risk assessment activities, and various site-specific advisory services to the Savannah River and Hanford sites. He has been a member of numerous EPA teams including the FIFRA ECOFRAM working group, two FIFRA science advisory panels, the Chesapeake Bay Office science advisory board, a FQPA scientific review board, and a joint U.S. EPA-Israeli Water Agency working group. He has reviewed numerous risk assessment documents for EPA and was a consultant to the NAS (Everglades Ecosystem Assessment). He continues to work actively with various Virginia Department of Environmental Quality teams and panels. Dr. Newman is currently a member of the SAB Ecological Processes and Effects Committee.

Gary Sayler, PhD

Dr. Gary S. Sayler is a Distinguished Professor of Microbiology, and Ecology and Evolutionary Biology at the University of Tennessee. He received his Ph.D. (1974) in Bacteriology and Biochemistry from the University of Idaho where he conducted research of heterotrophic turnover of organic matter in freshwater environments. This was followed by postdoctoral training in Marine Microbiology and Biodegradation at the University of Maryland after which he joined the faculty of the University of Tennessee in 1975. He is the Founding Director (1986) of the Center for Environmental Biotechnology, a recently designated Research Center-of-Excellence, and is current Director of the State Center-of-Excellence, Waste Management Research and Education Institute. Over his career he has directed approximately $30,000,000 in environmental, biodegradation, and molecular ecological research for numerous federal, state, and industrial sponsors. He has directed the graduate programs of approximately 40 Ph.D. and 15 Master's students in Microbiology, Ecology, and Evolutionary Biology. He has edited five books and contributed 268 publications in broad areas of molecular biology, environmental microbiology, biodegradation, and biotechnology, and holds nine patents on environmental gene probing, genetic engineering for bioremediation and bioelectronic sensor technology. His work has included molecular and environmental aspects of PCB, PAH, BTEX and TCE metabolism. He has given invited presentations at over 300 national and international meetings in the broad area of biotechnology and the environment. He has served on numerous panels and chaired advisory review committees of ORNL, LBNL, ANL, NSF, NIH, DOE, EPA, and four different NAS/NRC subcommittees and panels. During his career, he has been awarded a NIEHS' Research Career Development Award (1980-1985); he received the American Society for Microbiology, Procter and Gamble Award for Environmental Microbiology (1994), the Distinguished Alumni Award of the University of Idaho (1995) and the DOW Chemical Foundation SPHERE Award (1998-2000). He was elected to the American Academy of Microbiology in 1991. He has served in an editorial capacity for six journals and is currently an associate editor for *Environmental Science and Technology*. Professional memberships include AAAS, ASM, ACS, SIM, SETAC and SPIEE. Dr. Sayler served as a member of the Water Environment Research Foundation, Research Council from 1999 to 2001. Recent research support is from NIH, NASA, DARPA, NSF, USDA, US Army, DOE in areas integrating Bioluminescent Bioreporter Integrated Circuit technology, nucleic acid environmental diagnostics and expression, and biosensing and monitoring in complex system analysis. Areas of research expertise include microbiology, genetic engineering, molecular biology in biodegradation and bioremediation; PAH, PCB soils, sediments, and water; molecular ecology in biological waste treatment, PCR-gene probes, biosensors for bioavailable pollutants including endoctrine disruptors, nanotechnology, and carbon nanofibers in microbial biofilms. He has recently served (2003-2004) on a NAS/NRC review subcommittee on explosive detection and was a member of a DOE Committee of Visitors (2004) examining OBER's grant solicitation and review process. He is currently a member of EPA's Science Advisory Board Drinking Water Committee and is a member of the Board of Scientific Counselors for EPA's Office of Research and Development.

Laura Steinberg, PhD

Dr. Laura Steinberg is Associate Professor in the Civil and Environmental Engineering Department

of Tulane University. She holds a B.S.E. in Civil and Urban Engineering from the University of Pennsylvania and an M.S and Ph.D. in Environmental Engineering from Duke University. She is currently on sabbatical leave from Tulane and is a Visiting Associate Professor at the School of the Environment, Duke University. Her research focuses on water quality modeling and natural hazards management. She has recently completed modeling studies of arsenic concentrations in water distribution systems and transport processes in contaminated sediments, and is working on spatial statistical modeling of heavy metals and PCBs in contaminated sediments. During the last several years, she has spent visited Turkey a number of times, investigating the impacts of the devastating earthquake of 1999 on industrial infrastructure and the environment, and evaluating the effectiveness of chemical risk management procedures. Dr. Steinberg is the chair of the American Society of Civil Engineers' National Energy and Environmental Policy Committee, and a past member of the ASCE's National Water Policy Committee. She serves on the Water Environment Federation's Disinfection Committee, and is a fellow of the Institute of Civil Infrastructure Systems and a former member of the Chapel Hill, NC Planning Board. She has consulted to the USEPA's Science Advisory Board on technology diffusion, and the Department of Energy on risk assessment. Prior to her work in academia, Dr. Steinberg was Environmental Engineering Department Head at the planning and engineering firm of Louis Berger International, and Business Development Manager at Geraghty and Miller, an environmental engineering firm. She also had the distinct honor of serving as a US Congressional Page while attending high school. Dr. Steinberg is currently a member of the SAB Drinking Water Committee.

Thomas L. Theis, PhD

Professor Thomas L. Theis is the director of the Institute for Environmental Science and Policy, a cross-disciplinary unit dedicated to promoting collaborative research on the environment, at the University of Illinois at Chicago. His areas of expertise include the mathematical modeling and systems analysis of environmental processes, the environmental chemistry of trace organic and inorganic substances, interfacial reactions, subsurface contaminant transport, hazardous waste management, industrial pollution prevention, and industrial ecology. He has been principal or co-principal investigator on more than fifty funded research projects totaling in excess of $10 million and has authored or co-authored over one hundred papers in peer-reviewed research journals, books, and reports. He is a former editor of the Journal of Environmental Engineering. From 1980 to 1985 he was the co-director of the Industrial Waste Elimination Research Center (a collaboration of the Illinois Institute of Technology and the University of Notre Dame), one of the first centers of excellence established by the EPA. In 1989 he was an invited participant on the United Nations Scientific Committee on Problems in the Environment for its workshop on groundwater contamination. In 1998 he was invited by the World Bank to assist in the development of the first environmental engineering program in Argentina. He is the founding principal investigator of the Environmental Manufacturing Management Program, one of the Integrative Graduate. Dr. Theis is currently a member of the EPA Science Advisory Board (SAB).

Timothy Thompson, MS

Mr. Timothy Thompson is a senior environmental scientist with Science, Engineering and the Environment, and is a nationally recognized leader in the field of characterization, risk assessment,

and management of contaminated sediments. He received his B.Sc. in Agricultural Sciences from the University of Arizona, his M.Sc. in Ocean Sciences from the University of British Columbia, and was a Monbusho Fellow, at the University of Nagasaki and Tokyo Fisheries University, Japan. In his 18 years of experience, Mr. Thompson has served as program manager and principal scientist for several large contaminated sediment programs under CERCLA and RCRA, and has particular expertise in sediment capping design and implementation. His current work in sediments also includes habitat evaluations and integration of field data with spatial modeling tools, spatial characterization and statistical analysis of bedded sediment data, bedded sediment characterization, water quality monitoring, and ecological risk assessment. He is a member of EPA's Science Advisory Board Environmental Processes and Effects Committee, and sits on request with the Environmental Engineering Committee. He is a peer reviewer for the Hudson River CERCLA Ecological Risk Assessment and for the Engineering Performance Standards. He also recently completed peer review for the Housatonic River Ecological Risk Assessment. His recent contract experience includes both industry and federal/state agencies, ranging from large multi-national oil firms to the U.S. Navy and the Corps of Engineers. Mr. Thompson has numerous publications on ecological risk assessment, contaminated sediment management, and sediment capping techniques. Mr. Thompson is currently a member of the SAB Ecological Processes and Effects Committee.

Lauren Zeise, PhD

Dr. Lauren Zeise is Chief of Reproductive and Cancer Hazard Assessment within the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment. In that position since 1991, she has overseen a variety of the state's cancer, reproductive and ecological risk assessment activities. Current work addresses cancer and reproductive risk methodologies and characterizations, development of ecological risk guidance, establishment of baseline risks from gasoline use in California and guidance for evaluating risks to the fetus, children and adolescents from environmental exposures. Her group also conducts scientific evaluations mandated by California's Proposition 65. Her research has focused on cancer risk assessment methodology and applications. Dr. Zeise currently serves on the EPA Science Advisory Board (SAB), and has served previously as a member of the SAB Environmental Health Committee, Research Strategies Advisory Committee and Integrated Risk Project, and as consultant to the Clean Air Act Scientific Advisory Committee, Environmental Engineering Committee, FIFRA Science Advisory Panel, EPA Board of Scientific Counselors, and on various Ad-hoc advisory committees of the Agency. Other service includes membership on various committees of the National Institute of Medicine (IOM), National Research Council (NRC), Consumer Product Safety Commission, National Toxicology Program, Office of Technology Assessment. She currently serves on the IOM Board of Health Promotion and Disease Prevention and NRC Board on Environmental Sciences and Toxicology. She is a member, fellow and councilor of the Society of Risk Analysis and is on the editorial board for the Society's journal. The National Cancer Institute Smoking and Tobacco Smoke Monograph Health Effects of Environmental Tobacco Smoke was conceived and developed under her editorial direction. She is co-author and co-editor of the 1999 International Agency for Research on Cancer monograph Quantitative Estimation and Prediction of Cancer Risk. She received in 1977 her M.S. and in 1984 her Ph.D. from Harvard University, where she also conducted postdoctoral research on risk assessment methodology.