Invitation for Comment on Short List Candidates
Science Advisory Board (SAB)
Advisory Council on Clean Air Compliance Analysis (Council)
for Advice on Characterizing Uncertainties Associated with Risk and Benefit Assessment

March 26, 2008
(Updated April 1, 2008*)

The EPA Science Advisory Board (SAB) Staff Office has identified this short list of candidate experts to provide advice to EPA on characterizing uncertainties associated with risk and benefit assessment. The requests received to date on this topic include: 1) a request from the Office of Air and Radiation (OAR) for advice regarding "Characterizing Uncertainty in the Estimated Benefits of Reduced PM-Mortality using Expert Elicitation;" 2) a request for review of an Expert Elicitation White Paper prepared by the EPA Science Policy Council's Expert Elicitation Task Force; 3) a request for advice on an OAR draft paper on a "Hierarchy of Methods for Characterizing Uncertainty;" and 4) a request for advice on an OAR draft paper on "Influence Analysis of Uncertainty in Air Pollution Benefit Analyses."

The SAB Staff Office published a request for nominations of technical experts in a June 28, 2007 Federal Register Notice (72 FR 35463-35465). The Federal Register Notice sought nominations of individuals with expertise in uncertainty analysis or expert elicitation related to one or more of the following areas: statistics, mathematics, biostatistics, cognitive psychology, decision analysis, environmental economics, human health sciences, ecological science, epidemiology, policy analysis, risk assessment, and risk communication.

Below are the biosketches for the candidate experts under consideration to augment the Council and to form SAB panels on the topics listed above and in the future where advice is needed on characterizing uncertainties associated with risk and benefit assessment. The SAB Staff Office hereby invites comments from members of the public for relevant information, analysis or other documentation for the consideration in making the final decisions to augment the Council and to select experts for SAB *ad hoc* panels on characterizing uncertainties associated with risk and benefit assessment.

Information furnished by the public in response to this Web site posting will be combined with information provided by the nominees and information gathered independently by the SAB Staff Office. For the SAB Staff Office, a balanced subcommittee or review panel includes nominees with 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 experience to adequately address the charge. Specific criteria to be used in evaluating an individual Panel member include: (a)

*The name of Dr. Loveday Conquest was included on the March 26, 2008 list erroneously and this update removes her name. The update also includes updated information for Drs. Igor Linkoff and Katherine Walker.

scientific and/or technical expertise, knowledge, and experience; (b) availability and willingness to serve; (c) absence of financial conflicts of interest; (d) absence of an appearance of a lack of impartiality; and (e) skills working in committees, subcommittees and advisory panels; and, for the Panel as a whole, (f) diversity of, and balance among, scientific expertise, viewpoints, etc.

The SAB Staff Office Director makes the final decision concerning who will serve on the SAB Panels as well as to augment the Council's expertise. Please provide any comments no later than April 16, 2008 to Dr. Angela Nugent, Designated Federal Officer (DFO), at: nugent.angela@epa.gov.

SAB and Council Short List Candidates for Advice on Characterizing Uncertainties Associated with Risk and Benefit Assessment
Ascher,William Louis
Claremont McKenna College
Dr. William Ascher (Ph.D., Political Science, Yale University) is the Donald C. McKenna Professor of Government and Economics at Claremont McKenna College, where he also serves as Vice President and Dean of the Faculty. His research covers environmental and natural resource policymaking, evaluation and forecasting methodologies, and policymaking processes in developing countries. As the Director of the Duke University Center for International Development Research, he led workshops on the valuation of environmental services for the UN Food and Agriculture Organization and several national governments. He also undertook World Bank-funded research on the valuation of oil and mineral assets. His most recent books are Why Governments Waste Natural Resources (1999), The Caspian Sea: A Quest for Environmental Security (ed. with Natalia Mirovitskaya, 2000), and Guide to Sustainable Development and Environmental Policy (ed. with Natalia Mirovitskaya, 2001). He has also published two books on political-economic forecasting: Forecasting: An Appraisal for Policymakers and Planners (1978), and Strategic Planning and Forecasting (with William Overholt, 1983). He served on the Advisory Group on the Future of Science, U.S. House of Representatives Subcommittee on Science, Committee on Science, Space and Technology.
Bailar,John
The National Academies
John C. Bailar III, MD, PhD (statistics) is Professor Emeritus at the University of Chicago and founding Chair of the Department of Health Studies there. For many years, his professional interests centered on the causes and prevention of disease. More recently he has focused on improving quality and performance in science generally. He was at the US National Cancer Institute 1956-1980, Harvard University 1980-1988, and McGill University 1988-1995 before he went to Chicago. At present he is Scholar in Residence at the National Academies. He was a MacArthur Fellow 1990-1995. He has published widely in the statistics and epidemiology literature, including, recently, the health effects of air pollution. His areas of expertise include statistics, epidemiology and risk assessment. He has chaired over 20 National Academy committees and served on numerous others. He has also served as monitor of more than 20 Academy reports.
Borsuk,Mark

Dartmouth College
Dr. Mark Borsuk received a B.S.E. in Civil Engineering and Operations Research from Princeton University, an M.S. in Statistics and Decision Sciences from Duke University, and a Ph.D. in Aquatic and Atmospheric Sciences from Duke University. Mark did his post-doctoral training in the Department of Systems Analysis, Integrated Assessment, and Modelling (SIAM) at the Swiss Federal Institute for Aquatic Science and Technology (EAWAG), where he advanced to head of the Decision Analysis and Integrated Assessment group. He is currently an Assistant Professor in the Thayer School of Engineering at Dartmouth College, Hanover, New Hampshire. Dr. Borsuk's research broadly concerns the use of scientific information in complex decision processes. More specifically, he develops methods and models that integrate knowledge and data across disciplines to generate probabilistic predictions for supporting environmental and human health policy and management. He uses multiattribute utility theory to relate these predictions to the preferences and risk attitudes of decision-makers, organizations, and the public. Mark serves as an Associate Editor for the journals Environmental Modelling & Software and Operations Research. He has received research fundeing from EPA and the National Institutes of Health..
Bruine de Bruin,Wändi
Carnegie Mellon University
Dr. Wändi Bruine de Bruin is a member of the research faculty in Carnegie Mellon University's Department of Social and Decision Sciences. She received her PhD. and M.Sc. in Behavioral Decision Theory and Psychology from Carnegie Mellon University, and her M.Sc. in Cognitive Psychology from the Free University Amsterdam. She received additional postdoctoral training in consumer behavior at the Eindhoven University of Technology. Her research focuses on risk perception and communication, individual differences in decision-making competence, as well as survey and intervention design. She has applied the mental models methodology to conduct expert elicitations about various health and environmental risks, and to study lay decisions about those risks – including sexually transmitted infections, pandemic influenza, xenotransplantation, and carbon dioxide and sequestration. She has used the results of this research to develop interventions aiming to help lay people to make more informed decisions about specific risks. In an NIH-sponsored project, she created an interactive DVD intervention targeting female adolescents' sexual decisions. Compared to participants in a control group, viewers of the DVD were less likely to have contracted a sexually transmitted infection six months later. Dr. Bruine de Bruin is currently developing an interactive intervention to help lay people to make more informed decisions about energy generation options that reduce carbon dioxide emissions. Her work has been published in peer-reviewed journals targeting a variety of disciplines, including environmental science, public health, psychology, and behavioral decision making. She has participated in advisory panels and workshops as an expert in risk perception and communication, including recent ones on pandemic influenza funded by the Department of Health and Human Services and RAND Corporation, on adolescent decision making about over-the-counter medication funded by the National Institute of Health and the Food and Drug Administration, and on assessing bio-availability as a pollutant exposure sponsored

by, among others, the University of North Carolina and the U.S. Environmental Protection Agency.

Cohen,Aaron

Health Effects Institute

Aaron J Cohen is Principal Scientist at the Health Effects Institute (HEI) in Charlestown, MA, where he has been employed since 1990. At HEI he manages an international program of epidemiologic research on the health effects of air pollution, and is involved in scientific program development. Dr. Cohen has served since 1999 as a Temporary Advisor to the World Health Organization, and co-chaired the Working Group on Urban Outdoor Air Pollution that produced estimates of the global burden of disease due to outdoor air pollution for the WHO's World Health Report 2002. Dr. Cohen received his D.Sc. in Epidemiology (1991), and Masters in Public Health (1985) from the Boston University School of Public Health. He also is a Registered Respiratory Therapist (AS and BS, Northeastern University), and worked as a therapist in newborn intensive care, and subsequently as Research Associate in Perinatal Epidemiology in the Joint Program in Neonatology at Brigham and Women's Hospital in Boston, where he conducted epidemiologic and clinical research on neonatal respiratory disease, and the evaluation of related medical technologies. Since 1994 Dr. Cohen has been an Adjunct Assistant Professor of Environmental Health at Boston University School of Public Health, where he lectures on environmental epidemiology.

Cooke,Roger

Resources for the Future

Dr. Roger Cooke's current position is Chauncey Starr Senior Fellow for Risk Analysis at Resources for the Future (70%) and Professor of Mathematics at Delft University of Technology (30%). He graduated magna cum laude from Yale college in 1968, where he got his PhD in 1974. Cooke's work is in mathematical methods of risk analysis, uncertainty analysis and expert judgment. Cooke has published four books, (Geloof in Wetenschap,1983, Experts in Uncertainty, 1991, and Probabilistic Risk Analysis, Foundations and Methods 2001 (with T. Bedford), Uncertainty Analysis with High Dimensional Dependence Modeling 2006 (with d. Kurowicka)), edited two books, published 60 articles in international refereed journals, 76 papers in refereed international conference proceedings. The book Probabilistic Risk Analysis is being translated into Japanese. Cooke has (co-)authored 21 peer reviewed contract research reports for the Dutch government, the Japanese government, the European Union, the US Nuclear Regulatory Authority, the Swedish Nuclear Inspectorate, the German VGB centralized Databank, the Harvard center for Risk Analysis, as well as many companies and laboratories. He is a member of the European Safety and Reliability Association, and has served on the executive board, he serves in the editorial board of Reliability Engineering and System Safety, and on many technical committees of Mathematical Methods for Reliability, Probabilistic Safety and Accident Management, he served as chairman of the Technical Committee on Uncertainty Modeling of the European Safety and

Reliability Association, and editor of the Newsletter.

Cox, Jr.,Louis Anthony (Tony)

Cox Associates

Dr. Louis Anthony (Tony) Cox is President of Cox Associates, a Denver-based applied research company specializing in applied health risk analysis, statistical and probabilistic risk assessment and data mining, and operations research modeling. From 1987 to 1996, Dr. Cox led business and engineering modeling for U S WEST Advanced Technologies in Boulder, Colorado, where he directed the development and deployment of new operations research, artificial intelligence, signal processing, and statistics applications.Dr. Cox holds a Ph.D. in Risk Analysis (1986) and an S.M. in Operations Research (1985), both from Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science. He has an A.B. from Harvard University (1978) and is a graduate of the Stanford Executive Program (1993). He is Honorary Full Professor of Mathematics at the University of Colorado at Denver, where he has lectured on biomathematics, health risk modeling, computational statistics and machine learning. Dr. Cox is on the Faculties of the Center for Computational Mathematics and the Center for Computational Biology at the University of Colorado at Denver and is Clinical Professor of Preventive Medicine and Biometrics at the University of Colorado Health Sciences Center, where he teaches and guides graduate research on uncertainty analysis and causation in epidemiological studies.Dr. Cox is on the Editorial Board of Risk Analysis: An International Journal, and is a co-founder and Area Editor of the Journal of Heuristics . He is a member of INFORMS, the American Statistical Association, and the Society for Risk Analysis (SRA). Dr. Cox served as a founder and Secretary of the New England Chapter of SRA in 1985-1986 and was a Member of the International Life Sciences Institute's (ILSI's) Risk Science Institute Cancer Dose-Response Working Group in 1991-1992. He was made a Fellow of the SRA in 1993, largely for contributions to causal and biomathematical modeling for chemical carcinogens. He won the Society for Risk Analysis (SRA) Best Paper Awards in both 2002 and 2003 for work applying discrete-event simulation and Bayesian Monte Carlo uncertainty analysis to evaluate public health risks and benefits of animal antibiotics. In 2006, Dr. Cox was made an Edelman Laureate of INFORMS, recognizing outstanding achievement in the practice of operations research and the management sciences. In 2007, he won the Society of Toxicology’s Award “for the Outstanding Published Paper in 2006 Demonstrating an Application of Risk Assessment”. In 2007, he also won the Outstanding Practioner Award from the Society for Risk Analysis.Dr. Cox has taught many graduate and professional courses in risk analysis, decision analysis, forecasting, operations research and computational and Bayesian statistics and has authored and co-authored over 100 journal articles and book chapters on these fields. His most recent books are Quantitative Health Risk Analysis Methods: Modeling the Human Health Impacts of Antibiotics Used in Food Animals (Springer, 2006) and Risk Analysis: Foundations, Models and Methods (Kluwer, 2001). He has over a dozen U.S. patents on applications of artificial intelligence, signal processing, statistics and operations research methods in telecommunications. More recently, he has developed biomathematical and simulation models of antimicrobial drug

resistance to provide a better basis for risk management decision-making in food safety. His current research interests include computational statistical methods for causal inference in risk analysis and data-mining of customer, construction defect, and epidemiological data bases. He has provided consulting services for a wide variety of clients in the telecommunications, agriculture, pharmaceutical, chemical, insurance, and legal sectors as well as to state governments and to community groups.

Cropper,Maureen L.

University of Maryland

Dr. Maureen L. Cropper is professor of economics at the University of Maryland, a lead economist at the World Bank, and a university fellow at Resources for the Future. She received a B.A. in economics from Bryn Mawr College in 1969 and a Ph.D. in economics from Cornell University in 1973. Her research has focused on valuing environmental amenities, especially environmental health effects; on the discounting of future health benefits, and on the tradeoffs implicit in environmental regulations. Her recent research focuses on factors affecting deforestation in developing countries and on the externalities associated with motorization. Dr. Cropper is past president of the Association of Environmental and Resource Economists and a former chair of the Advisory Council for Clean Air Act Compliance Analysis. She has served on the advisory boards of Resources for the Future, the Harvard Center for Risk Analysis, the Donald Bren School of the Environment, and the AEI-Brookings Center on Regulation.

Evans,John

Harvard University

Dr. Evans is Senior Lecturer in Environmental Science at Harvard School of Public Health, where he serves as co-director of the Program in Environmental Science and Risk Management. He holds a B.S.E. (Industrial Engineering) and a M.S. (Water Resources Management) from the University of Michigan and earned his S.M. and Sc.D. in Environmental Health Sciences at Harvard. Dr. Evans has worked in the field of risk analysis for over twenty years and has emphasized the importance of characterizing uncertainty in estimates of health risks in his research. He has experience in uncertainty analysis and has conducted several studies using formally elicited expert judgment to describe uncertainty in environmental health risks. His recent work has examined the role of decision and value of information analysis in setting priorities for environmental research. Dr. Evans has been a member of the Society for Risk Analysis since it was founded; has served as the Chair of the New England Chapter, and as both a member of the Editorial Board of the SRA's journal Risk Analysis and as an area editor of Risk Analysis. He was a member of the NAS Committee on Estimating the Health Benefits of Air Pollution Regulations and also served on the EPA Science Advisory Board (Drinking Water Committee). Dr. Evans' current research funding comes largely (over 90%) from the Government of Kuwait. In the past his work has been funded by a number of sources, including the US EPA Office for Research and Development, the Mexican Government (through subcontracts with MIT), several corporations and individuals (through

contracts with and/or gifts to the Harvard Center for Risk Analysis), Health Canada, and the US Nuclear Regulatory Commission.

Ferson,Scott

Applied Biomathematics

Dr. Scott Ferson is a senior scientist at Applied Biomathematics (www.ramas.com). His research focuses on developing reliable mathematical and statistical tools for risk assessments and on methods for uncertainty analysis when empirical information is very sparse. He holds a Ph.D. in Ecology and Evolution from the State University of New York at Stony Brook and an A.B. in biology from Wabash College. He is author of RAMAS Risk Calc Software 4.0: Risk Assessment with Uncertain Numbers (Lewis Publishers) and has over 100 other scholarly publications, including four books and several software packages, in environmental risk analysis and uncertainty propagation. His research has addressed quality assurance for Monte Carlo assessments, exact methods for detecting clusters in small data sets, backcalculation methods for use in remediation planning, and distribution-free methods of risk analysis appropriate for use in information-poor situations. Ferson is an adjunct professor at School of Marine and Atmospheric Sciences at Stony Brook University, and serves on the editorial board of Human and Ecological Risk Assessment. He is a member of the Society of Risk Analysis and the Society for Environmental Toxicology and Chemistry (SETAC). Dr. Ferson's research has been supported by National Aeronautics and Space Administration (NASA), Sandia National Laboratories, National Institutes of Health (NIH) including both the National Cancer Institute and the National Institute for Environmental Health Sciences, National Science Foundation (NSF), Army Corps of Engineers, Electric Power Research Institute (EPRI), and the European Commission's EUFRAM Concerted Action. He has also served as a consultant for EPA on FIFRA Scientific Advisory Panels, FPQA Science Review Board, and for the European Commission's EUPRA project, Canadian Wildlife Service, Environment Canada, and the Triborough Bridge and Tunnel Authority.

Fischbeck,Paul

Carnegie Mellon University

Dr. Paul S. Fischbeck is a Professor in the Department of Engineering and Public Policy and the Department of Social and Decision Sciences at Carnegie Mellon University, Pittsburgh, Pennsylvania. His general research involves normative and descriptive risk analysis. Past and current research includes the development of a risk index to prioritize inspections of offshore oil production platforms, an engineering and economic policy analysis of air pollution from international shipping, a large-scale probabilistic risk assessment of the space shuttle's tile protection system, and a series of expert elicitations involving a variety of topics including environmental policy selection, travel risks, and food safety.As Director of the Carnegie Mellon's Center for the Study and Improvement of Regulation (CSIR), Fischbeck is coordinating a diverse research group exploring all aspects of regulation from historical case studies to transmission-line siting to emissions-trading programs. Fischbeck's collaborators include researchers from all the engineering disciplines and the social

sciences. He has served on five National Academy panels investigating a variety of risk assessments (school buses to offshore oil platforms to double hull oil tankers) and has chaired an NSF panel on Urban Interactions. He is also the co-founder of the Brownfield center at Carnegie Mellon, an interdisciplinary research group investigating ways to improve industrial site reuse. A 2002 book, Improving Regulation (RFF Press, co-edited with Scott Farrow), presents a dozen case studies of how to integrate insights from multiple disciplines to improve the regulatory process. Dr. Fischbeck has received funding from federal sources NSF (through both major center grants and individual awards), the EPA, and DOE. He has received funds from Heinz foundation, the Doris Duke Foundation, and the AAA Foundation for Traffic Safety. Over five years ago, his research center (CSIR) received unencumbered money from ExxonMobil for general research. Currently, his research is being supported by the NSF and Doris Duke Foundation, and he has grants pending with the CDC, NIH, and NSF.

Frey,H. Christopher

North Carolina State University

Dr. H. Christopher Frey is a professor of civil, construction, and environmental engineering at North Carolina State University in Raleigh, NC. He heads a multidisciplinary research program in the broad area of environmental systems analysis, including development and demonstration of quantitative methods for dealing with variability and uncertainty and with applications to risk assessment, technology evaluation, air pollutant emissions, and food safety. In the area of risk assessment, Dr. Frey's experience includes risk assessment methods for both human health and food safety, and development, application, review, and evaluation of risk assessment models and strategies. Dr. Frey currently serves on the EPA's Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel. He also served on an EPA Science Advisory Board Subcommittee that reviewed EPA's Report to Congress on Residual Risk Assessment. He continues to serve in various international advisory capacities, including expert meetings of the Intergovernmental Panel on Climate Change on the topic of uncertainty in emission inventories, a recent panel of the World Health Organization (WHO) and Food and Agricultural Organization (FAO) to develop guidance on risk characterization for microbial risk assessment, a current WHO panel on uncertainty in exposure assessment, a NARSTO effort between Mexico, Canada, and the U.S. to assess and provide recommendations regarding the practice of developing emission inventories, and a National Research Council panel that is assessing the effect of changes in New Source Review air pollution rules.Dr. Frey is co-author, with A.C. Cullen, of Probabilistic Techniques in Exposure Assessment: A Handbook for Dealing with Variability and Uncertainty in Models and Inputs (Plenum Press, 1999). Dr. Frey has authored or co-authored 36 journal papers, 3 book chapters, 87 conference papers, and 47 technical reports. Dr. Frey is active in the Society for Risk Analysis (SRA), Air & Waste Management Association (AWMA), and American Society of Civil Engineers (ASCE). He is currently President-Elect of SRA. Dr. Frey was a 1992 AAAS/EPA Environmental Science and Engineering Fellow, and received the 1992 AAAS Barnard Scholarship. Dr. Frey received a 1997 NSF CAREER award, which is one of the highest awards bestowed by NSF upon faculty. Dr. Frey

received the 1999 Chauncey Starr Award of SRA for outstanding contributions to the field of risk analysis. Dr. Frey earned a B.S. in Mechanical Engineering in 1985 from the University of Virginia, a Master of Engineering in Mechanical Engineering in 1987 from Carnegie Mellon University, and a Ph.D. in Engineering and Public Policy in 1991 from CMU. Dr. Frey has received research funding from the National Science Foundation, US EPA, US Department of Energy, US Department of Transportation, National Oceanic and Atmospheric Adminstration, North Carolina Department of Transportation, and Texas Transportation Institute.

Fuentes,Montserrat

North Carolina State University

Dr. Montserrat Fuentes is an associate professor in the Statistics Department at North Carolina State University and a visiting faculty in the Center on Global Change at Duke University. She also holds an associate status in the Marine Earth Atmospheric Sciences Department at NCSU. Dr. Fuentes received her B.S. in Mathematics and also in Music from the University of Valladolid (Spain), and her Ph.D. in Statistics from the University of Chicago (1999). She spent 6 months as a postdoc in the National Center of Atmospheric Research (NCAR) before joining NC State in 1999. Throughout her professional career, Dr. Fuentes has been active in numerous professional societies, including being chair of the section on Statistics and the Environment (2003) for the Eastern North American Region (ENAR) of the International Biometric Society, chair of the General Methodology Section (2001, and 2004) of the American Statistical Association (ASA), program chair for the 2002 Southern Regional Council on Statistics (SRCOS) and ASA, serving in the scientific committee for The International Environmetrics Society (TIES) (2004) and in the program committee for the Institute of Mathematical Science-The International Society for Bayesian Analysis (IMS-ISBA) joint conference (2005). She was also chair of the scientific committee for the International Statistical Institute (ISI) Conference on Environmental Statistics and Health (July, 2003). She is a member-elect of the ISI, and also member of the Regional Advisory Board (RAB) for ENAR (2003-2006). Dr. Fuentes is an associate editor for the Journal Biometrics (2003-2006). She received the Abdel El-Shaarawi Young Research's Award in recognition of outstanding contributions to environmetric research (2003). Dr. Fuentes has developed new statistical methods that she applied to air pollution and weather prediction problems in collaboration with the air quality modelers and scientists at EPA and NCAR. This work has led to numerous publications in top statistical journals and books, as well as top journals in atmospheric sciences. Her current research focuses on the development of novel spatial-temporal statistical methodology to quantify uncertainties about the impacts of fine particles exposure on mortality and illness.

Gad,Shayne

Gad Consulting Services

Dr. Shayne C. Gad, B.S. (Whittier College, Chemistry and Biology, 1970) and Ph.D. in Pharmacology/Toxicology (Texas, 1977) DABT,

ATS, is the principal of Gad Consulting Services, a fourteen year old consulting firm with six employees and more than 300 clients (including 120 pharmaceutical companies in the US and 30 overseas). Prior to this, he served in director-level and above positions at Searle, Synergen and Becton Dickinson. He has published 32 books and more than 350 chapters, articles and abstracts in the fields of toxicology, statistics, pharmacology, drug development and safety assessment. He has more than 30 years of broad based experience in toxicology, drug and device development, statistics and risk assessment. He has specific expertise in neurotoxicology, in vitro methods, inhalation toxicology, immunotoxicology, and genotoxicology. A past president of the American College of Toxicology, the Roundtable of Toxicology Consultants and three of SOT's specialty section. He has direct involvement in the preparation of INDs (86 successfully to date), NDA, PLA, ANDA, 510(k), IDE, CTD, clinical data bases for phase 1 and 2 studies, and PMAs. He has consulted for FDA and NIH, and been an expert witness and trained reviewers for FDA.

Hammitt,James K.

Harvard University

Dr. James K. Hammitt is Professor of Economics and Decision Sciences and Director of the Harvard Center for Risk Analysis. He holds appointments in the Department of Health Policy and Management and the Department of Environmental Health and is co-director of the Program in Environmental Science and Risk Management at the Harvard School of Public Health. His research interests include the development and application of quantitative methods of decision and risk analysis to health and environmental policy. Professor Hammitt studies the management of long-term environmental issues with important scientific uncertainties such as global climate change and stratospheric-ozone depletion, the evaluation of ancillary benefits and countervailing risks associated with risk-control measures, and social preferences over health and environmental risks using revealed- and stated-preference methods. He holds degrees in Applied Mathematics (A.B., Sc.M.) and Public Policy (M.P.P., Ph.D.) from Harvard University. Professor Hammitt was Senior Mathematician at the RAND Corporation in Santa Monica and Pierre-de-Fermat visiting professor at the University of Toulouse.

Hassenzahl,David

University of Nevada, Las Vegas

Dr. David M. Hassenzahl Chairs the Department of Environmental Studies at the University of Nevada, Las Vegas, where he holds the rank of Associate Professor. He has a Bachelors Degree from the University of California at Berkeley, where he majored in Environmental Science and Paleontology. His earned his MA and PhD from Princeton University's Woodrow Wilson School of Public and International Affairs, where his dissertation explored the impact of uncertainty on decisions using cost-effectiveness analysis. His research focuses on incorporating scientific information and expertise into environmental and health risk decisions, with particular

emphasis on the management, interpretation and communication of uncertainty. Among his academic publications is the widely used risk analysis textbook Should We Risk It? Dr. Hassenzahl's relevant advisory and professional service include chairing the Education Committee for the Society for Risk Analysis; acting as Ombudsman for the New Jersey Comparative Risk Project; serving on the publications committee for the second World Congress on Risk Analysis; serving as risk assessment area editor for the Encyclopedia of Earth; advising Clark County Nevada and the State of Nevada on risk, vulnerability and homeland security issues; and representing UNLV on the Council of Environmental Deans and Directors. He has extensive experience working on risk and uncertainty issues from an interdisciplinary perspective: his collaborators have backgrounds in physics, astrophysics, rhetoric, medicine, chemistry, public policy, psychology, engineering, planning, botany, communications, public health, toxicology, economics, and geography. Prior to his academic career, he worked in the private sector as an environmental manager at a pulp and paper mill, and in the public sector as an inspector for the (San Francisco) Bay Area Air Quality Management District. His recent research funding sources include the National Science Foundation's Human and Social Dimensions program (completed and pending), the Southern Nevada Regional Transportation Commission (completed) and the Regional Transportation Commission of Southern Nevada (completed).

Hattis,Dale

Clark University

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 twenty-nine 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 interindividual 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 recently 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. He holds a Ph.D. in Genetics from Stanford University and a B.A. in biochemistry from the University of California at Berkeley.

Heeringa,Steven

University of Michigan

Dr. Steven G. Heeringa is the Director of the Division of Surveys and Technologies at the University of Michigan Institute for Social Research (ISR) where he oversees research design and operations for population-based studies in the social sciences, education, demography, public health and medicine. Dr. Heeringa has a Ph.D. in Biostatistics from the University of Michigan and is a specialist in statistical design and analysis for studies of human and animal populations. Steve Heeringa has over twenty-five years of statistical sampling experience directing the development of the ISR National Sample design as well as sample designs for ISR's major longitudinal and cross-sectional survey programs. During this period he has been actively involved in research and publication on statistical methods and procedures such as sample design methods and procedures, such as weighting, variance estimation and the imputation of missing data that are required in the analysis of sample survey data. He is an advisor to panels of the National Institutes of Health (NIH) and the World Health Organization (WHO). Since 2000, Steve has served as an ad hoc member of more than 10 EPA Scientific Review panels. He has been a teacher of survey sampling methods to U.S. and international students and has served as a sample design consultant to a wide variety of international research programs based in countries such as: Russia, the Ukraine, Uzbekistan, Kazakhstan, India, Nepal, China, Iran, Chile and Egypt.

Helsel,Dennis

Practical Stats

Dr. Dennis Helsel (PhD in Environmental Science and Engineering, Virginia Tech) is the owner and Principal Scientist of Practical Stats, a consulting firm for environmental statistics. He has 30 years experience in applying statistical methods to environmental sciences with the US Geological Survey, from which he is now retired. Dr. Helsel has taught training courses in environmental statistics since 1990, both within the US and internationally. He has authored articles in numerous journals, including Environmental Science and Technology, Water Resources Research, and Chemosphere. He has authored two textbooks, Nondetects And Data Analysis (Wiley, 2005), and Statistical Methods in Water Resources (USGS, 2002, available online), and has authored chapters in two handbooks (Handbook of Hydrology, McGraw-Hill 1993; Encyclopedia of Quantitative Risk Analysis and Assessment , Wiley, 2008). Dr. Helsel is a 2003 recipient of the Distinguished Achievement Award from the American Statistical Association's section on Statistics and the Environment, and received the Meritorious and Distinguished Service Awards from the U.S. Department of the Interior.

Henrion,Max

Lumina Decision Systems, Inc.

Dr. Max Henrion has 30 years experience as a researcher, educator, software designer, consultant, and entrepreneur, specializing in the design and effective use of methods and tools for decision and risk analysis. He is the Chief Executive Officer of Lumina Decision Systems, which provides consulting in decision and risk analysis to government and business clients. He was the lead designer of Lumina's flagship product, Analytica¸ software widely used for modeling and uncertainty analysis. At Ask Jeeves (now Ask.com), the Internet search company, he was Vice President for Decision Technology. He has led consulting teams providing decision analysis and decision models for government and industry clients in environment and energy, healthcare, telecommunications, aerospace, and consumer choice. He has given invited talks at conferences, universities, industry, and government agencies in four continents.He pioneered methods for the elicitation of expert opinions as probability distributions and software for analysis of uncertainties using influence diagrams. He has coauthored three books, including the widely used text, Uncertainty: A Guide to dealing with Uncertainty in Policy and Risk Analysis (Cambridge University Press, 1990). He has published over sixty peer-reviewed articles in risk and decision analysis, artificial intelligence, cognitive psychology, and public policy. He was the founding President of the Association for Uncertainty and Artificial Intelligence, and Consulting Professor at Stanford University in Medical Informatics. He is Adjunct Professor at Carnegie Mellon University, where he was previously Professor in the Departments of Engineering and Public Policy, and Social and Decision Science. He has supervised 11 PhD dissertations at Carnegie Mellon and Stanford. He has an MA in Natural Sciences (physics and statistics) from Cambridge University, Master of Design from the Royal College of Art, London, and a PhD from the Heinz School at Carnegie Mellon University. His current work is funded by Lumina Decision Systems, consulting contracts with theNational Renewable Energy Lab, EPRI, and various commercial clients.

Krupnick,Alan J.

Resources for the Future

Dr. Alan J. Krupnick is a Senior Fellow and Director of the Quality of the Environment Division at Resources for the Future. He is widely published in the areas of cost-benefit analysis and instrument design, with research on such topics as: the value on reduced morbidity and mortality, issues associated with revision of ozone and PM standards, optimal adders for environmental damage by public utilities, social costing of electricity, global warming and urban smog, alternative fuels, the external costs of nuclear power, measuring the effects of urban transportation policies on the environment, weighing environmental uncertainties, the benefits and cost of Superfund cleanups and many other related topics. He has served as Senior Economist in the Council of Economic Advisors (1993-94), consultant to US AID, World Bank, Health Canada, the European Commission, the Harvard Institute for International Development, the US Congressional Office of Technology Assessment, the University of Missouri, the State of Maryland, the National Commission on Water Quality and other organizations. He has provided expert testimony to the U.S. Congress on implementation and enforcement of the Clean Air Act, the Regulatory Reform Bill in Congress, reforming Superfund risk assessment, cost-effectiveness and cost-benefit analysis and

related topics. Dr. Krupnick has been a reviewer for over a dozen journals in the topics of valuation, cost-benefit analysis and related topics. He is currently serving on several Panels organized by the National Academy of Sciences' Transportation Research Board, and has served on many other expert committees, including one from the Royal Society of Canada on the socioeconomic analysis of possible Canada-wide ozone and fine particulate standards. He was also a co-chair of a major EPA-led stakeholder process on implementation of new ozone and fine particulate ambient air quality standards.Dr. Krupnick has his Ph.D and M.A. in Economics from the University of Maryland, and his B.S. in Finance from Pennsylvania State University.

Linkov,Igor

US Army Engineer Research and Development Center

Dr. Igor Linkov is a Research Scientist at the US Army Engineer Research and Development Center and Adjunct Professor of Engineering and Public Policy at Carnegie Mellon University. Dr. Linkov has a BS and MSc in Physics and Mathematics (Polytechnic Institute, Russia) and a Ph.D. in Environmental, Occupational and Radiation Health (University of Pittsburgh). He completed his postdoctoral training in Biostatistics and Toxicology and Risk Assessment at Harvard University. Dr. Linkov has managed ecological and human health risk assessments and risk management projects. Many of his projects have included application of the state-of-the-science modeling and software tools (e.g., probabilistic and Bayesian Monte-Carlo, spatially-explicit modeling) to highly complex sites (e.g., Hudson River, Dow Midland, Natick Soldier Systems Command, Elizabeth Mine, etc.) and projects (e.g., insuring emerging risks, risk-based prioritization of remedial projects, developing performance metrics for oil spill response). He was instrumental in developing an integrated risk assessment and multi-criteria decision analysis framework that is now being widely applied by the US Army Corps of Engineers, including restoration planning for coastal Louisiana and Mississippi affected by the hurricane Katrina where a multi-billion dollar budget is at stake. Dr. Linkov is currently involved in several projects that examine factors responsible for nanotoxicology and nanomaterials risks. These projects investigate fate and transport of nanoparticles in the environment, ecotoxicology, assessment of nano-enabled product life cycle and risks. Dr. Linkov has published widely on environmental policy, environmental modeling, and risk analysis, including ten books and over 100 peer-reviewed papers and book chapters. Dr. Linkov has organized more than dozen national and international conferences and continuing education workshops on risk assessment, decision analysis, nanotechnology, risk communication and modeling and participated in organizing many others. Dr. Linkov has served on many review and advisory panels for EPA and other US and international agencies, including SAB STAA Panel, risk assessment reviews for Superfund sites, EPA Peer Review Panels on Nanotechnology, EPA, DOD, NSF and EU proposal review panels. He is DOD representative at the Interagency Working Group on Nanotechnology Environmental and Health Implications (NEHI). He serves as a Scientific Advisor to the Toxic Use Reduction Institute, a position that requires nomination by the Governor of Massachusetts. He is the recipient of the prestigious Chauncey Starr Award for exceptional contribution to Risk Analysis.

Mogolesko,Fred
Entergy Corporation
Dr. Fred Mogolesko is currently a Senior Project Manager for the Entergy Corporation and a private environmental consultant. He has an earned PhD and MS from New York University in Oceanography and Meteorology, and an earned MS and BS from the Polytechnic Institute of Brooklyn in Aerospace Engineering and Applied Mechanics. Dr. Mogolesko has had responsibilities for circulation and dispersion modeling for the ocean and atmosphere with specific emphasis on sea breeze/land breeze scenarios, he has studied and published results associated with the probable maximum hurricane event, has evaluated emergency planning scenarios using the DOE's MACCS2 code,has responsibility for risk assessments, and has assessed various dispersion models developed by EPA and DOE for Emergency Planning needs. In addition, from the consulting side, he developed early guidance for wind energy projects sponsored by the Solar Energy Research Institute. Dr. Mogolesko is a Certified Consulting Meteorologists under the sponsorship of the American Meteorological Society. He was Chairman of a Nuclear Energy Institute Task Force charged with reviewing the state-of-the-art for atmospheric dispersion models. Dr. Mogolesko was a peer reviewer for EPA's Industrial Source Complex Dispersion Model and the Sampled Chronological Model. In addition, Dr. Mogolesko participated in DOE atmospheric dispersion modeling workshops. He was an Associate Editor for the Journal of Applied Meteorology and Chairman of the BWROG's Committee on Instrument Uncertainty.
Moore,Dwayne
Intrinsic
Dr. Dwayne Moore has a B.Sc. in Biology from the University of Western Ontario, and a M.Sc. and Ph.D. in wetland community ecology from the University of Ottawa. After graduating, he worked for six years at Environment Canada, the first two years developing environmental quality guidelines for industrial chemicals, and the last four years conducting ecological risk assessments for priority substances in Canada. He was with the Cadmus Group for nearly eight years (April 1996 to December 2003), first as a Senior Associate and then as a Principal. Dr. Moore recently joined Cantox Environmental as a Vice President and Senior Scientist.Dr. Moore has considerable expertise in ecological risk assessment, the development of environmental quality guidelines and criteria, community ecology, multivariate statistics, uncertainty analysis, and analysis of toxicity data. He is currently leading the ecological risk assessment for the PCBs-contaminated Housatonic River in Massachusetts on behalf of the U.S. EPA, and recently co-led the ecological risk assessment of the Calcasieu Estuary in Louisiana also on behalf of the U.S. EPA. Dr. Moore has conducted numerous reviews of site-specific assessments including those for the PCBs-contaminated Hudson River on behalf of the U.S. EPA, potential spills of Orimulsion and Fuel Oil #6 in Tampa Bay on behalf of the U.S. EPA, and the Darlington nuclear facility on behalf of Ontario Power Corporation. Dr. Moore has led projects to assess the ecological risks of a variety of chemicals including hexachlorobenzene, chloroform, chlorinated wastewater effluents, waste crankcase oils, mercury, PCBs, and hexachlorobutadiene. Dr. Moore has also been involved in the

Environment Canada probabilistic risk assessments of ammonia and chloramines. He led the effort to update and considerably expand Environment Canada's guidelines for the conduct of ecological risk assessments of priority substances under the Canadian Environmental Protection Act. Dr. Moore authored the chapter on probabilistic risk assessment in Ecological Risk Assessment and Prioritization Process for the Department of Energy (DOE). The chapter includes state-of-the-art statistical and modeling techniques for use in higher tier assessments including: first and second order Monte Carlo analysis, variance propagation, probability bounds analysis, interval analysis and cost-benefits analysis. To illustrate these and other techniques, Dr. Moore prepared a case study that estimated the effects of methylmercury and PCBs to mink and kingfishers at a CERCLA/RCRA site near Oak Ridge, Tennessee and compared these effects to the costs and benefits of several remediation alternatives. Dr. Moore has been involved in projects to prepare guidance, training, and case studies for probabilistic risk assessments for several agencies including the ACC, CEFIC, pesticide companies, and the U.S. EPA Office of Pesticide Products. He recently completed a detailed evaluation of a large spatially-explicit population model (PATCH) for the U.S. EPA Office of Research and Development, and led the development of ambient water quality criteria for mercury for the Water Environment Research Foundation. Dr. Moore co-chaired the Society of Environmental Toxicology and Chemistry (SETAC) Pellston conference on the use of uncertainty analysis in ecological risk assessment and co-edited the book that followed from the conference. He is currently serving on the SETAC Pellston steering committee for Probabilistic Risk Assessments of Pesticides, and has served on a past steering committee to develop an ecological risk assessment decision support system. Dr. Moore has participated in several other Pellston workshops (e.g., assessing multiple stressors, re-evaluation of environmental quality criteria), and has participated in EPA Science Advisory Panels and other EPA peer review workshops. Dr. Moore has been a member of the editorial board for Human and Ecological Risk Assessment journal since its inception and is a member of the editorial board for Environmental Toxicology and Chemistry.

Morgan,M. Granger

Carnegie Mellon University

Dr. M. Granger Morgan is University Professor and Head of the Department of Engineering and Public Policy at Carnegie Mellon University where he is also Lord Chair Professor in Engineering, and is a Professor in the Department of Electrical and Computer Engineering and in the H. John Heinz III School of Public Policy and Management. He holds a B.A. from Harvard College (1963) where he concentrated in physics, an M.S .in astronomy and space science from Cornell (1965), and a Ph.D. from the department of applied physics and information sciences at the University of California at San Diego (1969). Dr. Morgan's research addresses problems in science, technology, and public policy. Much of it has involved the development and demonstration of methods to characterize and treat uncertainty in quantitative policy analysis. He works on risk analysis, management and communication; on problems in the integrated assessment of global change; on energy systems, focused particularly on electric power; on problems in technology and domestic security; on improving health, safety, and environmental regulation; and on several other topics in technology and public policy.

North,D. Warner

NorthWorks Inc

Dr. D. Warner North is president and principal scientist of NorthWorks, Inc., a consulting firm in Belmont, California, and consulting professor in the Department of Management Science and Engineering at Stanford University. Over the past thirty years Dr. North has carried out applications of decision analysis, risk analysis, and cost-benefit analysis for electric utilities in the US and Mexico, for the petroleum and chemical industries, and for US government agencies with responsibility for energy and environmental protection. He has served as a member and consultant to the Science Advisory Board of the US Environmental Protection Agency since 1978, and as a Presidentially appointed member of the US Nuclear Waste Technical Review Board (1989-1994). Dr. North is a co-author of many reports dealing with environmental risk for the National Research Council of the National Academy of Sciences, including "Risk Assessment in the Federal Government: Managing the Process"(1983), "Improving Risk Communication" (1989), "Science and Judgment in Risk Assessment" (1994), and "Understanding Risk: Informing Decisions in a Democratic Society"(1996). He is currently a member of the National Research Council Panel on Public Participation in Environmental Assessment and Decision Making. Dr. North was a member of the Board on Radioactive Waste Management of the National Research Council from 1995 until 1999. He was the chair for the steering and advisory committees for the International Workshop on the Disposition of High-Level Radioactive Waste, held November 4-5, 1999, and leading to the National Research Council report, "Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges," published in June 2001. Dr. North is a past president (1991-92) of the international Society for Risk Analysis, a recipient of the Frank P. Ramsey Medal from the Decision Analysis Society in 1997 for lifetime contributions to the field of decision analysis, and the 1999 recipient of the Outstanding Risk Practitioner Award from the Society for Risk Analysis.Dr. North received his Ph.D. in operations research from Stanford University and his B.S. in physics from Yale University.

Sandquist,Gary

University of Utah

Dr. Gary M. Sandquist is currently a Professor of Mechanical Engineering and former Director of the Graduate Nuclear Engineering Program at the University of Utah. Previously he was a Distinguished Visiting Professor in Physics and Civil and Mechanical Engineering Departments at the U.S. Military Academy at West Point, where he supported and trained Army personnel in Functional Area 52 activities (Nuclear operations). He has a B.S. in Mechanical Engineering, M.S. in Engineering Science, Ph.D. in Mechanical and Nuclear Engineering, MBA, was a Post Doctoral Fellow at MIT, and served a Sabbatical at ben Gurion University in Beer Sheva, Israel. He is a Registered Professional Engineer in Utah and New York (Mechanical) and California (Nuclear), a Board Certified Health Physicist, a Diplomate in Environmental Engineering, a Certified Quality Auditor, and a retired U.S. Naval Reserve Commander with an Intelligence Designator. The Reactor Supervisor and U.S. Nuclear Regulatory Commission (NRC) Licensed Senior Reactor Operator for

a TRIGA research reactor, he served as a short mission expert in nuclear science and safeguards for the International Atomic Energy Agency (IAEA) and as Technical Training Director for the joint DOE, EPA, DRI Community Radiation Monitoring Program at the Nevada Test Site. Dr. Sandquist's principal scientific interests include risk assessment; radiation transport, analytical detection and measurement; assessment and decontamination of chemical and radioactive hazards; design and execution of characterization and final status surveys using Multi-Agency Site Survey and Investigation Manual (MARSSIM); and design and operation of heating, ventilation and air-conditioning (HVAC) systems. He is a Fellow of the American Society of Mechanical Engineering (ASME) and American Nuclear Society (QUANS). He has authored or co-authored 500 publications including 5 books and book chapters, 180 refereed papers, 325 technical reports, developed 17 major technical computer codes and participated in over 200 technical meetings, conferences, workshops and government hearings.

Small,Mitchell J.

Carnegie Mellon University

Dr. Mitchell Small is a Professor of Civil and Environmental Engineering, and Engineering & Public Policy, at Carnegie Mellon University. He joined Carnegie Mellon in 1982 following completion of his Ph.D. in Environmental & Water Resources Engineering from the University of Michigan. At Carnegie Mellon, Professor Small serves as the Associate Department Head for Graduate Education in the Department of Engineering & Public Policy. He has also worked as a consulting engineer, with Hydroscience, Inc., from 1975-1978. Dr. Small's research involves mathematical modeling and statistical evaluation of environmental quality, exposure and risk. He has developed methods for statistical modeling of variability and uncertainty for air, soil, surface-water and ground-water problems. His recent work has evolved to consider the impact of human risk perception and behavior in integrated exposure assessment, and has included collaboration with statisticians, toxicologists, economists, and behavioral and decision scientists. Current applications include the study of regulations and risk communication for drinking water utilities, decision support for site and soil remediation, and integrated assessment of ambient particulate matter. Support for this research has come from a number of government agencies and private industry, including a National Science Foundation Presidential Young Investigator Award from 1986-1991. Professor Small has been active in providing advice to the US Environmental Protection Agency, first as a member of the Science Advisory Board (SAB), Environmental Engineering Committee, 1985-1991, and currently as Chair of the Environmental Models Subcommittee. He is also a member of the Office of Research and Development's Board of Scientific Counselors (BOSC). He has served on a number of National Research Council Committees reviewing issues of environmental contamination and risk in the United States, most recently the Commission on Behavioral and Social Sciences and Education's Committee on Risk Characterization. He currently serves as an Associate Editor for the journal Environmental Science & Technology, with particular responsibility for the Policy Analysis section, and is a Councilor of the Society for Risk Analysis. (2000)

Smith,Leonard A.

University of Oxford

Professor Leonard Smith received his undergraduate degree in “Physics Mathematics and Computer Science” from the University of Florida and higher degrees in Physics at Columbia University (USA). He came to England for a two-year postdoc in Cambridge about two decades ago. Since 1992 he has been a Senior Research Fellow (mathematics) at Pembroke College and Research Associate, Mathematics Institute, University of Oxford, (UK), and also became a Professor of Statistics (Research), at the London School of Economics (LSE) in October 2004. Professor Smith is currently Director of the LSE Centre for the Analysis of Time Series (CATS). He has supervised doctoral students in departments of Maths, Physics, Statistics and Engineering. His work falls at the model/reality interface with an emphasis on predictability and understanding. In environmental systems he and his students have worked primarily on weather time scales, interpreting how to apply the information in a mix of high-res and ensemble forecasts. On climate time scales, he has been involved with climateprediction.net since its origin and he will co-direct the LSE’s new Centre for Climate Change Economics and Policy. He has also been active in studying the dynamics of uncertainty in other fields, including medicine, electrical generating plants, industrial boiling and a variety of physical experiments. In each case, his interest focuses on the questions “What can we hope to compute, given the current level of understanding, observation and computer power?”, “What exactly do those computations imply regarding the system of interest?” and “How can this information be used effectively in practice?” He has been a member of the WMO Expert Team on Verification, co-authored the THORPEX science plan, and is a consultant at the European Centre for Medium-range Weather Forecasting. He gave invited evidence to the US National Academy of Science and the UK’s Stern Review on the Economics of Climate Change. In addition, he has spoken to a number of non-meteorological groups, including meetings by the US NIH, the UK National Health Service and the Institute of Actuaries. He is deeply interested in the communication of uncertainty and understanding both between scientific fields and to the public, an interest recognised by his appointment as the 2002 Selby Fellow of the Australian National Academy of Science, his award of the 2003 Fitzroy Prize of the UK Royal Metrological Society, and his recent book “Chaos: A Very Short Introduction”. Other advisory service includes information on operational weather risk and other modelling issues to a large number of corporations in Europe and North America.

Smith,V. Kerry

Arizona State University

Dr. V. Kerry Smith is W.P. Carey Professor of Economics at Arizona State University. Prior to his current position, he served as University Distinguished Professor and Director, Center for Environmental and Resource Economic Policy in the Department of Agricultural and Resource Economics at North Carolina State University as well as a University Fellow in the Quality of the

Environment Division of Resources for the Future. Dr. Smith received his A.B. and Ph.D. in Economics from Rutgers University. He presented the Frederick V. Waugh Lecture for the American Agricultural Economics Association (AAEA) in 1992 and at the 2002 AAEA annual meeting he was named an AAEA Fellow. In 2004 he was elected a member of the National Academy of Sciences. Dr. Smith is a member of the American Economic Association, the Southern Economic Association, the Association of Environmental and Resource Economists, and several other professional associations. He has also held editorial positions with the Journal of Environmental Economics and Management, Land Economics, Review of Economics and Statistics, and other professional journals. His research interests include non-market valuation of environmental resources, role of public information in promoting private risk mitigation, non-point source pollution and nutrient policy, and the linking of ecological and economic models.

Sohn,Michael

Lawrence Berkeley National Laboratory

Dr. Michael Sohn is Staff Scientist and Deputy Group Leader of the Airflow and Pollutant Transport Group in the Indoor Environment Department at Lawrence Berkeley National Laboratory (LBNL). Mike holds a Ph.D. in Civil and Environmental Engineering, and an M.S. degree in Engineering and Public Policy from Carnegie Mellon University. He also holds an M.S. degree in Mechanical Engineering from the University of California, Los Angeles. Dr. Sohn conducts research in mathematical modeling of environmental systems and quality, human exposure assessment, uncertainty analysis, and value-of-information decision analysis. He has extensive experience in constructing environmental fate and pollutant transport models for risk assessments, and developing statistical algorithms for characterizing uncertainty and interpreting field data. He currently leads a research project, funded by the US EPA NERL, on relating biomarkers to population-scale exposures. He is also the principle investigator of several decision analyses studies for the US Department of Homeland Security. He has served on panels on exposure assessment and modeling of the EPA Scientifc Advisory Panel. Dr. Sohn has also worked at an environmental engineering consulting firm, where he conducted environmental health risk assessments. He is a California-licensed Professional Engineer (Civil). His current work is funded by the U. S. Department of Homeland Security and the Department of Defense.

von Stackelberg,Katherine

Harvard Center for Risk Analysis

Dr. Katherine von Stackelberg is currently a senior scientist with Menzie-Cura & Associates, Inc. and a research associate at the Harvard Center for Risk Analysis. She recently completed her Sc.D. in Environmental Science and Risk Management at the Harvard School of Public Health. In addition, she has an Sc.M. in Health Policy and Management and Environmental Health from the Harvard School of Public Health, and an AB from Harvard College, cum laude, in General Studies. She specializes in developing models and methods to

quantify the probability that ecological and human receptors will develop adverse effects as a result of exposure to chemicals in the environment. She also focuses on methods for integrating economics and risk assessment to quantify the benefits of proposed risk reductions of management or regulatory actions for use in cost-benefit, cost-effectiveness, and value of information analyses. Much of her work has focused on incorporating quantitative uncertainty analysis (e.g., analytical, probabilistic, and fuzzy methods) into the risk assessment process, and she has been at the forefront of the effort to promote probabilistic methods. Dr. von Stackelberg was the technical lead for the development of the probabilistic bioaccumulation model used to evaluate remedial alternatives for the Hudson River Superfund Site, and she was the technical lead for the ecological risk assessment, which incorporated a joint probability model for predicting potential effects. Under a Phase I SBIR grant, she led the effort to develop a prototype Bayesian hierarchical model for predicting the potential for ecological effects associated with exposures to military unique compounds (e.g., smokes and obscurants, energetics) for which toxicity is poorly characterized and/or highly uncertain. She is currently leading the effort to develop a probabilistic decisionmaking framework for evaluating the suitability of disposal of dredged materials at the Historic Area Remediation Site (HARS) in NY-NJ Harbor. Dr. von Stackelberg's dissertation "Contingent Valuation for Ecological and Noncancer Risk Reductions within an Integrated Human Health and Ecological Risk Framework," explored the use of stated preference techniques for eliciting values consistent with economic theory for risk reductions associated with exposure to PCBs in the environment. She developed a valuation function for risk reduction, and incorporated that into a risk assessment model using exposures to PCBs in the Hudson River as a case study. Dr. von Stackelberg is active in the Society for Risk Analysis, Society for Environmental Toxicology and Chemistry (SETAC), and the Association of Environmental Resource Economists. She serves on the Technical Committee of SETAC. She was an invited participant to a Society for Environmental Toxicology and Chemistry Pellston Conference on Valuation of Ecological Resources, and the recipient of a STAR grant. She has been asked to peer review manuscripts for Risk Analysis, Human and Ecological Risk Assessment, and Environmental Toxicology and Chemistry. Her current research is funded by EPA.

Walker,Katherine

Independent Consultant

Dr. Katherine D. Walker is an environmental health scientist with 20 years of experience in public health risk assessment and its application to the regulatory process. Dr. Walker has been responsible for numerous risk analyses spanning a wide range of topics including cancer risks of volatile organic chemicals in drinking water, public health and environmental risks of hazardous (chemical and nuclear) waste sites, the cost effectiveness of risk management decisions at hazardous waste sites, and implications of pesticide exposure profiles for regulatory decisions, among others. She is currently on tempory assignment in Geneva, Switzerland where she is working as a consultant to WHO and the International Risk Governance Council, a non-governmental organization. Dr. Walker specializes in the analysis of uncertainty in human exposures and health risks. In her most recent work in this area, Dr. Walker has served as the senior

scientific consultant on EPA's pilot and expanded studies on the use expert judgment elicitations to characterize uncertainty in the concentration response relationship between PM2.5 and mortality. Her doctoral research at Harvard School of Public Health involved the elicitation of probabilistic expert judgments from benzene exposure assessment experts about both the variability and uncertainty in ambient, indoor, and personal exposures to benzene. Her study was one of the first studies of subjective expert judgment to assess quantitatively the quality, or calibration, of the experts' judgments about uncertainty using monitoring data collected as part of the USEPA National Human Exposure Survey (NHEXAS) on the same benzene distributions the experts were asked to predict. She holds a Sc.D. in Environmental Health Sciences from the Harvard School of Public Health. She has served as the chair of the exposure assessment specialty group for the Society for Risk Analysis (SRA) (2004-5) and as a member of SRA's Conference and Workshops Committee (2005 to present).

Wallsten,Thomas S.

University of Maryland

Dr. Thomas S. Wallsten is a professor in and chair of the Department of Psychology as well as a professor in the Program in Cognitive Science and Neuroscience. He received his Ph.D. from the University of Pennsylvania in 1969, did a postdoctoral fellowship at the University of Michigan in 1970, and then joined the faculty at the University of North Carolina, Chapel Hill. He was professor of psychology and director of the Cognitive Science program when he left UNC-CH in 2000. Over the past years he was a visiting professor or visiting scholar at the University of Chicago, Duke University, Haifa University in Israel, and University of Oldenburg in Germany. He is a mathematical and cognitive psychologist with expertise in subjective probability, judgment, choice, decision behavior, and related areas of decision science and cognitive psychology. His current research focuses on subjective probability encoding and representation, communication of opinion, and human information processing under uncertainty. This research has been supported over the past 35 years primarily by grants from the National Science Foundation (NSF) as well from other agencies. Among his advisory roles, he was editor of the Journal of Mathematical Psychology from 1990-1994, associate editor of Psychometrika from 1984-1988, associate editor of the Journal of Experimental Psychology: Learning, Memory, and Cognition from 2000-2003, and on numerous editorial boards. He served in various advisory roles for NSF: During 1995-1997 on the grant review panel for Methodology, Measurement, and Statistics Program in the Division of Social, Behavioral, and Economic Research; in 2000 as a member of the Committee of Visitors for Social, Behavioral, and Economic Sciences Directorate; in 2003 as a member of the Committee of Visitors for the Behavioral and Cognitive Sciences Directorate; in 1998 on an ad hoc NSF-EPA grant review panel. In 2002,he was a grant review panel member for the Cognition and Student Learning Program of the Department of Education Office of Educational Research and Improvement.

Wyzga,Ronald
Electric Power Research Institute
Dr. Ronald Wyzga is Technical Executive in the Air Quality Health Effects program area of the Environment Sector. He received an AB degree in mathematics from Harvard College in 1964 and an M.S. degree in statistics from Florida State University in 1966. He also received a Sc.D. degree in biostatistics from Harvard University in 1971. Dr. Wyzga has authored an extensive list of publications on his research. His current research activities focus on understanding the relationship between health effects and air pollution, an area in which he has worked for over 30 years. Dr. Wyzga is particularly interested in the design, conduct, and interpretation of epidemiological studies that examine this relationship. He is also interested in health risk assessment methods. Dr. Wyzga has studied the relationship between health effects and air pollution since he joined EPRI in 1975. In addition, he has worked on methods to attach economic values to air pollution damage and effects. Dr. Wyzga has served on, and has chaired, several committees for the EPA Science Advisory Board and National Academy of Sciences. He has also served on advisory oversight committees for several research programs on the health effects of air pollution. In 1990, Dr. Wyzga was elected a Fellow of the American Statistical Association by his peers. Prior to joining EPRI, he worked at the Organization for Economic Cooperation and Development (OECD) in Paris, where he co-authored a book on economic evaluation of environmental damage.
Zeise,Lauren
California Environmental Protection Agency
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.