

# **Sediment Dredging at Superfund Megasites**

## **Committee**

### **Charles R. O'Melia**

#### **Chair**

Charles O'Melia (NAE) is the Abel Wolman Professor of Environmental Engineering and Chair of the Geography and Environmental Engineering Department at the Johns Hopkins University where he has served on the faculty for over twenty-five years. Dr. O'Melia's research areas include aquatic chemistry, environmental colloid chemistry, water and wastewater treatment, modeling of natural surface and subsurface waters, and the behavior of colloidal particles. He has served on the advisory board and review committees for the environmental engineering departments of multiple universities. He has served in a range of advising roles to professional societies including the American Water Works Association and Research Foundation, the Water Pollution Control Federation, the American Chemical Society, and the International Water Supply Association. He served the U.S. Environmental Protection Agency as a peer review panel member and on the science advisory board. Dr. O'Melia has also consulted for a variety of municipal, industrial, and governmental clients. In addition, he has served on several National Research Council (NRC) committees, including chairing the Steering Committee, Symposium on Science and Regulation, and the Committee on Watershed Management for New York City. He was also a member of the NRC Water Science and Technology Board and the Board on Environmental Studies and Toxicology. Dr. O'Melia earned a Ph.D. in Sanitary Engineering from the University of Michigan. In 1989, Dr. O'Melia was elected to the National Academy of Engineering for significant contributions to the theories of coagulation, flocculation, and filtration leading to improved water-treatment practices throughout the world.

### **G. A. Burton, Jr.**

#### **Member**

G. Allen Burton is a Professor of Environmental Sciences and Director of the Institute for Environmental Quality at Wright State University. He has served as a NATO Senior Research Fellow in Portugal and a Visiting Senior Scientist in Italy and New Zealand. He was awarded the Brage Golding Distinguished Professor of Research at Wright State University, among other honors. Dr. Burton's research during the past 25 years focused on developing effective methods for identifying ecological effects and stressors in aquatic systems where sediment and stormwater contamination is a concern. His ecosystem risk assessments have evaluated multiple levels of biological organization, ranging from microbial to amphibian effects. Dr. Burton serves on numerous national and international scientific committees, review panels, councils and editorial boards, and consults for both industry and regulatory agencies. He earned his Ph.D. in Environmental Science (Aquatic Toxicology) from the University of Texas at Dallas.

## **William H. Clements**

### **Member**

William Clements is a Professor at Colorado State University where he has served on the faculty since 1989. Dr. Clements' primary research interests are in basic aquatic ecology and ecotoxicology. His research has focused on understanding how benthic macroinvertebrate communities respond to natural and anthropogenic stressors. More recently his research projects have included assessments of recovery from fire disturbance, quantifying interactions between natural and anthropogenic stressors, and measuring abiotic factors that influence contaminant bioavailability. Dr. Clements has a substantial publication record on benthic invertebrates, benthic community interactions, and effects of stressors. He also authored several book chapters and he co-authored the book *Community Ecotoxicology* published in 2002. William Clements earned his Ph.D. in Zoology from Virginia Polytechnic Institute and State University (1988).

## **Frank C. Curriero**

### **Member**

Frank C. Curriero is an Assistant Professor in the Departments of Environmental Health Sciences and Biostatistics at the Bloomberg School of Public Health, Johns Hopkins University. His research expertise and interests include applications of spatial statistics and geographic information systems for environmental public health. Dr. Curriero's research has spanned applications involving environmental epidemiology, disease mapping, spatial variation in risk and exposure assessment models, and geostatistical methods. His current methodological research includes statistical methods for censored spatial data and models for non-Euclidean isotropic spatial dependence in geostatistics. Frank Curriero earned his Ph.D. in statistics from Kansas State University.

## **Dominic M. Di Toro**

### **Member**

Dominic Di Toro is the Edward C. Davis Professor of Civil and Environmental Engineering in the Department of Civil and Environmental Engineering at the University of Delaware and is a consultant for HydroQual, Inc. Dr. Di Toro has specialized in the development and application of mathematical and statistical models to stream, lake, estuarine, and coastal water and sediment quality problems. He has participated as an expert consultant, principal investigator, and project manager on numerous water quality studies for industry, research foundations, and governmental agencies. Recently his work has focused on the development of water and sediment quality criteria, sediment flux models for nutrients and metals, and integrated hydrodynamic, sediment transport and water quality models. Dr. Di Toro received his Ph.D. in Civil and Geological Engineering from Princeton University. In 2005, Dr. Di Toro was elected to the National Academy of Engineering for leadership in the development and application of mathematical models for establishing water-quality criteria and making management decisions.

## **Norman Francingues**

### **Member**

Norman Francingues is recently retired from the U. S. Army Corps of Engineers in 2002 with over thirty years of federal civil service. He is the recipient of the U.S. Army Engineer Association Bronze Order of the de Fluery Medal and the U.S. Army Meritorius Civilian Service Award from the Chief of Engineers. He is currently a Senior Consultant with OA Systems Corporation. Mr. Francingues worked for the U. S. Army Corps as a senior technical advisor to the Corps and other national and international agencies on the environmental engineering aspects of navigation and hazardous waste projects. He was technical lead for the development of innovative dredging technologies for the U.S. Army Corps of Engineers Dredging Operations and Environmental Research (DOER) Program. He currently advises on contaminated dredged material for the International Association of Navigation (PIANC), headquartered in Brussels, Belgium. His research involves innovative dredging technologies, fluidized sediment evaluations, confined placement of contaminated dredged material, and treatment of contaminated sediments and soils. Mr. Francingues earned an M.S. in Environmental Engineering from Mississippi State University.

## **Richard G. Luthy**

### **Member**

Richard Luthy (NAE) is the Silas H. Palmer Professor and Chair of the Department of Civil and Environmental Engineering at Stanford University. His research interests include environmental engineering and water quality, particularly phase partitioning and the treatment and fate of hydrophobic organic compounds. His research emphasizes interdisciplinary approaches to understand the behavior and availability of organic contaminants and the application of these approaches to bioavailability and environmental quality criteria and sediment restoration. He chaired the National Research Council's Water Science and Technology Board and the NRC Committee on Bioavailability of Contaminants in Soils and Sediments. He is a Past-President of the Association of Environmental Engineering Professors. He is a registered professional engineer and a Diplomate of the American Academy of Environmental Engineers. He received his Ph.D. in environmental engineering from the University of California at Berkeley. Dr. Luthy was elected a member of the National Academy of Engineering in 1999 for leadership in the treatment of industrial waste waters, contaminated soils, and aquifers.

## **Perry L. McCarty**

### **Member**

Perry L. McCarty (NAE) is the Silas H. Palmer Professor Emeritus in the Department of Civil and Environmental Engineering Emeritus at Stanford University. He directed the Western Region Hazardous Substance Research Center from 1989 to 2002. Dr. McCarty specializes in environmental engineering with emphasis on biological processes for water quality control and the control of hazardous substances in treatment systems and groundwater. His research interests over the past 45 years have been in biological processes for the control of environmental contaminants. His early research was on anaerobic treatment processes, biological processes for nitrogen removal, and biological degradation of hazardous chemicals. Current interests are on aerobic and anaerobic biological processes for control of chlorinated solvents; advanced wastewater treatment processes; and movement, fate, and control of groundwater contaminants. Dr. McCarty earned his Sc.D. in Sanitary Engineering from the Massachusetts Institute of Technology. He was elected to the National Academy of Engineering in 1977 for contributions to the environmental engineering profession through education, research, and service to government and industry.

## **Nancy Musgrove**

### **Member**

Nancy Musgrove is the President of Management of Environmental Resources, Inc (MER). Ms. Musgrove is experienced as an aquatic ecologist working with both regulators and the regulated community, she has expertise in assessment of risks to aquatic communities; water and sediment quality investigations; and design of environmental monitoring programs and laboratory and field studies. She has been involved in numerous regional and national sediment investigation and cleanup projects and the peer review of decisions made at contaminated sediment sites. Ms. Musgrove has substantial experience with the regulatory framework and technical protocols governing environmental management decisions throughout the United States and Canada. She earned an M.S. in Fisheries from the University of Washington.

## **Katherine N. Probst**

### **Member**

Katherine N. Probst is a Senior Fellow and Director of Risk, Resource, and Environmental Management division at Resources for the Future. Over the past 25 years, she has conducted numerous analyses of environmental programs, focusing mainly on improving the implementation of Superfund and other hazardous waste management programs. She was the lead author of the study, *Superfund's Future: What Will it Cost?*, requested by Congress, on the estimated cost of the Superfund program to the U.S. Environmental Protection Agency (EPA). Her most recent study, *Success for Superfund*, includes recommendations for specific information EPA should make available to the public on all Superfund sites, in a site "report card." Probst also has investigated issues related to the use of institutional controls at contaminated sites, long-term stewardship, and the cleanup of sites in the nuclear weapons complex. She was a member of U.S. EPA's Superfund National Advisory Council for Environmental Policy and Technology Subcommittee and of the EPA Science Advisory Board Committee that reviewed analyses of the benefits of the Superfund program. Ms. Probst received an M.A. in city and regional planning from Harvard University.

## **Danny D. Reible**

### **Member**

Danny Reible (NAE) joined the faculty of the University of Texas at Austin's College of Engineering in August 2004, where he holds the Bettie Margaret Smith Chair of Environmental Health Engineering. He is also director of the Hazardous Substance Research Center/South & Southwest, a consortium of Louisiana State University, Rice University, Texas A&M University, Georgia Institute of Technology and the University of Texas at Austin. Dr. Reible leads both fundamental and applied efforts in the assessment and management of risks of hazardous substances, especially as they apply to contaminated sediments. Dr. Reible has led the development of in-situ sediment capping and he has evaluated the applicability of capping technology to a wide range of contaminants and settings including PAHs from fuels, manufactured gas plants and creosote manufacturing facilities; PCBs; and metals. He has consulted for both industry and regulatory groups on the applicability and design of capping for remediation at a variety of specific sites. His research has also focused on the natural attenuation of contaminants as a result of a variety of processes in the environment. He received his Ph.D. degree in chemical engineering from the California Institute of Technology in Pasadena, California. Dr. Reible was elected a member of the National Academy of Engineering in 2005 for the development of widely used methods of managing contaminated sediments.

## **Louis J. Thibodeaux**

### **Member**

Louis J. Thibodeaux is the Jesse Coates Professor at the Louisiana State University College of Engineering. Dr. Thibodeaux's experience and expertise resides in chemical transport processes at and across the natural media (air, water, soil, and sediments) interfaces. Specific applications have included chemical movement associated with landfill disposal, treatment, and storage of aqueous waste. He has conducted environmental research projects on chemical spills in rivers, volatiles from wastewater, nutrient cycling/modeling in lakes, and hazardous substances in contaminated bed sediment in natural aquatic systems. His current research efforts address three key aspects of the remediation chemodynamics of bed-sediment contamination. One is the natural recovery processes of in situ bed-sediment in the aquatic environment of rivers, lakes, and estuaries. The second is on the processes occurring with the surface soils formed from extracted (ex situ) dredged material. The third is on the chemodynamics associated with mud-clouds produced during dredging. Dr. Thibodeaux has served the National Research Council as Co-Chair of the Steering Committee for the National Symposium on Strategies and Technologies for Cleaning up Contaminated Sediments in the Nation's Harbors and Waterways, Committee on Risk-Based Criteria for Non-RCRA Hazardous Waste, Committee on Contaminated Marine Sediments and the Committee on Remedial Action Priorities for Hazardous Waste Sites. Dr. Thibodeaux earned his Ph.D. in Chemical Engineering from Louisiana State University.

## **Donna J. Vorhees**

### **Member**

Donna J. Vorhees is a Principal Scientist with Menzie-Cura & Associates, Inc. where she directs human health risk assessment work for a variety of municipal, federal, and industrial clients. She is also an instructor at the Boston University School of Public Health where she teaches a course in risk assessment methods. She has extensive experience addressing environmental questions arising from multi-pathway human exposure to chemicals that have been released to indoor and outdoor environments at federal and state hazardous waste sites. Her research interests include development of probabilistic human exposure models; field surveys to collect data needed to support risk assessment such as samples of biota consumed by humans and interviews with anglers regarding fish consumption practices; identification of research priorities for improving dredged materials management; and preparation of environmental health educational materials. Dr. Vorhees conducted probabilistic analyses of multi-pathway exposure to PCBs in residences near the New Bedford Harbor, Massachusetts Superfund site, to PCBs and pesticides that accumulate in fish from an offshore dredged material disposal site, and to PCBs, dioxins, and furans that accumulate in agricultural products from the floodplain of a contaminated river. She serves as chair of the Exposure Assessment Specialty Group of the Society for Risk Analysis and is a member of the International Society of Exposure Analysis. Dr. Vorhees earned her master's degree and doctoral degree in Environmental Health from the Harvard School of Public Health.

# John Wolfe

## Member

John R. Wolfe is a Senior Manager at Limno-Tech, Inc. He has expertise in fate and transport modeling of contaminants and environmental economics, and manages projects in areas of contaminated sediment, wastewater treatment and discharge permitting, combined sewer overflow control, and groundwater protection for a variety of municipal, state, federal, and industrial clients. Dr. Wolfe holds an M.S.E. from the University of Michigan, where has an adjunct teaching appointment in the Department of Civil and Environmental Engineering. He also holds a Ph.D. in Economics from the University of Pennsylvania, and was previously Associate Professor of Economics at Michigan State University. He is a licensed Professional Engineer and a Member of the American Academy of Environmental Engineers.