

Attachment 2: Project Description & Committee Members

Project Description

Project Title: Assessing the Performance of Surface and Subsurface Engineered Barriers

Date Posted: <Posted: 07/29/2005>

Project Identification Number: **BESR-U-02-08-A**

Major Unit:

[Division on Earth and Life Studies](#)

Sub Unit:

[Board on Earth Sciences and Resources](#)

Project Scope:

In order to develop and describe an improved framework for assessing the effectiveness of surface and subsurface engineered barriers, an ad hoc committee will complete the following tasks:

1. Describe and assess current and emerging containment systems for land disposal, heap leach mining, and other applications:

*How is their performance defined?

*For how long are they effective, and what factors affect their lifetimes?

*Are there designs used in other countries that could improve system performance?

2. Assess and describe the current state of science and engineering with respect to the following:

*Risk assessment methodology (components vs. overall system, deterministic and probability-based methods, natural analogs)

*System installation (construction quality assessment)

*Performance monitoring (type, amount, methods, retrofitting existing systems)

*Sustainability (utilization of monitoring data, remediation of systems leaks)

3. Identify data gaps and long-term research needs.

Sponsors: NSF, EPA, USNRC

Project Duration: 20 months

Project Meetings to Date:

Meeting 1 - 10/27/2005
Meeting 2 - 02/14/2006

Committee Members:

JAMES K. MITCHELL is University Distinguished Professor, emeritus, in the Department of Civil and Environmental Engineering at Virginia Polytechnic Institute and State University. Prior to joining Virginia Tech in 1994, he spent 35 years on the Civil Engineering faculty of the University of California, Berkeley, where he served as Chair of the Department from 1979-1984. He received his PhD in civil engineering from the Massachusetts Institute of Technology. Dr. Mitchell's research interests are in geotechnical engineering, with emphasis on soil properties and behavior, ground improvement, environmental geotechnics, and in-situ testing. Much of his recent work has focused on the application of knowledge in these areas to waste landfills, waste containment barriers, and mitigation of seismic risk to earth structures. He is a widely known and well respected leader who has received many awards for notable research achievements and for international contributions to engineering practice and education. He has served on several NRC boards and committees dealing with geotechnical engineering and waste containment systems, including the Geotechnical Board (chair), Committee for Noninvasive Characterization of the Shallow Subsurface for Environmental and Engineering Applications, Committee on Subsurface Contamination at Department of Energy Complex Sites: Research Needs and Opportunities (vice chair), Committee on Geological and Geotechnical Engineering in the New Millennium: Opportunities for Research and Technological Innovation, Committee for Review of the Hanford Site's Environmental Remediation Science and Technology Plan. He is a member of both the National Academy of Sciences and the National Academy of Engineering.

LISA M. ALVAREZ-COHEN is the Fred and Claire Sauer Professor of Environmental Engineering at the University of California, Berkeley. She received her PhD in environmental engineering and science from Stanford University. Her current research interests include the biotransformation of contaminants in the subsurface and innovative methods for evaluating in situ bioremediation, including molecular biological and stable isotopic techniques. Dr. Alvarez-Cohen has served on several NRC committees related to subsurface contamination and remediation, including the Committee on Source Removal of Contaminants in the Subsurface and the Committee on In Situ Bioremediation. She is a fellow of the American Academy of Microbiology.

ESTELLA A. ATEKWANA is professor of Geophysics in the Department of geological Sciences & Engineering at the University of Missouri, Rolla. She received her PhD in geophysics from Dalhousie University. Her research focuses on tectonic studies and the application of near-surface geophysical monitoring techniques (gravity, magnetic, seismic, geoelectrical) to aquifer vulnerability, groundwater contamination, and remediation. She is also pioneering the field of Biogeophysics using geophysical methods to examine microbe-mineral interactions and the effect of this interaction on the subsurface environment. Dr. Atekwana chaired the International Committee of the Environmental and Engineering Geophysical Society, and recently completed a term as Vice President for Committees. Additionally, she is currently a member of the Budget and Finance committee of the American Geophysical Union.

SUSAN E. BURNS is an associate professor in the School of Civil and Environmental Engineering at the Georgia Institute of Technology. Prior to joining the faculty in 2004, she spent seven years on the faculty at the University of Virginia. She received her PHD in civil engineering from the Georgia Institute of Technology. Her research focuses on the transport of air bubbles through saturated porous media, physical and chemical behavior of organic-exchanged soil minerals, and remediation of organic compounds using in situ treatment technologies. Dr. Burns received the Edmund Friedman Young Engineer Award from the American Society of Civil Engineers in 2000. She is a board member of the U.S. Universities Council on Geotechnical Engineering Research, and member of the NRC Committee on Geological and Geotechnical Engineering.

ROBERT B. GILBERT is a Professor in the Civil, Architectural, and Environmental Engineering Department at the University of Texas at Austin. In addition to his faculty responsibilities, he teaches short courses for geo-professionals on risk-based decision making and waste

containment systems. He received his PhD in civil engineering from the University of Illinois, Urbana-Champaign. Dr. Gilbert's research interests include performance reliability and risk management for geotechnical and geoenvironmental systems, waste containment, and site remediation. He chairs the TRB Subcommittee on Reliability in Geotechnical and Pavement Engineering, and is a member of the Risk Analysis and Management committees of both the American Society of Civil Engineers Geo-Institute and the International Society of Soil Mechanics and Geotechnical Engineering.

EDWARD KAVAZANJIAN JR. is Associate Professor of Civil and Environmental Engineering at Arizona State University (ASU) in Tempe, Arizona. Prior to moving to ASU in 2004, Dr. Kavazanjian spent twenty years in engineering practice. He is recognized for his work on analysis and design of waste containment systems and on geotechnical aspects of earthquake engineering. He has served as engineer in responsible charge of major infrastructure development projects involving up to \$8.5 million in engineering services and \$150 million in construction and as principal and co-principal investigator on geotechnical engineering research projects sponsored by the Department of Transportation, the National Science Foundation, the U.S. Geological Survey, and the U.S. Army Corps of Engineers. He currently serves on the Board of Governors of the Geo-Institute of the American Society of Civil Engineers and as chair of the Geoseismic Concerns subcommittee of the Transportation Research Board Committee on Seismic Design of Bridges. Dr. Kavazanjian holds a S.M. in Geotechnical Engineering, an S.B. in Civil Engineering from Massachusetts Institute of Technology, and a Ph.D. in Geotechnical Engineering from the University of California, Berkeley.

W. HUGH O'RIORDAN is an attorney at Givens Pursley LLP in Boise, Idaho. Prior to entering private practice in 1980, he practiced law in the Office of the Solicitor of the U.S. Department of the Interior and served as deputy attorney general and chief of the Natural Resources Division for the state of Idaho. He received his J.D. from the University of Arizona College of Law and an L.L.M. in environmental law from George Washington University. Mr. O'Riordan practices in the areas of environmental, natural resources, and administrative law and litigation. His practice focuses on environmental compliance and litigation with emphasis on the Clean Air Act, Toxic Substance Control Act, and cleanup of facilities. He is a frequent writer and lecturer on legal aspects of environmental and natural resources issues. He was a member of the NRC Committee on Remediation of Buried and Tank Wastes and participated in an NRC workshop on barrier technologies for environmental management.

R. KERRY ROWE is a professor of Civil Engineering and research director of the GeoEngineering Centre, and Vice-Principal for Research at Queen's University. Prior to emigrating to Canada, he worked as a geotechnical engineer at the Australian Government Department of Construction. He received his PhD in geotechnical engineering from the University of Sydney. Dr. Rowe's research concentrates on landfill design, geosynthetics, and long-term performance of municipal waste containment systems. He has authored over 300 papers and books, including "Barrier Systems for Waste Disposal Facilities." His research has been recognized with a number of awards, including the Canada Council's Killiam Prize for Engineering (2004) and several medals awarded by geotechnical professional societies. He is past-president of the Canadian Geotechnical Society, President-elect of the Engineering Institute of Canada and a fellow of both the Royal Society of Canada and the Canadian Academy of Engineering as well as professional societies in Canada, the United States, and Australia.

CHARLES D. SHACKELFORD is a Professor in the Department of Civil Engineering and Director of the Rocky Mountain Regional Hazardous Substance Research Center at Colorado State University. He received his PhD in Civil Engineering from the University of Texas, Austin. His research interests concern the flow and transport of hazardous liquids and contaminants through clay soils and geosynthetic containment barriers. Dr. Shackelford's work on diffusion in containment barrier design was acknowledged in 1995 with the receipt of the Walter L. Huber Civil Engineering Prize from the American Society of Civil Engineers (ASCE). He has been involved with several committees for the Geo-Institute of ASCE, including the Environmental

Geotechnics Committee (past chair and current member) and the Technical Coordination Council (member). He also was an elected board member of the U.S. Universities Council on Geotechnical Education and Research (USUCGER).

HARI D. SHARMA is a principal of GeoSyntec Consultants, a private company that specializes in waste management, engineered barriers and synthetics, geotechnical engineering, and design, permitting, and construction quality assurance. He received his PhD in geotechnical engineering from Purdue University. Dr. Sharma has over 30 years experience directing field investigations, designing and managing landfills, related remediation and monitoring landfill construction in the United States and Canada. In addition to his practical work, he has published or presented papers on all aspects of landfills. His three books, including "Waste Containment Systems, Waste Stabilization and Landfills: Design and Evaluation," and his recently published book, "Geoenvironmental Engineering: Site remediation, waste containment, and Emerging Waste management technologies," are widely used in industry and academia. For many years, he served on the Environmental Geotechnics Committee of the American Society of Civil Engineers.

NAZLI YESILLER is an Associate Professor in the Department of Civil and Environmental Engineering at Wayne State University. She received her Ph.D. in civil and environmental engineering from the University of Wisconsin. Her research interests focus on nondestructive testing and image analysis of geosynthetics and soils, desiccation of barrier systems, and thermal performance of landfill systems. Dr. Yesiller is a member and officer of several committees of the American Society for Testing and Materials (ASTM) International, which are developing standards for materials ranging from geosynthetics to soils. She is also a member of Geoenvironmental Engineering Committee of the American Society of Civil Engineers.