

1999 Conference on

Hazardous Waste Research

Gateways to
Environmental
Solutions

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May 24–27

Regal Riverfront Hotel

St. Louis, Missouri

Welcome to St. Louis

The Great Plains/Rocky Mountain Hazardous Substance Research Center invites you to participate in the 1999 Conference on Hazardous Waste Research to be held at the Regal Riverfront Hotel in St. Louis, Missouri, May 24–27, 1999. The conference theme is "Gateways to Environmental Solutions."

This year's conference and workshops will highlight several broad areas of hazardous waste research including brownfields redevelopment and contaminated sediments as well as industrial and mine-contaminated soils and groundwater.

Brownfields are abandoned, idled, or under-used industrial and commercial sites where expansion or redevelopment is complicated by real or perceived environmental contamination. Presentations will describe innovative techniques and case studies for brownfields redevelopment including both scientific and institutional processes of site characterization, public education, community involvement, contaminant remediation, and reintegration.

Contaminated sediments and dredged materials, either suspended in the water column or on the bottom of rivers, bayous, lakes, harbors, estuaries, fresh-water wetlands, and adjoining regions of the continental shelf, contain organics, metals, and conventional pollutants. Innovative approaches to assess and remediate contaminated sediment are needed and presentations describing techniques for improving characterization of sediments and contaminant availability; assessing fate and transport; and the development, selection, and design of both passive and active remediation technologies will be featured.

Case studies, demonstration projects, and research findings surrounding technical and institutional issues will also be included. Oral and poster presentations, panel discussions, and training workshops on these topics will be used to strengthen existing partnerships and develop new alliances to promote simple, cost-effective compliance, cleanup, and integration of hazardous sites.

Opening Reception

Please join us in the Jefferson DEF rooms on Tuesday, May 25 from 5:30 to 7:30 p.m. for the opportunity to visit informally with exhibitors, view posters, and visit with other conference participants. Complimentary hors d'oeuvres will be served and a cash bar will be available.

Who Should Attend

Researchers and practitioners engaged in the cleanup, management, treatment, and disposal of hazardous wastes will benefit by attending this conference. Engineers and scientists conducting research will address topics appropriate for those involved in the cleanup, management, regulation, and treatment of hazardous wastes.

Proceedings Available

The Great Plains/Rocky Mountain Hazardous Substance Research Center at Kansas State University will publish the proceedings of the 1999 conference. **FOR THOSE WHO ORDER THE PROCEEDINGS AT THE TIME OF THEIR CONFERENCE REGISTRATION, THE COST WILL BE \$50.** After that time, cost for the 1999 proceedings may be higher.

Publication Opportunities

All papers presented at the 1999 Conference on Hazardous Waste Research may be submitted for publication in the 1999 proceedings. In addition, papers may be submitted to the *Journal of Hazardous Substance Research*, a peer-reviewed electronic journal which will be available to readers on the Internet. The journal has been established by the Great Plains/Rocky Mountain Hazardous Substance Research Center and will consider for publication original articles and reviews that deal with all aspects of hazardous substance research. Appendices which incorporate multimedia content in the PDF file format will be encouraged where this contributes to content and clarity. More information about the *Journal of Hazardous Substance Research* is available on the World Wide Web at <http://www.engg.ksu.edu/HSRC/JHSR>, or by calling Carla Wolfe at 785-532-7464.

Special Assistance

The Great Plains/Rocky Mountain Hazardous Substance Research Center and Kansas State University are committed to making conference activities accessible to all participants. Please indicate on the registration form any special requirements due to disabilities or dietary restrictions. In order to accommodate you, we must receive your requests by April 30, 1999. After this date, we will make every effort to provide assistance but cannot guarantee that requested equipment or services will be available.

Special Monday Evening Forum

Open Forum on the Future of Hazardous Substance Research, Technology
Development, and Implementation
Monday May 24, 6:00–9:00 p.m.

Hazardous substance research and technology development efforts over the past ten years have dramatically increased our understanding while decreasing the cost of cleaning up contaminants in the environment. Many government, university, and private organizations have played important roles in this progress. However, a number of challenges remain for certain types of contaminants, and under new regulatory and multi-stakeholder problem-solving approaches. New technology itself poses additional challenges. This forum will consider current needs and appropriate roles for the EPA Hazardous Substance Research Centers program in creating, testing, and implementing new environmental knowledge and technology.

The forum will begin with a synopsis of major problem areas in waste management, restoration, and redevelopment recently cited in the literature, and roles the HSRCs have traditionally played in knowledge and technology development. A panel of lawmakers, research strategic planners, public and private landowners, and regulators will then provide additional perspective on specific needs, and on how the HSRCs can most effectively help address these needs at present and in the foreseeable future. Special emphasis will be on challenges with sediments, agricultural, refinery, mining, defense, energy, and brownfields sites. A reception will precede the event, with complimentary hors d'oeuvres and non-alcoholic refreshments available.

Tuesday, May 25, 1999

Plenary Session

Tuesday, May 25, 1999

Mississippi Ballroom

8:30 Welcoming remarks:

Larry E. Erickson, Director, Great Plains/Rocky Mountain Hazardous Substance
Research Center

Danny Reible, Director, South/Southwest Hazardous Substance Research Center

Plenary Speakers:

8:50 "Enhanced Anaerobic Bioremediation Using Zero-Valent Iron," Gene F. Parkin,
University of Iowa

9:30 "On the Management of Contaminated Sediments: A Systems Approach,"
W. Frank Bohlen, University of Connecticut

10:00 Break—Jefferson DEF

Location and Transportation

The conference will be held at the Regal Riverfront Hotel located at 200 S. 4th Street in downtown St. Louis. For those driving to St. Louis, ground transportation is simple since Highways I-70, I-40, I-44, and I-55 merge in the neighborhood of the Regal Riverfront.

Air transportation to St. Louis is available through Lambert International Airport. The airport is located just 13 miles from the hotel on Interstate 70.

For those arriving by air, Airport Express provides van shuttle service to the hotel and costs \$10 one-way or \$18 round-trip. The shuttle leaves every 20–25 minutes from the airport between 6:50 a.m. and 10:30 p.m. Reservations are not required. Airport Express desks are located at the airport in the Main Terminal across from Baggage Carousel #2 and Baggage Carousels #5 and #6. A desk is also located in the East Terminal near Exit #12. Airport Express shuttle service is also available from the Regal Riverfront Hotel every 25 minutes between 6:00 a.m. and 6:20 p.m., with other hours available by reservation. Airport Express may be contacted at 314-429-4950.

Parking

Parking for the conference is available at a garage across the street and directly connected to the hotel by an enclosed walkway. Registered hotel guests have unlimited in-out privileges. Although current parking fees are \$11.00 per day, the Regal Riverfront Hotel has agreed to offer conference attendees registered at the hotel a special \$5.50 per day parking charge for May 23–30, 1999.

More Information

For registration information, call the KSU Division of Continuing Education at 1-800-432-8222 or 785-532-5569; Fax us at 785-532-5637; or e-mail us at info@dce.ksu.edu.

For information about the 1999 Conference on Hazardous Waste Research, call Carla Wolfe at 785-532-7464; send e-mail to caw@ksu.edu; or visit our web site at www.engg.ksu.edu/HSRC.

Cancellations / Refunds

If you must cancel your attendance, please do so as soon as possible. Registration fees will be refunded only if notice is received by the KSU Division of Continuing Education, 785-532-5569, by 5 p.m., May 12, 1999. Substitutions are encouraged.

Tuesday, May 25, 1999

Program One

Jefferson A

Risk-Based Decision Making, T.K. Boguski, Kansas State University, presiding

10:30 Target Cleanup Levels and Remediation, M.B. Tomson, L. Vignona, W. Chen, and A.T. Kan, Rice University

11:00 Site Characterization/Risk Assessment of Tetrachloroethene (PCE)-Contaminated Site, C.L. Quast, M.G. Fisher, and A. Broughton, Howard R. Green Company

11:30 Wildlife Applications to Remediation Decision Making, M.J. Hooper and G.P. Cobb, Texas Tech University Health Science Center

12:00 **Lunch—Mississippi Ballroom**
“Environmental Measurements in the New Millennium,” Mitch Erickson, U.S. Department of Energy
Presentation of 1998 Karen Morehouse Best Paper Award

Jefferson A

Environmental Management, E. Mead, U.S. Army Corps of Engineers, presiding

1:30 Role of Hybrid Poplar Trees in Brownfield and Industrial Site Management, E. Aitchison and L. Licht, Ecolotree, Inc.

2:00 Monitored Enhanced Natural Attenuation (MENA), J. Golchin, Iowa Department of Natural Resources, B.H. Kjartanson, S.K. Ong, and G.A. Stenback, Iowa State University, and G.L. Nelson, MidAmerican Energy Company

2:30 Effective Management of Lagoons to Reduce the Fate and Transport of Contaminants into the Subsurface, M.V.S. Bonala, L.N. Reddi, and H. Davalos, Kansas State University

3:00 **Break—View Posters and Exhibits, Jefferson DEF**

Jefferson A

Wetlands, J.H. Pardue, Louisiana State University, presiding

3:30 Lead and Zinc Removal by Lab-Scale Constructed Wetlands, M. Fitch, J. Burken, Y. Song, L. Nass, S. Chiliklri, and N. Gale, University of Missouri-Rolla

4:00 Natural Attenuation of Chlorophenols in Anaerobic Wetland Sediments, F.M. Saunders and S.-Y. Chiang, Daniel Environmental Engineering Laboratory

4:30 Chlorinated VOC Treatment in Constructed Wetlands, J.H. Pardue, C. Gomez-Hermsillo, M. Ford, and S. Lee, Louisiana State University

Program Two

- Jefferson B
Brownfields, B.A. Leven, Kansas State University, presiding
- 10:30 Hydraulic Conductivity Influence on Utilization of Illinois' Tiered Approach to Corrective Action Objectives (TACO), T.W. Dixon, Maurer-Stutz, Inc.
- 11:00 Tribal Approaches to Brownfield Redevelopment Issues, D.R. Wildcat, Haskell Indian Nations University, and W.M. Griswold, Kansas State University
- 11:30 Environmental Solutions Through Effective Planning, H. Novotny, U.S. Army Corps of Engineers, and C. Willis, Black & Veatch

12:00 Lunch—Mississippi Ballroom
“Environmental Measurements in the New Millennium,”
Mitch Erickson, U.S. Department of Energy
Presentation of 1998 Karen Morehouse Best Paper Award

- Jefferson B
Brownfields, B.A. Leven, Kansas State University, presiding
- 1:30 Michigan Brownfield Regulatory Review, R.H. Kummler, Wayne State University
- 2:00 Turning Inner City Industrial Land Into a New Civic Park for Springfield, Missouri, W.B. Lindsey, Midwest Environmental Consultants, P.C.
- 2:30 Managing Sensitive MGP Remediation Projects: A Church and a School, S. Anderson, Black & Veatch, and N.J. Huston and R.J. Tappan, Nicor Gas

3:00 Break—View Posters and Exhibits, Jefferson DEF

- Jefferson B
Bioremediation, K.F. Reardon, Colorado State University, presiding
- 3:30 Role of Hydrogen in Correlating Microcosm and Field-Derived Rate Constants for TCE, W.A. Jackson, Texas Tech University, and J.H. Pardue and W.S. Shin, Louisiana State University
- 4:00 Impact of Mixed-Culture Supplementation on Development of a High-Rate, PCE-Dechlorinating Culture, D.T. Adamson and G.F. Parkin, University of Iowa
- 4:30 Use of Hydrogen-Release Compound (HRC™) for CAH Bioremediation, S.S. Koenigsberg, Regenesis Bioremediation Products
- 5:00 Microbial Population Shifts in Soil as a Function of Surfactant Application, G.M. Colores, E.A. Kern, D.M. Ward, and W.P. Inskeep, Montana State University

Program Three

- Jefferson C
Zero-Valent Metals, G.F. Parkin, University of Iowa, presiding
- 10:30 Correlation Analysis of Rate Constants for Dechlorination by Iron Metal, M.M. Scherer, University of Iowa, and P.G. Tratnyek, Oregon Graduate Institute
- 11:00 Nitrate Removal with Industrial Iron Powder, C.F. Chew and T.C. Zhang, University of Nebraska
- 11:30 Preparation, Characterization, and Use of ZnO Nanoparticles, C.L. Carnes, K.J. Klabunde, and J. Stipp, Kansas State University

- Jefferson C
Metals Remediation, J.L. Gardea-Torresdey, University of Texas at El Paso, presiding
- 1:30 Chromium(VI) Removal by Modified PVP-Coated Silica Gel, D. Gang, S.K. Banerji, and T.E. Clevenger, University of Missouri--Columbia
- 2:00 Heavy Metal Binding by *Mucor rouxii* Biomass Grown Under Copper-Stressed Conditions, J.L. Gardea-Torresdey and K.J. Tiemann, University of Texas-El Paso, and I. Cano-Aguilera, Universidad de Guanajuato
- 2:30 Spectroscopic Studies of Gold(III) Binding to Alfalfa Biomass, G. Gamez, K. Dokken, K.J. Tiemann, M.J. Yacaman, and J.L. Gardea-Torresdey, University of Texas-El Paso, and M.W. Renner, Brookhaven National Laboratory

3:00 Break—View Posters and Exhibits, Jefferson DEF

- Jefferson C
Metals Remediation, T.E. Clevenger, University of Missouri-Columbia, presiding
- 3:30 Copper(II) and Lead(II) Binding by Alfalfa Biomass: Use of Chemical Modification and X-ray Absorption Spectroscopy to Determine the Metal-Binding Mechanism, K.J. Tiemann, G. Gamex, K. Dokken, and J.L. Gardea-Torresdey, University of Texas-El Paso, and M.W. Renner, Brookhaven National Laboratory
- 4:00 Berkeley Pit Innovative Technologies Project, K. E. Burgher and S. Anderson, Montana University
- 4:30 Characterization of Chromium(IV) Bioreduction and Chromium(III) Binding to Alfalfa Biomass, K. Dokken, G. Gamez, K.J. Tiemann, N.E. Pingitore, J.L. Gardea-Torresdey, and M.W. Renner, University of Texas-El Paso.
- 5:00 Berkeley Pit Lake from Top to Bottom, S. Anderson and K.E. Burgher, Montana University

Accommodations

The conference will be held at the Regal Riverfront Hotel and a block of rooms is being held there through April 23, 1999, for conference participants. Please make your reservations by the cut-off date to receive the special conference rates. Mention that you are with the 1999 Hazardous Waste Research Conference when making your reservations directly with the hotel. Rates listed below do not include tax.

NOTE: If you must cancel your reservations, you must do so no later than 48 hours prior to your date of arrival. Cancellations after this date (except for emergencies) will result in forfeiture of your one-night's deposit.

Conference Hotel:

Regal Riverfront Hotel
1-800-325-7353 or 314-241-9500

Group Rates

Single or Double Occupancy	\$99.00
Triple Occupancy	\$109.00
Quad Occupancy	\$119.00

Please make reservations by April 23 to receive these rates.

Sponsors

The conference and workshops are co-sponsored by:
U.S. Environmental Protection Agency
Great Plains/Rocky Mountain Hazardous Substance Research Center
South/Southwest Hazardous Substance Research Center
Waste-management Education and Research Consortium
National Institute of Environmental Health Sciences
National Mine Land Reclamation Center

Cooperating Supporters

- Missouri Department of Natural Resources
- Air and Waste Management Association
- American Institute of Chemical Engineers
- Illinois Waste Management and Research Center
- Sediment Management Workgroup
- Sediment Remediation Technology Development Forum

Wednesday, May 26, 1999

Program One

Jefferson A

Sediment Assessment and Remediation, L.J.

Thibodeaux, Louisiana State University, presiding

- 8:30 Integrated Sediment Characterization: Case Studies, S.E. Apitz, E. Arias, B. Ayers, D.B. Chadwick, J.G. Grovhoug, T. Hampton, D. Lapota, J. Leather, V.J. Kirtay, and G. Rosen, SPAWARSYSCEN, and J. Chock, S.A. Clawson, J. Duerrero, and M.O. Stallard, Computer Sciences Corporation
- 9:00 Characterization of the Role of Macrophytes and Microbial Populations in Governing the Fate/Transport of Methyl Mercury in Highly Contaminated Estuarine Sediments, F.M. Saunders and J.K. King, Georgia Institute of Technology, and J.E. Kostka and M. Fischer, Skidaway Institute of Oceanography
- 9:30 Assessment of the Effects of Bioturbation in Sediments, D.D. Reible, J.F. Fleeger, K.T. Valsaraj, and L.J. Thibodeaux, Louisiana State University

10:00 Break—View Posters and Exhibits, Jefferson DEF

Jefferson A

Sediment Assessment and Remediation, W.F.

Bohlen, University of Connecticut, presiding

- 10:30 *In Situ* Capping of Contaminated Sediments: Comparing the Functional Effectiveness of Granular Versus Clay Mineral-Based Sediment Caps, J.H. Hull, C.A. Kasper, and J.M. Jersak, Hull & Associates
- 11:00 Effectiveness of Environmental Dredging, L.J. Thibodeaux, D.D. Reible, and K.T. Valsaraj, Louisiana State University
- 11:30 Air Emissions from Exposed, Contaminated Sediments and Dredged Material, K.T. Valsaraj, R. Ravikrishna, D.D. Reible, and L.J. Thibodeaux, Louisiana State University, B. Choy, University of Sydney, and C.B. Price, S. Yost, J.M. Brannon, and T.E. Myers, DynTel Corporation

12:00 Lunch—Mississippi Ballroom

“Redesigning a Watershed: Thinking Like DaVinci,” Lou Licht, Ecolotree, Inc.

Presentation of 1999 Best Poster Awards

Jefferson A

Bioavailability of Contaminants, D.D. Reible,

Louisiana State University, presiding

- 1:30 Bioavailability of Soil Lead, Cadmium, and Zinc as Influenced by Phosphorous and Other Soil Amendments, G.M. Hettiarachchi and G.M. Pierzinski, Kansas State University
- 2:00 Bioavailability of Desorption-Resistant PAHs, J.B. Hughes, D.M. Beckles, S.J. Friedfeld, A.T. Kan, and M.B. Tomson, Rice University

Program Two

Jefferson B

Bioremediation, P.L. Bishop, University of Cincinnati, presiding

- 8:30 Multi-Species Biofilms for Reactive Biobarrier Formation, J. Komlos, A.B. Cunningham, and R. Sharp, Montana State University
- 9:00 Chemical- and Biological-Oxidation Pathways of MTBE and Its Oxidation Byproducts Using Combinations of H₂O₂, O₃, and UV under Oxygenated and Oxygen-Limited Conditions, J. Sutherland, B. Panka, J. Burken, and C. Adams, University of Missouri-Rolla
- 9:30 Effect of Media Type and Charge on TCE Cometabolism in a Fluidized-Bed Reactor, L. Wang and R.L. Segar, University of Missouri-Columbia

10:00 Break—View Posters and Exhibits, Jefferson DEF

Jefferson B

Bioremediation, R.L. Segar, University of Missouri-Columbia, presiding

- 10:30 Effects of an Alternate Growth Substrate on *In Situ* Bioremediation of Polycyclic Aromatic Hydrocarbons, T. Ebihara and P.L. Bishop, University of Cincinnati
- 11:00 Biodegradation of De-Icing Compounds in Columns Simulating a Range of Natural Conditions, A.R. Bielefeldt and M. Grant, University of Colorado, and T. Illangasekare, Colorado School of Mines
- 11:30 Modeling the Biodegradation of Mixtures Using Pseudocompounds, D.E. Brown and K.F. Reardon, Colorado State University

12:00 Lunch—Mississippi Ballroom
 “Redesigning a Watershed: Thinking Like DaVinci,” Lou Licht,
 Ecolotree, Inc.
 Presentation of 1999 Best Poster Awards

Jefferson B

Bioremediation, F.M. Saunders, Georgia Tech, presiding

- 1:30 Anaerobic/Aerobic Treatment of Polychlorinated Biphenyls in Soil, J.D. Rogers, N.M. DuTeau, and K.F. Reardon, Colorado State University
- 2:00 Reductive Dechlorination of PCBs in Soil, R.C. Ahlert, RAMS Environmental, Inc., and R.W. Peters, Argonne National Laboratory
- 2:30 Evaluation of Gene Transfer as a Mode of Plasmid Dispersal in 2,4-D Contaminated Soil, D.T. Newby and I.L. Pepper, University of Arizona

3:00 Break—View Posters and Exhibits, Jefferson DEF

Program Three

Jefferson C

Adsorption, K.T. Valsaraj, Louisiana State University, presiding

- 8:30 Nanocrystal Metal Oxide-Chlorine Adducts: Selective Catalysts Chlorination of Alkanes, N. Sun and K.J. Klabunde, Kansas State University
- 9:00 Sorption-Desorption Asymmetry of Organic Compounds in Natural Sediments, A.T. Kan, W. Chen, L. Vignona, W. Liu, M.B. Tomson, and J. Hughes, Rice University, and D. Reible, Louisiana State University
- 9:30 Development of Adsorption Isotherms and Breakthrough Curves for Cyanazine and *s*-Triazine Metabolites in Synthetic and Natural Waters, E. Wehmeyer, C. Adams, and S. Ummethela, University of Missouri-Rolla

10:00 Break—View Posters and Exhibits, Jefferson DEF

Jefferson C

Adsorption, C. Adams, University of Missouri-Rolla, presiding

- 10:30 Nanocrystalline Metal Oxides and Mixed Metal Oxides as Effective Adsorbants for Volatile Organic Compounds, A. Khaleel and K.J. Klabunde, Kansas State University
- 11:00 Destructive Adsorption of War Agent Mimics by Nanoparticle Magnesium Oxide, E.M. Lucas and K.J. Klabunde, Kansas State University
- 11:30 Vapor Sorption of Air Pollutants by Metal Oxides, W. Li and K.J. Klabunde, Kansas State University

Jefferson C

Biobarriers, T.C. Zhang, University of Nebraska, presiding

- 1:30 Animal Waste Containment in Anaerobic Lagoons Lined with Compact Clays, H. Davalos and L.N. Reddi, Kansas State University
- 2:00 Biological Clogging of Compacted Clay Liner, L.N. Reddi and V. Felker, Kansas State University
- 2:30 A Model to Predict Biological Clogging in Porous Media, M. Ghose Hajra and L.N. Reddi, Kansas State University

3:00 Break—View Posters and Exhibits, Jefferson DEF

Registration and Fees

Event	Until Apr. 30	After Apr. 30
Conference		
Regular	\$200	\$225
Student	\$100	\$125
Exhibitor	\$250	\$275
Monday, May 24		
Reactive Barriers Workshop	\$50	\$55
Assessment and Cleanup Strategies Workshop		
Government Employees & Community Representatives	Free	Free
Other Participants	\$25	\$30
Monday Evening Forum	Free	Free
Wednesday, May 26		
Riverboat Tour/Dinner	\$35	\$40
Thursday, May 27		
Community Participation in Brownfields Development Workshop		
Government Employees & Community Representatives	Free	Free
Other Participants	\$25	\$30

3 easy ways to register:

- 1) Return registration form along with check or money order for total fees to:
 Conference on Hazardous Waste Research
 Division of Continuing Education
 Kansas State University
 141 College Court Building
 Manhattan, KS 66506-6015
- 2) To register by phone, call 785-532-5569 or 1-800-432-8222.
- 3) To Fax your registration, 785-532-5637.

Program One

- 2:30 Bioaccumulation and Biotransformation of Pyrene by the Freshwater Oligochaete *Limnodrilus Hoffmeisteri*, R.N. Millward, J.W. Fleeger, D.D. Reible, K.A. Keteles, and P.B. Cunningham, Louisiana State University
- 3:00 **Break—View Posters and Exhibits, Jefferson DEF**
- Jefferson A
Sediment Remediation—Grasse River, NY, J.R. Smith, ALCOA, presiding
- 3:30 Historical Overview of Grasse River Investigations, D.S. Foster, Blasland, Bouck & Lee, Inc., and P.C. Dargan, ALCOA, Inc.
- 4:00 Grasse River Non-Time-Critical Removal Action (NCTRA) Summary, R. Romagnoli, Blasland, Bouck & Lee, Inc.
- 4:30 Grasse River Supplemental Remedial Studies Program: Implementation Techniques, W.J. Lyman, Camp Dresser & McKee, Inc.
- 5:00 Characterization of PCB Sources and Fate in the Lower Grasse River, J. Quadrini, J.P. Connolly, and J.R. Rhea, Quantitative Environmental Analysis, LLC, and J.R. Smith, Aluminum Company of America, Inc.

Thursday, May 27, 1999

- Jefferson A
Nonaqueous-Phase Liquids, D.D. Reible, Louisiana State University, presiding
- 8:30 Entrapment Characterization of NAPLS in the Subsurface Using Partitioning Tracers: A Laboratory Evaluation, F.T. Barranco, Jr. and T.H. Illangasekare, Colorado School of Mines
- 9:00 Modeling of Net Interphase Mass Exchange in NAPL Water Systems Undergoing Biodegradation at the Spill-Site Scale, E.W. Vestal and T.H. Illangasekare, Colorado School of Mines, and A. Ramaswami, A. Bielefeldt, K. Morrison, and M. Goldade, Colorado University at Denver
- 9:30 Long-Term Composition Dynamics of PAH-Containing NAPLS and Implications for Risk Assessment, C.A. Peters, C.D. Knights, and D.G. Brown, Princeton University
- 10:00 **Break—View Posters and Exhibits, Jefferson DEF**
- Jefferson A
Surfactant-Based Remediation, W.P. Inskeep, Montana State University, presiding
- 10:30 Enhancing Bioremediation with *In Situ* Biosurfactant Production, J. Eyre, R. Jordan, and A.B. Cunningham, Montana State University

Program Two

Jefferson B

- Bioremediation, W.D. Constant, Louisiana State University, presiding
- 3:30 Mercury Methylation in Marine Sediments: An Assessment of Coupled Biochemical Processes and Potential for Sediment Remediation, F.M. Saunders, Georgia Institute of Technology, and J.K. King, R.F. Lee, R.A. Jahnke, and H. Windom, Skidaway Institute of Oceanography
- 4:00 Role of Microorganisms in Metal Transformation and Remediation, T.M. Roane and I.L. Pepper, University of Arizona
- 4:30 Identification of Specific Methylation Rates for Species of Sulfate-Reducing Bacteria in Pure Culture and in Organic-Acid-Amended Sediment Slurries, F.M. Saunders and J.K. King, Georgia Institute of Technology, and M. Frischer and J.E. Kostka, Skidaway Institute of Oceanography
- 5:00 Study on Heavy Metal Uptake by *Elsholtzia Haichowensis* Sun and *Commelina Communis* Linn. Using Hydroponic Culture, S. Tang, Zhejiang University, and B.M. Wilke, Technische Universität Berlin

Program Three

Jefferson C

- Fate and Transport, R.C. Ahlert, RAMS Environmental Consultants, presiding
- 3:30 Analysis of Horizontal Wells for Pump-and-Treat Remediation, D.R. Steward, Kansas State University
- 4:00 Modeling Permeability Changes Due to Particle Transport, M. Xiao and L.N. Reddi, Kansas State University
- 4:30 Tracer Sensitivity to Entrapped Nonaqueous-Phase Liquids: Intermediate Scale Experiments in Heterogeneous Porous Media, T.H. Illangasekare, Colorado School of Mines, G. Barth and M. Hill, U.S. Geological Survey, and H. Rajaram, University of Colorado
- 5:00 Chelating Extraction for Removal of Radionuclides from Contaminated Soils, R.W. Peters and M.C. Negri, Argonne National Laboratory, and A.Hong, University of Utah

Day Three

Thursday, May 27, 1999

Jefferson B

- Phytoremediation, J.G. Burken, University of Missouri-Rolla, presiding
- 8:30 Toxicity of Chlorinated Aliphatics to Poplar Cuttings and Cell Cultures, A. Dietz and J.L. Schnoor, University of Iowa
- 9:00 Analytical Techniques and Uptake Studies of Explosives-Contaminated Wetland Plants, C.L. Just and J.L. Schnoor, University of Iowa
- 9:30 Plant Growth Conditions Alter the Uptake of Trichloroethylene by Hybrid Poplar, J.K. Chard, B.J. Orchard, W.J. Doucette, and B. Bugbee, Utah State University

10:00 Break—View Posters and Exhibits, Jefferson DEF

Jefferson B

- Phytoremediation, L.E. Erickson, Kansas State University, presiding
- 10:30 An Experimental Study of Phytoremediation of Methyl-Tert-Butyl Ether (MTBE) in Groundwater, Q. Zhang, L.C. Davis, and L.E. Erickson, Kansas State University

Jefferson C

- Analytical Methods, G.M. Pierzynski, Kansas State University, presiding
- 8:30 Organometal Speciation Analysis with Supercritical Fluid Chromatography Coupled to ICP-MS, C.A. Ponce de Leon and J. Caruso, University of Cincinnati
- 9:00 From Sample Preparation to Detection for Elemental Speciation Studies, J.A. Caruso, University of Cincinnati
- 9:30 Speciation Analysis of Trace Arsenic and Selenium by Hybrid Generation Sample Introduction Combined with Laser-Induced Fluorescence and Laser-Enhanced Ionization Detection, J.B. Simeonsson, S.A. Elwood, M. Ezer, H.L. Pacquette, and D.J. Swart, University of Iowa

10:00 Break—View Posters and Exhibits, Jefferson DEF

Jefferson C

- Analytical Methods, S. Kapila, University of Missouri-Rolla, presiding
- 10:30 Ultratrace Analysis of Arsenic and Selenium by Laser-Induced Fluorescence Spectrometry Techniques, J.B. Simeonsson, S.A. Elwood, M. Ezer, H.L. Pacquette, and D.J. Swart, University of Iowa

St. Louis, Missouri

Gateway to the American West

When Lewis and Clark set out from the confluence of the Missouri and Mississippi rivers to explore the uncharted West, St. Louis was already a thriving city where fur trade was a mainstay of life. Founded as a French colonial village in 1764, St. Louis has grown into an exciting and colorful community. The dramatic, soaring Gateway Arch stands on St. Louis' Riverfront as a memorial to Thomas Jefferson's dream of a continental United States. Vibrant reminders of St. Louis' history are found in the Museum of Westward Expansion, as well as in many historic homes throughout the city. Another jewel from St. Louis' past is Forest Park, one of the top ten urban parks in the nation and the site of the famous 1904 World's Fair, and the Missouri History Museum offers another glimpse into the area's historic past.

In addition to its rich historical significance, St. Louis also offers a variety of other activities. The Saint Louis Art Museum offers exhibitions that attract visitors throughout the year. The St. Louis Zoo features 90 acres of wildlife from seven continents, and the St. Louis Science Center allows visitors to relive the race for outer space and conduct their own scientific experiments. The Missouri Botanical Garden encourages visitors to explore its beautifully manicured landscapes; Six Flags St. Louis theme park offers thrilling rides and entertainment for all ages; and tours of Anheuser-Busch offer a behind-the-scenes look at the world's largest brewer. St. Louis offers sports fans the St. Louis Blues NHL hockey team, the St. Louis Cardinals baseball team, and the St. Louis Rams NFL football team. Those with interest in the performing arts will enjoy the St. Louis Symphony Orchestra and the soulful sounds of St. Louis blues and jazz, as well as numerous theaters offering everything from Broadway touring companies to alternative theatrical experiences. For visitors with shopping and fine dining in mind, historic St. Louis Union Station offers a festival marketplace filled with more than 100 shops and restaurants. And don't forget to experience St. Louis the old fashioned way—from the deck of a paddlewheel riverboat.

Getting around in St. Louis is easy and inexpensive. Metrolink, St. Louis' light-rail mass transportation system, links many of these major attractions. It also runs between the airport and downtown daily. Adult fare is only \$1 and trains are scheduled at convenient intervals.

Program One

- 11:00 Micro-Visualization of Colloidal Gas Aphrons Interaction with Oil, N. Bhimasen and D.D. Reible, Louisiana State University
- 11:30 Surfactant-Enhanced Dissolution of Nonaqueous-Phase Waste Chemicals: Effect of Flow Dimensionality, T. Saba and T.H. Illangasekare, Colorado School of Mines

Zero-Valent Metals

1. Enhanced Anaerobic Degradation of Tetrachloroethene and 1,1,1-Trichloroethane Using a Lactate-Enriched Methanogenic Culture in the Presence of Zero-Valent Iron, M.G. Mason, J.D. Shrout, and G.F. Parkin, University of Iowa
2. Microbial-Fe(0) Interactions During Treatment of Groundwater Contaminant Mixtures, E.J. Sawvel, R. Donald, and P.J.J. Alvarez, University of Iowa
3. Significance of Green Rust Minerals in Abiotic Redox Transformations, A.G.B. Williams and M.M. Scherer, University of Iowa
4. Nitrate Reduction by Iron Metal: The Rate-Limiting Step, J. Ginner, S. Threkelsen, M. Scherer, and P.J.J. Alvarez, University of Iowa
5. Effect of Surface Oxides on the Longevity of Iron-Permeable Reactive Barriers, M.J. Alowitz and M.M. Scherer, University of Iowa
6. Bioaugmentation of Zero-Valent Iron for the Enhanced Treatment of Chlorinated Aliphatic Compounds, K.B. Gregory, M.G. Mason, and G.F. Parkin, University of Iowa, and L.J. Weathers, Tennessee Technological University
7. Zero-Valent Iron Adsorption Kinetics and Dechlorination of Polychlorinated Biphenyls, L.M. Falanga, J.R. Chiarenzelli, and R.J. Scridato, SUNY-Oswego

Remediation Technologies

8. Nitrogen Transformations in Wastes from Animal Production Operations, H.Y. Lee, Kangwon National University, and L.N. Reddi and L.E. Erickson, Kansas State University

Program Two

- 11:00 Biodegradation of Jet Fuels in the Presence of Vegetation, R. Karthikeyan, L.C. Davis, K.R. Mankin, L.E. Erickson, C.W. Rice, and P. Kulakow, Kansas State University
- 11:30 Phytoremediation of Vehicle Wash Sediments, P.A. Kulakow, R. Karthikeyan, B. Leven, H. Li, and G. Pierzynski, Kansas State University, and A.P. Schwab, Purdue University

Program Three

- 11:00 Environmental Fluorescent Fingerprinting, R. Ham, University of Wisconsin–Madison, and P.M. Potter, B. Duely, and S. Harlan, Missouri Department of Natural Resources

Posters

9. Effect of Bacterial Extracellular Polymers on PAH Desorption and Mineralization in Soil, A. Liu, L.W. Lion, M.L. Shuler, and W.C. Ghiorse, Cornell University
10. *In Situ* Bioremediation of PCB by Combination of the Alfalfa Plant and Selective Microorganisms, S.K. Dutta and O. Toure, Howard University
11. Effect of Plant Root Exudates on Soil Microbial Communities, K. Yoshitomi and J. Shann, University of Cincinnati
12. Design of a Graphical User Interface Decision Support System for a Vegetated Treatment System, S.R. Burckhard and V.R. Schaefer, South Dakota State University, and M. Narayanan, P.A. Kulakow, and B.A. Leven, Kansas State University
13. Effect of Benzotriazoles on Sunflowers, D. Luper, L.C. Davis, and L.E. Erickson, Kansas State University
14. Transport of Trichloroethylene Through Woody Tissues, L.C. Davis, D. Luper, J.Hu, and L.E. Erickson, Kansas State University
15. Influence of Solution Matrix on the Photocatalytic Degradation of 2-Chlorobiphenyl in TiO₂ Slurries, C.S. Hong, New York State Department of Health, and Y. Wang and F. Fang, State University of New York at Albany
- Metals**
16. Revegetation of Heavy Metal-Contaminated Mine Tailings (CHAT), M. Lambert, G.M. Pierzynski, G. Hettiarachchi, L.E. Erickson, and D. Sweeney, Kansas State University
17. Investigation of Metal Ion Binding by Agricultural By-Products, J.V. Rios, L. Bess-Oberto, K.J. Tiemann, and J.L. Gardea-Torresdey, University of Texas–El Paso
18. Adsorption of Heavy Metal Ions by Biomass of *Solanum elaeagnifolium* (Silvery Nightshade), A.F. Garcia, T. Gaig, K.J. Tiemann, and J.L. Gardea-Torresdey, University of Texas–El Paso
- Sediments**
19. Effects of Polychlorinated Biphenyl-Contaminated Sediment on Larval Amphibian Growth and Development, W. Savage and F.W. Quimby, Cornell University
20. Managing Sediment Containment Facilities to Promote PCB Separation and Degradation, M.L. Wunderlich, J.R. Chiarenzelli, and R.J. Scridato, SUNY–Oswego
- Risk Management**
21. Initial Investigation of Analytical Extraction Techniques for the Determination of Bioavailability of Pesticides in Soil, B.K. Kramer and P.B. Ryan, Emory University, and D.L. MacIntosh, University of Georgia
22. Peroxidase-Mediated Binding of Phenols to Soils, A. Bhandari and I.-K. Cho, Kansas State University
23. Heavy Metal Bioavailability in Small Mammal-Inhabiting, Smelter-Associated Tailings and Deposition Areas Following Different Remediation Treatments, M.J. Hooper, G.P. Cobb, S.T. McMurry, B. Adair, and K. Reynolds, Texas Tech University Health Science Center
24. Geographic Distributions of Exposure and Physiological Responses of Raccoons to Polychlorinated Biphenyls on Wildlife Management Areas in Western Kentucky, USA, M.J. Hooper, P.N. Smith, M.S. Schwarz, T.A. Anderson, and S.T. McMurry, Texas Tech University Health Science Center

Regal Riverfront Hotel

Located in downtown St. Louis, the Regal Riverfront Hotel offers a majestic riverfront setting including breathtaking views of the Gateway Arch, Busch Stadium, and the city skyline. The hotel offers award-winning American cuisine at the revolving Top of the Riverfront restaurant, which includes a spectacular panoramic view of St. Louis with your meal. In addition, you'll find casual dining at the Fourth Street Grill, quick service at the deli-style Park Cafe, piano music at Martini's Lobby Bar, and games and TV sports at the Dugout Sports Bar. The hotel also features both indoor and outdoor swimming pools, exercise room, florist, hair salon, game room, and a high-tech Business Center. Plus, visitors are only moments from countless dining and entertainment opportunities in downtown St. Louis, including the historic Laclede's Landing, a national historic district nestled on the banks of the mighty Mississippi which features a variety of restaurants, nightclubs, shops, and special events.

Mississippi Riverboat Tour and Dinner

May 26, 1999, 7:00 p.m.–9:30 p.m.

You won't be the first ever to cruise the Mississippi. Too much history has floated by for that. From Lewis and Clark to the fur traders, to the riverboat gamblers to Tom Sawyer and Becky Thatcher, many before you have cruised the Mighty Mississippi and made up a good part of the stories that still drift by. But that doesn't mean you'll enjoy the river any less, or that your mind can't wander back to some of their histories, or that on your trip you won't spin a few yarns of your own. After all, that's what Mark Twain did. The river is not the same river it was a hundred years ago, but one of those logs lying on the bank could be from Huck Finn's raft. And as you view the Gateway City on your cruise, you might see in your mind's eye some of what was a century or so ago.

On this evening dinner cruise, you'll feel that you are a river traveler from long ago when the river was the highway to the next port city. You'll be entertained by a Dixieland band and enjoy a delicious, mouth-watering prime rib dinner served at your table complete with salad, dessert, and all the trimmings. The stars and moon of ages ago will still be out there shining as a reminder of what was, while the bright city lights illuminating the St. Louis skyline will remind you of what is today. Plan now to join us for this exciting trip back to yesteryear aboard an authentic paddle wheeler. The cost is only \$35.00 per person and includes the prime rib dinner.

Posters

25. A Model for Tribal Risk Assessment, B.L. Brandon, Haskell Indian Nations University, and W.M. Griswold, Kansas State University
 26. Desorption and Aqueous Extractability of Polycyclic Aromatic Hydrocarbon Mixtures on Soil, W.R. Reeves, L.-Y. He, T.J. McDonald, and K.C. Donnelly, Texas A&M University
 27. An Experimental Approach to Convergent-Flow Tracer Tests in Heterogeneous Media, D.F. Garcia and T. Illangasekare, Colorado School of Mines, and X. Sanchez-Vila, Escola de Camins, Canals i Ports de Barcelona
- Barrier Technologies
28. Effect of Flow Rate and Influent Particle Concentration on Clogging of Soil Filters, M. Ghose Hajra, M.V.S. Bonala, and L.N. Reddi, Kansas State University
 29. Biological Clogging in Porous Media and the Effects of Using Iodinated Resins, J. Mutyala, G.L. Marchin, and L.N. Reddi, Kansas State University

Workshop Information

Monday, May 24

Reactive Barriers: Principles and Design Workshop

1:00–4:30 p.m.

This workshop is designed to provide participants with a comprehensive understanding of reactive barrier technology, which is increasingly being used to control groundwater contamination by reducible pollutants. The processes involved in the technology and the hydrogeological and engineering principles involved in the design will be covered. The workshop is designed for individuals in private industry, regulatory agencies, and academia.

Schedule and Instructors

Session I—1:00–2:30 p.m.

Basic Principles and Processes

This session will cover basic principles of physiochemical and biological processes pertaining to reactive barriers. The session will also focus on biogeochemical interactions and bioaugmentation of reactive Fe(0) barriers. The processes related to degradation of reducible pollutants by a variety of anaerobic bacteria and factors influencing performance of barriers as a result of combining anaerobic bacteria with Fe(0) will be discussed. Results from batch and column studies with a variety of Fe(0) sources and bioaugmented reactors will be used to demonstrate the processes.

Instructor: Dr. Gene Parkin, University of Iowa

Break—2:30–3:00 p.m.

Session II—3:00–4:30 p.m.

Design and Performance

This session will start with an overview of the principles of reactive barrier design, typical rate constants for chlorinated aliphatics with iron metal, and designs based on plug flow and the contaminant MCL. Discussion of the effects of dispersion, uncertainty in the reaction mechanisms and rates, and the effects of aquifer heterogeneity will follow. Finally, a discussion of alternative designs and performance issues will be presented.

Instructor: Dr. Jerry Eykholt, University of Wisconsin-Madison

More Information

For more information about the Reactive Barriers Workshop, call Lakshmi Reddi at 785-532-1586.

Brownfields Workshop: Assessment and Cleanup Strategies for Site Redevelopment Based on Intended Land Use and Risk Analysis

8:00 a.m.–5:00 p.m.

The goal of this workshop is to provide a framework for municipalities, developers, lending institutions, and contractors who must make environmental assessments and select corrective actions that will meet cost and risk goals for intended land use. Goals of the workshop include

- using decisions about costs, laws, and risks to steer site assessment techniques and selection of cleanup strategy;
- designing streamlined, complete sampling strategies that meet EPA QA/QC requirements;
- understanding relationships among cleanup options, risk, and redevelopment economics; and
- learning methods used to select a cleanup strategy.

The workshop will include exercises that ask participants to apply new information and strategies to solve problems related to real world brownfield sites.

Information in the workshop will be especially helpful for local government officials responsible for activities funded by EPA brownfields grants; property owners, developers, financiers, and citizens; and contractors. Information presented will be useful for all audiences but is tailored specifically for local governments and others who hire contractors to perform site characterizations and recommend cleanup options.

Workshop Topics

Redevelopment decision-making process
Project viability within ASTM evaluation steps
Environmental regulatory standards and voluntary cleanup programs
Financial risk analysis
Environmental site assessments:
 Overview of Phases I, II, III
 Sampling strategies
Environmental risk assessment and risk-based corrective action
Statistical methods in the environmental field
Conventional and innovative cleanup strategies
Cost/benefit analysis for selecting a cleanup strategy

More Information

For more information about the workshop, call Terrie Boguski at 913-780-3328.

- So that workshop materials can be prepared, please register in advance for these workshops by marking the appropriate section of your registration form.

Special Sediments Events

Sediments Track

The conference will feature a series of technical sessions and meetings seeking to improve our management of contaminated sediments. Assessment and remediation of contaminated sediments pose some of the most difficult and potentially expensive hazardous substance problems in the nation. Often, sediment sites are characterized by large volumes exhibiting marginal levels of contamination with uncertain risks. Removal options often entail significant uncontrolled releases of contaminants to the water column, generate large amounts of water requiring treatment, and leave a large volume of wet solids that must be further treated or confined indefinitely. Non-removal options alleviate some of these issues but lead to concerns over the long-term fate of the contaminants in the typically dynamic waterway environment. The goal of the technical sessions and meetings in this area is to help address the technical issues on which our management approaches are based.

RTDF Meeting

A special meeting of the EPA/Industry Sediment Remediation Technology Development Forum (RTDF) is also scheduled during the conference and attendees are invited to participate. The forum is a joint EPA/industry initiative tasked with improving and developing technologies for the remediation of contaminated sediment. The Industry Sediment Management Workgroup is co-sponsoring the conference and members will be participating in both the technical sessions and the RTDF meeting.

Workshop Information Thursday, May 27

Community Participation in Brownfields Redevelopment—A Collaborative Process Affecting the Interest of All Stakeholders

This workshop will address why active public participation is paramount and how local government can facilitate community input and involvement at brownfields pilots. Topics will include the overall brownfields process, and roles various stakeholders play, especially local government agencies and community members.

The focus of the workshop will be on redevelopment planning considerations, interactions among governmental agencies and other stakeholders, community concerns, and community involvement strategies during various phases of the brownfields initiative. Practical examples will be demonstrated through a panel discussion with members from various brownfields working groups and an exercise. The workshop will be conducted in a recently completed technical training center at the Wellston, Missouri, EPA Brownfields Pilot, a short ride from the conference hotel on St. Louis' Metrolink light rail system. The newly established American Society for Testing and Materials (ASTM) Standard Guide to the Process of Sustainable Brownfields Redevelopment will be referenced as participants work with invited experts and community representatives who will share results, pitfalls, successes, and lessons learned.

Workshop Topics

ASTM Standard Guide to the process of sustainable brownfields redevelopment
Issues related to community redevelopment
Panel discussion: Current methods of participation and community empowerment
Developing a community involvement strategy: A practical exercise

Sponsors

This workshop is sponsored by the Technical Outreach Services for Communities (TOSC) and Brownfields (TAB) Programs of the HSRC. These programs provide technical assistance to communities dealing with hazardous substance issues at cleanup sites.

More Information

For more information about the workshop, call LaBarbara Wigfall at 785-532-2446.

Exhibitors

Exhibitors are invited to participate in the conference. Conference attendees are involved in all phases of the environmental technology development cycle from fundamental research through remediation of contaminated sites. Past annual conferences have involved over 250 participants, and at least 300 registrants are expected for this year's conference. Exhibitors should send representatives knowledgeable of environmental research and technology topics.

The exhibit area will be adjacent to the conference sessions to encourage informal communication between those needing and those providing goods and services. Conference attendees will take breaks in the exhibit area several times each day and a special reception will be held in this area on the evening of May 25.

Time. The exhibit area will be available for setup beginning at 3 p.m. May 24. Exhibits must be set up by 10 a.m. on May 25. Exhibits may be left in place until 10:30 a.m. on May 27. During non-exhibiting hours, computers and other equipment should be stored in a secure area.

Space. Each booth will be provided one, 8-foot table with cover and two chairs. The table will be removed if requested. Electricity outlets for standard 110-volt household current are available upon request. Telephone lines are available for an additional charge.

Cost. The fee for each exhibit space will be \$250, which includes one conference registration with complimentary lunches. Additional representatives must pay the regular registration fee of \$200 per person.

Registration. Please indicate your desire to exhibit on your registration form. For more information, call Carla Wolfe at 785-532-7464. Registration forms must be received by May 12, 1999, in order to reserve exhibit space.

This program and other information about the conference and the Great Plains/Rocky Mountain Hazardous Substance Research Center are available on the World Wide Web at: www.engg.ksu.edu/HSRC.

Notice of Nondiscrimination

Kansas State University is committed to a policy of nondiscrimination on the basis of race, sex, national origin, disability, religion, age, sexual orientation, or other nonmerit reasons, in admissions, educational programs or activities, and employment (including employment of disabled veterans and veterans of the Vietnam Era), all as required by applicable laws and regulations. Responsibility for coordination of compliance efforts and receipt of inquiries, including those concerning Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act, has been delegated to Jane D. Rowlett, Ph.D., Director of Unclassified Affairs and University Compliance, Kansas State University, 111 Anderson Hall, Manhattan, KS 66506-0124 (785-532-4392).



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