

HazTech

T R A N S F E R

Great Plains - Rocky Mountain Hazardous Substance Research Center

Wet weather does not dampen 10th conference

By Mary Rankin

Raincoats and umbrellas were in abundance as the 10th annual Conference on Hazardous Waste Research opened May 23 in the K-State Union on the Kansas State University campus at Manhattan.

But despite downpours and flood watches, 208 persons attended the two-day event, sponsored by the Great Plains/Rocky Mountain Hazardous Substance Research Center, in order to gain information on new developments and ongoing research in the hazardous substance field.

Attendees were offered a wide variety of educational opportunities as 59 investigators made oral presentations, 31 posters were on display, and 11 exhibitors showcased their products and services.

Luncheon address and award presentation

Don Rathbone, dean of the college of engineering at Kansas State University, welcomed participants at the opening day noon luncheon in the Union ballroom. Melinda McClanahan, Assoc. Dir. for Science, National Center for Environmental Research and Quality Assurance, U.S. EPA, delivered the luncheon address entitled, "EPA: A New Beginning for Research Grants and Fellowships."

McClanahan pointed out that mission priorities had been redefined at EPA and that more of its money was being reprogrammed toward extramural grants for lab and field research. Dollars spent on research projects are expected to increase from \$22 million in 1994 to \$100 million in 1997.

This is not new money, she stressed, but "better, cheaper, smarter government."

Stan Grant, HSRC associate director, presented McClanahan with a certificate in appreciation of her efforts in support of the Haskell Environmental Research Studies (HERS) Center.

Larry Erickson, HSRC director, presented the Karen Morehouse Best Paper Award for the 1994 conference to Bradley Helland, Pedro Alvarez, and Gerald Schnoor, Univ. of Iowa, for their work entitled, "Reductive Dechlorination of Carbon Tetrachloride with Elemental Iron."



EPA's Melinda McClanahan tells conference attendees how her agency is streamlining.

Plenary session

On the second day of the conference, Terry Williams, Director of the Office of Indian Affairs, EPA, delivered the plenary address, "Environmental Issues in Native American Lands."

Williams covered some of the history of Native American land acquisitions and tribal treaties and the difficulties that have arisen with Congress over who has jurisdiction of the land.

There are 533 tribes in the U.S. today, Williams said, and this group has the "highest disease rate, highest death rate, and lowest education rate of any people in this country."

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EPA is working to help tribes change their system internally by creating links with university scientists and researchers that can assist tribes in getting their lands back to the way they want them to be.

As treaties long ago had once guaranteed, Williams said, tribes today want "their own land, their own resources, and the ability to maintain their own ecosystem."

Panel discussions

Three panel discussions were part of the oral presentation programs during the conference. The first, "Research Needs and Opportunities," was the concluding event of Tuesday's sessions as university and industry personnel tackled this topic.

On Wednesday, Pat McDonald, Kansas State University, moderated a panel on "Community Involvement: Making it Work." Rick Warner, We the People; Carolyn Offutt, EPA; Karl Burgher, Montana Tech.; and Jack Brown, Sedgwick Co. Health Dept., discussed the impact of environmental cleanups and projects on local communities.

A second panel that day, "Environmental Needs on Reservation Lands," involved participation from Don Aragon, Wind River Environmental Quality Commission; Kim Clausen, Ogallala Nation; and Steve Semken, Navajo Community College. The basic theme from all three was "regulation is the way of preservation," with Aragon in particular stressing that "without education, the degradation

of tribal lands will continue."

Committee meetings

The HSRC Science Advisory Committee met during the conference to review ongoing projects and research project assignments. Meeting also was the Technology Transfer and Training Committee who also reviewed ongoing projects status, voted unanimously to recommend acceptance of the University of Northern Iowa and Colorado State University into the consortium, and received an update address from center director, Dr. Larry Erickson.

In a joint session on Wednesday, the committees received an update on a field demonstration project of Kathy Banks and Paul Schwab, Kansas State University; and updates on both the NAOMI project and the R2D2 program. Members also heard a report from Melinda McClanahan, U.S. EPA. At the joint session, Diana Tillison, center program associate who recently relocated to Wichita, was recognized for her years of service to the center and in particular her work with the NAOMI project at



Terry Williams

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HERS advisory board makes recommendations

By Wendy Griswold

The Haskell Environmental Research Studies Center (HERS) Advisory Board met at Kansas State University's Manhattan campus during the tenth annual Conference on Hazardous Waste Research in May. One of the highlights of the session was a meeting with National Environmental Protection Agency officials and individuals funded by NAOMI to attend the conference.

Terry Williams, Director of the American Indian Environmental office at EPA in Washington, DC, addressed environmental needs on tribal lands. He said that the three major areas of concern are tribal jurisdiction on tribal lands, increasing building capacity with EPA resources and assisting tribes in understanding environmental conditions on tribal lands, and establishing national testing systems.

Melinda McClanahan from the EPA discussed her new role as Associate Director for Science for the new National Center for Environmental Research and Quality Assurance. She is responsible for overseeing the quality of research and improving

communication. Dr. McClanahan also mentioned the increase of funding available through the EPA for research.

Lee Roberts, Indian Coordinator for EPA Region 8 in Denver, stressed the importance of interesting tribal youth in studying in environmental fields and having qualified Indian people work in tribal communities. Roberts feels that Native professionals would be more sensitive and understanding of tribal cultures.

Both Williams and Lee believe that maintaining the quality of water, air, wildlife population, and vegetation are common concerns among Indian tribes.

NAOMI conference fundees talked about the work they are involved with, both NAOMI projects and projects at their own universities.

The HERS Advisory Board will meet again on October 12 and 13 at Haskell Indian Nations University. They will be reviewing proposals for research and training and technology transfer projects.

continued from page 2
Haskell Indian Nations University.

Workshops

Five workshops, with a combined attendance of more than 130 people, were held in conjunction with the conference. On Monday, May 22, faculty and students working with hazardous substances in the laboratory and on field sites had the opportunity to participate in an eight-hour HAZWOPER (Hazardous Waste Operations Training) Refresher Course.

Also on Monday was a workshop on Bioremediation of Munitions-Contaminated Soil, organized as an activity of the Western Governors' Association Military Munitions Waste Working Group.

On Thursday, May 25, the workshop "Designer Chelators," presented by the Center for Environmental Technologies, covered development of molecular descriptors and the design of chelator systems for heavy metal retardation. "Beneficial Effects of Vegetation in Contaminated Soils" was a second workshop on Thursday. Sponsored by the HSRC, U.S. DOE, and U.S. EPA, the sessions focused on biodegradation and fate of organic contaminants in vegetated soils.

The third workshop, "Environmentally Conscious Printing," was developed by the Kansas State University Pollution Prevention Institute for lithographic printers needing practical information about alternative printing techniques that meet regulatory requirements and protect the environment.



Steve Galitzer demonstrates how to tape up a protective suit.

Consortium Directory

Our World Wide Web address is:
<http://www.engg.ksu.edu/HSRC/home.html>

Key personnel at each university are:

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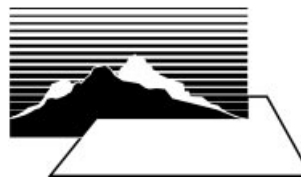
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George Vance, 307-766-2297 *
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*—research
**—technology transfer



Larry Erickson, HSRC director, presents Bradley Helland with an award for the best paper of the 1994 conference in Bozeman, Mont.



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Researchers study munitions-contaminated soil

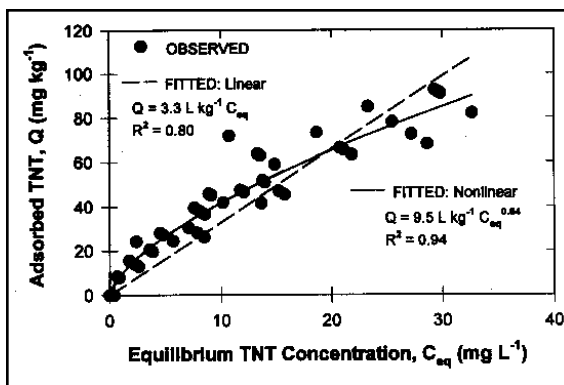
By Steve Comfort and J. Patrick McDonald

Past practices of disposing of munitions waste at numerous locations around the country have resulted in large volumes of soil contaminated with TNT and other munitions residues. One such facility, the Nebraska Ordnance Plant (NOP), offers researchers at the University of Nebraska a unique opportunity to study phenomena critical to cleanup of these soils.

An interdisciplinary team of researchers is studying TNT transport and fate in contaminated soil. Soil columns and long-term equilibration experiments are being conducted to obtain information that will be used to develop a computer model to predict TNT transport and fate in soil under various remediation scenarios.

Research findings

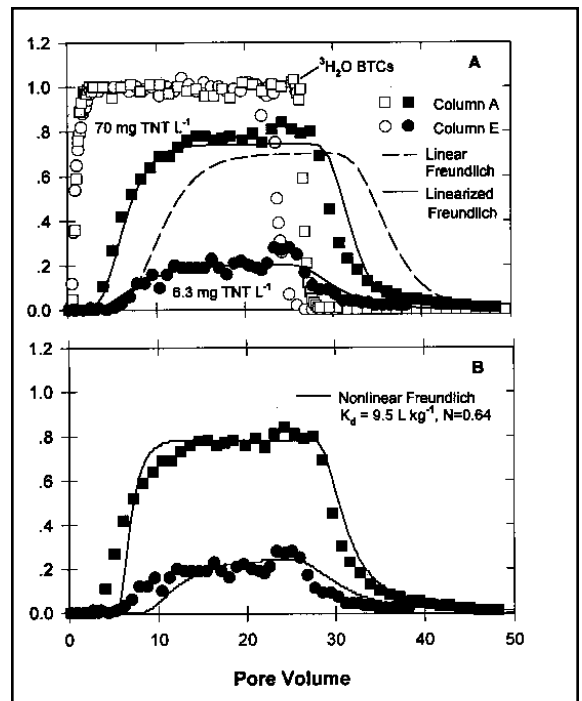
In order to understand the major mechanisms influencing the fate of TNT residues in soil, researchers conducted both sorption and transport experiments. Batch equilibration experiments indicated TNT sorption was concentration dependent and TNT sorption was more accurately described by a nonlinear Freundlich isotherm for the silty clay loam soil (Figure 1). To determine how nonlinear sorption influenced TNT transport, multiple pore volumes of solutions containing high (70 mg TNT L⁻¹) and low (6.3 mg TNT L⁻¹) TNT concentrations were applied to soil columns under unsaturated conditions. At the high pulse concentration (70 mg TNT L⁻¹), earlier TNT breakthrough occurred and a greater percentage of TNT applied was eluted than at the low pulse concentration (Figure 2). A transport model containing a linear adsorption distribution coefficient failed to predict observed TNT transport, while a transport model with a nonlinear Freundlich code provided reasonable predictions of observed data. Results indicated that the assumptions of linear adsorption and singular adsorption-desorption reactions commonly used in transport modeling are likely invalid for predicting TNT transport in highly contaminated soils.



Sorption experiments using 14C-labeled TNT (70 mg TNT L⁻¹) indicated a considerable capacity of soil to sorb TNT and its degradation products, but sorption capacity can be exceeded when solid phase TNT is present. In uncontaminated soil, sorption was rapid, exceeding 80 percent by 14 days and reaching 90 percent at the end of the experiment (168 days). The amount of readily available TNT (extractable with CaCl₂ solution) declined with time, and none was detected (<0.01 mg kg⁻¹) at 168 days. At 168 days less than 2.0 mg TNT kg⁻¹ was extractable with acetonitrile (potentially available pool). These results indicated that TNT was transient in soil and highly subject to sorption and degradation.

When particulate TNT was present (as is often the case in highly contaminated soils), sorption of TNT also increased with time, reaching a maximum of approximately 80 percent at 168 days. The lower amount sorbed compared to the soil without solid-phase TNT may be attributed, in part, to the lower sorption distribution coefficient obtained at high solution concentrations (Figure 1). Soil-bound residues similarly increased when solid-phase TNT was present, but less was bound in the presence of particulate TNT. Long-term sorption experiments provide evidence for formation of bound residues of TNT degradates in soil. Due to the reduced availability, this process may constitute a practical detoxification of TNT residues in soil.

Several microorganisms have been identified in



contaminated soil from the NOP site. TNT tolerant organisms are being studied to determine their capacity to transform TNT through reduction and/or denitration.

In addition, University of Nebraska researchers have investigated the use of Fenton's reagent (hydrogen peroxide and ferrous salt) as a chemical remediation treatment for soil highly contaminated with TNT or as a pretreatment prior to bioremediation. Complete or near complete destruction of TNT in aqueous solution was achieved within 24 hours by treatment with Fenton's reagent. Fenton oxidation of TNT could be combined with soil washing to effectively remove and remediate TNT contaminated soil. Four to five washings of contaminated soil ($500 \text{ mg TNT kg}^{-1}$) were required to achieve the preliminary remediation goal of 17.2 mg kg^{-1} set by the U.S. EPA for TNT in soil at the NOP site. The Fenton reagent was also effective in reducing acetonitrile-extractable TNT concentrations in soil slurries (Figure 3), and the preliminary remediation goal was achieved within 24 h at 45°C .

Potential development

Research findings from this project can be used in design of soil remediation schemes targeting TNT cleanup. Results are of interest to researchers, industry, remediation contractors, and regulators.

Principal investigators

Steve Comfort, Assistant Professor, Pat Shea and Bill Powers, Professors, and Dennis McCallister, Associate Professor, Dept. of Agronomy, 279 Plant Sciences, University of Nebraska, Lincoln 68583-0915

Tyler Kokjohn, Assistant Professor, Biological Sciences, University of Nebraska, Lincoln 68588-0343.

Garald Horst, Associate Professor, Dept. of Horticulture, University of Nebraska, Lincoln 68583-0724.

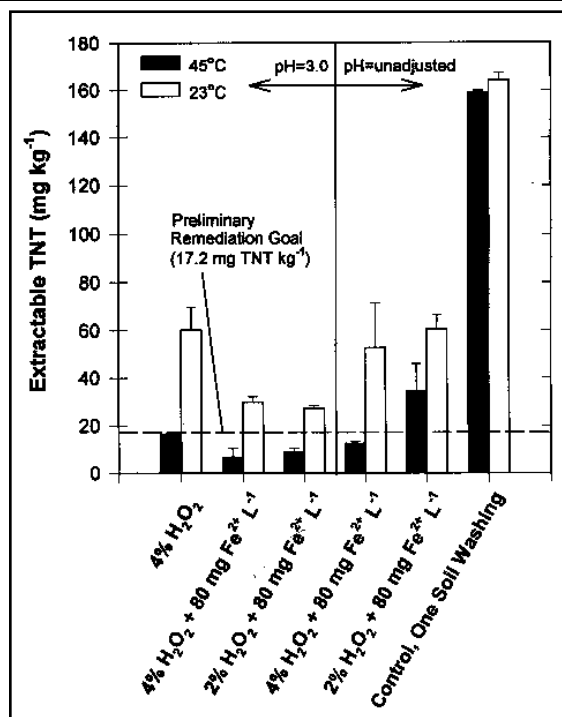
Publications and Presentations

The fate and transport of TNT in contaminated soils, S.D. Comfort, P.J. Shea, L. Hundal, Z. Li, B.L. Woodbury, J.M. Martin, and W.L. Powers, *J. Environ. Qual.* 24, in press, 1995.

Bioremediation/TNT contamination at the former Nebraska Ordnance Plant, P.J. Shea, and S.D. Comfort, Bioremediation Workshop, Annual Meeting of the Soil Science Soc. of America, Seattle, WA, 1994.

Remediating TNT-contaminated soils and water using Fenton's reagent, Z. Li, S.D. Comfort, and P.J. Shea, *Agron. Abstr.* 85, 45, 1994.

Integrated approaches to remediating munitions-contaminated soils, S.D. Comfort, Regional Explosives Technology Meeting, EPA/Corps of Engineers, 1994.



Remediating munitions contaminated soils., P.J. Shea, and S.D. Comfort, *Abstr. Proc. 21st Ann. Risk Reduction Engineering Laboratory Research Symposium*, p. 354-358, 1995.

Remediating TNT contaminated soil and water by Fenton oxidation and photolysis, Z. Li, P.J. Shea, and S.D. Comfort, *Abstr. In situ and on-site bioremediation: The Third International Symposium*, April 24-27, San Diego, CA, 1995.

Minority institution staffs get EPA training

By Wendy Griswold

KSU was the site of a training session for accounting staff and principal investigators from Minority Academic Institutions (MAI) who are recipients of funds from the Environmental Protection Agency (EPA). Staff and faculty from several institutions from across the U.S. attended an intensive two-day session May 25-26.

Topics covered included conflict of interest in sponsored research; principles of subcontracting; safety, OSHA and environmental regulations; and regulation and compliance. The group of administrators, accountants and researchers were also addressed by Dalton Leonard, an auditor from the Office of Inspector General, U.S. EPA, Region IV. Mr. Leonard discussed the auditing process and advised participants on what types of costs may be questioned during an audit.

Howard University coordinated the program and hosted a similar session in Washington, D.C., in April.

Although the projects described in this article have been funded in part by the U.S. Environmental Protection Agency under assistance agreement R-815653, through the Great Plains-Rocky Mountain Hazardous Substance Research Center, it has not been subjected to the agency's peer and administrative review and, therefore, may not reflect the views of the agency. No official endorsement should be inferred.

Al Cunningham works both sides of street

By Mary Rankin

"Evaluation and Modeling of Subsurface Biobarrier Formation and Persistence" is the title of the newest HSRC-funded research project of Al Cunningham, coordinator of research initiative at the Center for Biofilm Engineering, and civil engineering professor at Montana State University. The research will look at ways to grow biofilms in porous media to reduce the permeability of the formation and form a barrier that retards flow and transport of organic contaminants in groundwater.

"Our goal," Cunningham said, "is to demonstrate how to beneficially manipulate the microbial process in the subsurface. And our main application will be biocontainment and enhanced *in situ* biotransformation of dissolved organics."

An earlier completed center project, "Microbial Transport in Porous Media," involved the study of how operational variables, such as injection flow rate and suspended cell characteristics, influenced the distribution of cell adsorption along the porous media flow path in an injection/infiltration system.

He is also currently in the second year of funding of a technology transfer project, "Engineering Scale-Up on *In-Situ* Bioremediation Processes: A Process Guideline for Biotreatability," that will pro-

Leven named R2D2 program manager

The Hazardous Substance Research Center at Kansas State Univ. has named Blase Leven to the position of program manager of the Research and Re-Education for Displaced Military and Department of Defense Civilian Personnel Program (R2D2).

He assumed his duties May 30. They involve recruiting participants for the program and assisting in matching them with research and technology transfer programs at the 29 HSRC universities nationwide. Qualified DoD military and civilian personnel displaced by base closings and realignments since September 1990 can apply to participate in the program and earn bachelor's or advanced degrees while working on research and technology transfer projects that address hazardous substance problems shared by DoD and other federal facilities.

Leven has a B.S. in geology from the Univ. of Calif. at Davis, and a master's degree in geology from the Colorado School of Mines. He served as an Army officer from 1987-1991, and had been a project manager and geologist with Terracon Environmental, Inc., Tulsa, Okla., and Topeka, Kan.

Eligible persons should contact Leven at the HSRC main office, 913-532-6519, FAX 913-532-5985 or e-mail to baleven@ksuvm.ksu.edu.

duce a manual for comprehensive biotreatability site evaluation.

Cunningham, who has a B.S. in civil engineering from the Univ. of Nevada-Reno, an M.S. in civil engineering from Montana State, and a Ph.D. in hydrology from the Univ. of Nevada, claims his initial interest in hydrodynamics was driven by applications in ground and surface water hydrology.

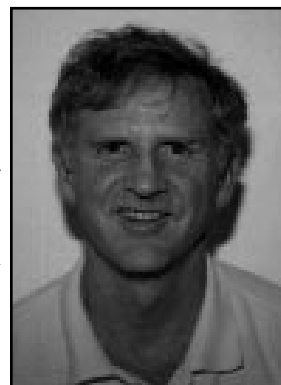
"In recent years, I've developed an interest in environmental applications of hydrodynamics—particularly in the groundwater contamination area," he explained.

Bringing results of research into the classroom is what Cunningham lists as the "favorite activity" of his profession. One example of this is his graduate course in Environmental Engineering, where with sponsorship of oil companies and other industries, students work with real world problems and develop research approaches to deal with them.

And while Cunningham said he has had many positive experiences with mentors over the years, he admitted, "I find these days, I learn more from my students than anyone else."

For relaxation and spare time activities, Cunningham likes to travel to foreign countries, and while at home enjoys outdoor recreation—hiking, skiing and fishing—"particularly in the wilderness."

He and his wife Brooke have a son who is a professional musician, and a daughter who is a junior at MSU majoring in international business.



Al Cunningham

Center staff changes

Diana Tillison, former center office manager and program associate, who has been working the past year as co-program manager of the Native American and Other Minority Institutions (NAOMI) program at Haskell Indian Nations University, has moved to Wichita, Kan., where she will continue to work for the center part-time. Diana will work in the Technical Outreach Services to Communities (TOSC) program, and will continue to produce the proceedings of the center's conferences and prepare special documents.

Wendy Griswold, Lawrence, Kan., has joined the center staff as coprogram associate with the NAOMI program. She is based at Haskell where she had been assisting Diana since January.

As part of a continuing series on the holdings of the Hazardous Substance Research Center repository, following is a partial list of holdings available for checkout or interlibrary loan from Farrell Library at Kansas State University (KSU).

Floppy disk copies of the entire list of holdings are also available. To request a disk copy of the list, write to Repository List, HSRC, Kansas State University, 101 Ward Hall, Manhattan, KS 66506-2502, 913-532-6519, FAX 913-532-5985.

Rec# 1000. Polystyrene and Our Environment [VHS cassette]. Manhattan, Kan.; 1993 Apr 1. VHS Tape.

Rec# 974-999. Topics in Biochemical Engineering (CHE 805) Bioremediation Video Tape Library: 1-26. Student Presentations [VHS cassette]. Manhattan, Kan.; 1993 Mar. VHS tapes.

Rec# 973. RCRA Orientation Program [VHS cassette and manual]. Ann Arbor, Mich.; 1990. VHS Tape and Manual.

Rec# 972. Permit Writer's Training Manual [VHS cassette and manual]. Ann Arbor, Mich.; 1989. VHS Tape and Manual.

Rec# 971. Atrazine, Water Quality and Best Management Practices [VHS cassette]. Lawrence, Kan.; 1994. VHS Tape.

Rec# 970. Application of Peat in Biotechnological Processes and Pollution Control [VHS cassette]. Manhattan, Kan.; 1993. VHS Tape.

Rec# 969. Hazardous Waste Engineering Seminar: Applications of Prompt Gamma Neutron Activation Analysis [VHS cassette]. Manhattan, Kan.; 1994. VHS Tape.

Rec# 968. Hazardous Waste Engineering Seminar: Pollution Prevention [VHS cassette]. Manhattan, Kan.; 1994. VHS Tape.

Journal available at HSRC

Copies of the special issue of the *Journal of Hazardous Materials*, featuring selected papers from the ninth Conference on Hazardous Waste Remediation, are available at a discounted price of \$50 each.

Contact Carla Wolfe at 913-532-6519 to place an order, or for more information.

Engineering Foundation calls for posters, papers

The Engineering Foundation will sponsor its first international conference on "Bioremediation of Surface and Subsurface Contamination," Jan. 21-26, 1996, at the Sheraton Palm Coast Resort, Palm Coast, Fla.

The conference will be organized in topical sessions with a keynote speaker addressing the most critical issues of each topic covered. These will include such areas as general remediation important to selection of cleanup strategies, the role of mathematical modeling in site-remediation strategies, genetically engineered microbial systems, and problems in field applications and hurdles in technology transfer.

Deadline for receipt of abstracts for posters and papers is Aug. 15, 1995. The abstracts should con-

tain 100-200 words and under no circumstances exceed one page. Submitters are asked to use an easily readable typeface, leave one-inch margins on all sides and center the following information at the top of the page: TITLE OF ABSTRACT; author(s); institution/company; address; phone, fax and e-mail.

Abstracts may be mailed/faxed/e-mailed to the Conference Chair, Rakesh Bajpai, Chemical Engineering Dept., Univ. of Missouri, W2030 EBE, Columbia, MO 65211 (fax: 314-884-4940; e-mail: chenrb@showme.missouri.edu); or to Conference Cochair, Mark Zappi, US Army Corps of Engineers, Waterways Experiment Station, CEWES-EE-R, 3909 Halls Ferry Road, Vicksburg, MS 39180 (fax: 601-634-3833; e-mail: zappim@ex1.wes.army.mil).

Center provides education and outreach to communities affected by hazardous waste

The Technical Outreach Services for Communities project continues to provide assistance to communities impacted by hazardous waste in EPA regions VII and VIII. Recent projects include a full-day Community RI/FS workshop on the Rocky Mountain Arsenal in Denver and assistance with a Town Hall meeting on the John Garland Park site in Kansas City, Kan.

The program matches the expertise of center researchers with the needs of communities to provide customized education and assistance to community groups dealing with hazardous waste cleanups, permitting and risk assessment issues. In addi-

tion to the above-mentioned sites, the program can provide support on hazardous substance issues at landfills, groundwater cleanup sites, hazardous waste permitting and other activities where communities have interest in the technical nature of hazardous substance management decisions.

The program provides an information hotline (1-800-798-7796) where interested communities can request assistance. The program is available on a first-come, first-served basis, with priority given to rural and environmental justice communities. HSRC faculty interested in participating in the program should contact Patrick McDonald at (913) 532-7496.

Calendar

July 10-14—Freight Pipeline Seminar, Columbia, MO; University of Missouri-Columbia, John Atkinson, 314-882-8880.

July 14—Inspector/Management Planner Refresher, Overland Park, KS; Center for Environmental Education and Training, Barbara Miles, 913-897-8549.

July 16-29—Technologies in Clean-up and Compliance, Lawrence, KS; Haskell Indian Nations University, Wendy Griswold, 913-749-8498.

July 22-27—Separation Technology VI: Advances and Opportunities in Environmental Separations, Snowbird, UT;

Proposals sought by HSRC

The Great Plains/Rocky Mountain Hazardous Substance Research Center is accepting proposals for both research and training and technology transfer projects for the May 1996-May 1997 funding cycle.

Deadlines are Aug. 15, 1995, for research proposals and Sept. 15, 1995, for training & technology transfer proposals. Copies of the Calls for Proposals may be obtained by calling or writing the GP/RM HSRC, 101 Ward Hall, Kansas State University, Manhattan, KS 66506-2502; phone 913-532-6519; fax 913-532-5985.

Georgia Institute of Technology, Ronald W. Rousseau, 404-894-2867, or Charles A. Eckert, 404-853-9344.

July 30-Aug. 3—AIChE 1995 Summer National Meeting, Planning for a Responsible 21st Century, Boston, MA; University of Utah, Russ Price, 801-585-3277.

Aug. 7-11—Hazardous Waste Summer Institute, Columbia, MO; University of Missouri-Columbia, John Atkinson, 314-882-8880.

Aug. 13-18—ER '95 Environmental Restoration Conference, Denver, CO; U.S. Department of Energy, 202-586-9417.

Aug. 14-16—Hydrologic Evaluation of Landfill Performance Modeling Workshop, Denver, CO; Colorado School of Mines, 303-273-3321.

Aug. 21-25—Statistical Methods in Groundwater Monitoring Studies, Golden, CO; Colorado School of Mines, 303-273-3103.

Aug. 30—Project Designer Refresher, Overland Park, KS; Center for Environmental Education and Training, Barbara Miles, 913-897-8549.

Aug. 31—Contractor/Supervisor Refresher, Overland Park, KS; Center for Environmental Education and Training, Barbara Miles, 913-897-8549.

Sept. 1—Inspector/Management Planner Refresher, Overland Park, KS; Center for Environmental Education and

Training, Barbara Miles, 913-897-8549.

Sept. 19-22—Lead Abatement Training for Supervisors and Contractors, Olathe, KS; Center for Environmental Education and Training, Stacy Milliman, 913-897-8524.

Sept. 20-21—3rd Annual Kansas Pollution Prevention Conference, Salina, KS; Univ. of Kansas Center for Environmental Education and Training, 913-864-3968.

September (dates to be determined)—Preparation for Professional Engineering Examinations (Civil, Electrical, Mechanical), Columbia, MO, and Kansas City, MO; University of Missouri-Columbia, John Atkinson, 314-882-8880.

September (dates to be determined)—Preparation for Registration in ISO 9000, Kansas City, MO; University of Missouri-Columbia, John Atkinson, 314-882-8880.

The 11th Annual Hazardous Waste Research Conference has been scheduled for May 20-24, 1996, in Albuquerque, N.M. It will be cosponsored by the Great Plains/Rocky Mountain Hazardous Substance Research Center and the Waste-Management Education and Research Consortium.

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