

November Section Meeting: Occurrence and Remediation of 1,4-Dioxane in a Large-Scale Plume

This month's presentation will describe the occurrence and remediation of a large scale 1,4-dioxane plume at a large scale manufacturing facility located in the south west US. The facility was constructed in the 1950's. The facility historically used solvents as a degreaser, and disposed of the spent solvents by a variety of methods with apparent leakage or inadvertent release transferring the solvent to soil and groundwater.

The primary solvent used at the facility from inception through the 1880s was trichloroethene. As awareness of the risks associated with trichloroethene increased in the 1970s and 1980's, industry sought "safer" solvents. One of these solvents was 1,1,1-trichloroethane, a compound similar to trichloroethene but with a slightly different structure. However, 1,1,1-trichloroethane is a less stable compound, so it was used in conjunction with solvent stabilizers to extend its life. One of these stabilizers was 1,4-dioxane, a cyclic ether compound that was added to commercial 1,1,1-trichloroethane products at up to 8 percent.

November Section Meeting

- Topic:** Occurrence and Remediation of 1,4-Dioxane in a Large-Scale Plume
- Speaker:** Jim Hatton, Senior Engineer, AECOM Environment, Greenwood Village, CO
- Date:** Tuesday, November 18th
- Time:** 6:00 Social Time
6:45 Dinner
7:45 Presentation
- Location:** PPA Event Center
2105 Decatur Street, Denver
- Cost:** Members: \$20
(w/RSVP)* Non-Members: \$25
Students & Unemployed: \$10

Please RSVP by Friday, November 14th (early RSVPs are greatly appreciated!) indicating your name, phone number, and number of attendees. Please RSVP to Martin Vorum by phone at 303-384-7414 or email at rockyaiche@yahoo.com.

*Add \$5 for attending meeting without RSVP

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Because of the properties that make 1,4-dioxane an effective solvent stabilizer – its stability and resistance to degradation and its affinity for water – it is a very difficult compound to treat. It only degrades rapidly when treated by the strongest oxidizers. It can be degraded biologically via cometabolism, but application in the field is difficult. It does not sorb well and it does not air strip at all. While the toxicity is somewhat debatable, EPA has designated it a probable carcinogen. Treatment goals for groundwater vary from 3 to 80 parts per billion. The state of the art for treatment is ex situ chemical oxidation, with biological and chemical treatment in development.

The 1,1,1-Trichloroethane mixes were used during the 1980's in plating and coating processes. In the 1980's, trichloroethene, from earlier sources, was detected in drinking water wells near the site. At this time, there was no analytical procedure to test for 1,4-dioxane. Trichloroethene groundwater remediation was initiated using a pump and treat system, based on treatment in stripping towers. But, because of 1,4-dioxane's high solubility, it is not treated by air stripping. Later, when analytical methods for 1,4-dioxane were improved, the compound was detected in treatment plant effluent and a groundwater plume was subsequently defined.

Since discovery of the 1,4-dioxane plume, the owner, operator and state and local agencies have struggled to set appropriate clean up goals and implement remediation. This talk will discuss the goals of remediation, regulatory issues, results of testing of available technologies, and implementation of the advanced oxidation

process currently under construction to address 1,4-dioxane in recharge water.

Mr. Hatton has a B. S. degree in Petroleum Engineering from West Virginia University and 20 years experience in soil and groundwater remediation. He is a Senior Engineer with AECOM Environment's Earth Tech Heritage Group in Greenwood Village, Colorado. Mr. Hatton has been involved with this project since 2000, and has dealt with 1,4-dioxane contamination-related issues since the early 1990's.

NEW MEXICO CORNER

If you'd like to volunteer to speak at a future meeting or if you have any meeting/activity ideas, please let me know! Participation in the Albuquerque area has increased over the last year and I'd like to keep this trend going! Again, a warm "Thank You" to all of the AIChE-NM members for making our little sub-section a great one! See you soon!

Kerrie Greenfelder, New Mexico Liaison
GreenfelderKL@cdm.com

EMPLOYMENT - Positions Available

Process Engineering Associates, LLC is currently seeking multiple individuals for process design engineering assignments on an exciting new laser isotope separation project in the commercial nuclear fuels production industry. Successful candidates will work for PROCESS as members of the process design team. Work will be performed primarily in Oak Ridge, Tennessee and will require minimal travel. Project duration is expected to be 3-5 years with likely opportunities for follow-on assignments. Minimum job requirements include a B.S. in Chemical Engineering and 5 years of design and operating experience in a chemical or nuclear materials processing facility. An active government Q-Clearance is required and prior UF6 experience is preferred. Advanced degree and professional registration desired but not required. Pay rate will be based on qualifications and experience. PROCESS is a world class specialty engineering company focussed solely on applied chemical engineering. Visit us on the web at www.ProcessEngr.com <<http://www.processengr.com>>. Qualified applicants should send resumes via email to info@processengr.com.

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Listing will also be placed on web page (aiche.org/rockymtn).*

AIChE Meetings

2008

Nov 16-21 AIChE Annual Mtg.
Philadelphia, PA

Dec 3-5 Science & the
Emerging
Bioeconomy
Scottsdale, AZ

2009

Jan 18-21 SBE 2nd Int'l Conf.
on Biomolecular
Engineering
Santa Barbara, CA

Mar 9-12 SBE Accelerating
Biopharmaceutical
Development
Coronado Isl., CA

Apr 26-30 2009 Spring Nat'l
Tampa, FL

Sept 13-19 2009 Ammonia
Conference
Calgary, Alberta

For further information, contact
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National AIChE Contact Info

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Web Page: <http://www.aiche.org>

Rocky Mountain AIChE Officers

Tom Wellborn	Director / Treasurer	303/933-0533 wellborns@mindspring.com
Craig Turchi	Chair	303/384-7565 craig_turchi@nrel.gov
Martin Vorum	Vice-Chair / Program	303/384-7414 Martin_Vorum@nrel.gov
Kevin Milliman	Secretary	303/704-7530 Kmilliman@evenergy.com
Dan LaRiviere	Website Administrator	303/462-7350 daniel.lariviere@jacobs.com
Glenn Sprenger	Membership	303/353-3989 glenn.sprenger@merrick.com
Mike Moes	Communication	303/796-0535 mmoes@ekiconsult.com
Kerrie Greenfelder	New Mexico Liaison	505/243-3200 GreenfelderKL@cdm.com
Morris Argyle	Wyoming/SD Liaison	307/766-2973 mdargyle@uwyo.edu
Laura Moes	Editor	303/770-2432 Lauramoes@msn.com

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The objectives of AIChE are to advance chemical engineering in theory and practice, to maintain a high professional standard among its members, and to serve society, particularly where chemical, engineering can contribute to the public interest.

Rocky Mountain AIChE News Publication Schedule

January 2009 issue
Articles due Wednesday, January 7th
Publish on Friday, January 9th
Meeting on Tuesday, January 20th

MEETING SCHEDULE

The Rocky Mountain District of AIChE generally meets the third Tuesday of every month, September through November and January through May.

Rocky Mountain AIChE News
America Institute of Chemical Engineers
7900 S. Monaco Ct.
Centennial, CO 80112-1326

On the Web at:

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 -  Invesco Field at Mile High
 -  Aquarium Restaurant
 -  Six Flags Elitch Gardens
 -  Pepsi Center
 -  Downtown Denver
- I-25 to 23rd Ave. Exit #211
West to Clay Street
South on Clay Street to 21st Ave.
West on 21st Ave. To Decatur St.
PPA Event Center is on the corner
of 21st Ave. And Decatur Street*