

SOFTWARE REVIEW

UTCHEM

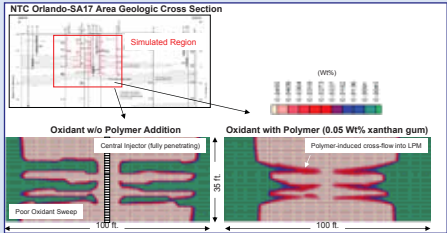
John E. McCray and Jeffrey A.K. Silva
 – Colorado School of Mines. Software Review
 courtesy of IGWMC and Col. School of Mines


The UTCHEM 6.1 software package can model transient and steady-state 3-D advective and dispersive flow and mass transport in saturated and unsaturated porous media. It has been used to simulate field-scale problems and laboratory experiments. It has a 3-phase formulation (relative permeability, capillary pressure, etc.), and can simulate movement of aqueous and non-aqueous phase liquid (NAPL) phases, but not contaminant vapor movement. The software allows for changes in fluid properties as a site is remediated; heterogeneous aquifer properties; variable density/viscosity; addition of remedial fluids, including surfactants and cosolvents; and dissolution/mobilization of NAPLs. UTCHEM can simulate equilibrium and nonequilibrium interphase mass transfer, including


dual-domain transport, sorption (linear and non-linear), and NAPL dissolution. NAPL mixtures can be simulated, but constant NAPL-water partitioning coefficients are assumed instead of using Raoult's law to permit dynamic NAPL dissolution. The biodegradation model includes sequential electron-acceptor use and cometabolism. The geochemical option allows for modeling of any solid or aqueous species. Researchers at the Colorado School of Mines have been using UTCHEM to simulate polymer floods in groundwater remediation applications.


Two graphical user interfaces (GUIs) are available. A stand-alone GUI can be obtained from Gary Pope at the University of Texas, which we recommend for 1-D and 2-D problems. A limited version of UTCHEM is included in the U.S. Department of Defense's Groundwater Modeling System (GMS), which is useful when importing GIS data to set up a 3-D model.


Review of UTCHEM





Ease of Use:  Excellent

GUI:  Excellent

Output/Plotting:  Excellent

Documentation:  Excellent



Speed:  Excellent

OVERALL RATING:  Excellent

Application: Multiphase flow, transport, and remediation

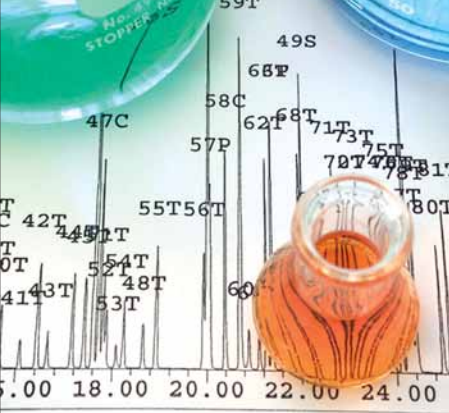
Best Features: Multiple processes

Worst Feature: No vapor transport

Rating System: Excellent  Poor 

IGWMC International Ground Water Modeling Center
 Department of Geology and Geological Engineering

The FORTRAN source code, along with sample input and output files, are available at no charge from the U.S. Environmental Protection Agency at www.epa.gov/ada/csmos/models/utchem.html

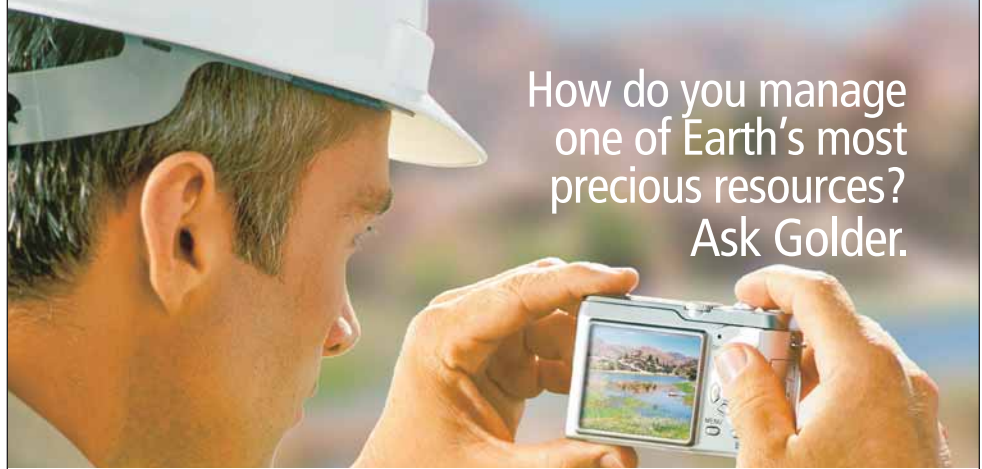


- Full Service Environmental Laboratory
- Mobile Laboratories (screening & compliance)
- Sampling Services
- Testing for: CWA, RCRA, SDWA, TSCA

TRANSWEST GEOCHEM
www.transgeo.com

Phone: (602) 437-0330 (Phoenix)
 (520) 573-1061 (Tucson)
 Toll Free: (800) 927-5183

3725 E. Atlanta Ave., Suite 2, Phoenix, AZ 85040
 3860 S. Palo Verde Rd., Suite 301, Tucson, AZ 85714



We focus on sustainable water resource solutions.

The world's most precious resource is becoming more precious by the minute. That's why responsible management is critical to ensuring water for industry and agriculture, for household needs... and for the future. Golder has been providing cost-effective solutions to satisfied clients for over 45 years, finding better ways to discover, produce, transport, manage and treat water.

Global Issues. Local Solutions.



Local offices:
 Tucson (520) 888-8818
 Albuquerque (505) 821-3043
solutions@golder.com
www.golder.com

© 2006 GAC