



Dr. Tom Sale

- Associate Professor, Civil Engineering, Colorado State University
- Director, Center for Contaminant Hydrology

Dr. Tom Sale is an Associate Professor and the Director of the Center for Contaminant Hydrology in Civil and Environmental Engineering at Colorado State University and an independent consulting hydrogeologist. Research and consulting over the past 30-years have focused on innovative solutions for groundwater contaminants in source zones and plumes. The Center for Contaminant Hydrology currently supports five full-time staff members, 4 PhD students, 6 MS students and three undergraduate students. The center conducts ~ \$1,500,000 in remediation research annually. Current sponsors include the USDoD, Chevron, DuPont, Shell, Suncor Energy, ExxonMobil, and GE. The innovative nature of the Center's research is reflected in acquisition of six final and one provisional patents over the last nine years.

Dr. Sale received his Ph.D. from Colorado State University, M.S. Degree from the University of Arizona, and B.A. degrees from Miami of Ohio. His abilities are reflected in his selection for the Environment Protection Agency DNAPL Source Expert Panel and the National Research Council's Army funded Committee on Source Removal of Contaminants in the Subsurface.

Honours and Awards

- 2012, 2011, 2010, 2009, 2008, 2007, 2006, 2005, 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995 - Award for Outstanding Contributions to Economic Development, College of Engineering
- 2010 - Research Faculty Award, CSU - Department of Civil & Environmental Engineering
- 2003 - Research Faculty Award, CSU - CIVE
- 1997 - Best Ph.D. Presentation, American Geophysical Union
- 1996 - Harlan Erker Scholarship, Colorado Ground Water Association
- 1992 - Innovation Award for the Union Pacific Railroad In Situ Treatment Process Development Program, CH2M HILL

Selected Papers

Selected Publications

Mahler, N., T. Sale, and M. Lyverse, (2012), A Mass Balance Approach to Resolving LNAPL Stability, *Journal of Ground Water*.

Olson, Mitchell R.; Thomas C. Sale; Charles D. Shackelford, Chris Bozzini, and Jessica Skeeane. (2012), DNAPL Source Zone Remediation at Camp Lejeune via ZVI-Clay Soil Mixing: One-Year Results, *Journal of Groundwater Monitoring and Remediation*.

Smith, T., T. Sale, and M. Lyverse, (2012), Measurement of LNAPL Flux Using Single-Well Intermittent Mixing Tracer Dilution Test, *Journal of Ground Water*.

Mahler, N; T. Sale; T. Smith; and M. Lyverse, (2012), Use of Single-Well Tracer Dilution Tests to Evaluate LNAPL Flux at Seven Field Sites, Submitted to the *Journal of Ground Water*.

Castlebaum, D; M. Olson, T. Sle; and C. Shackelford, (2011) Laboratory Apparatus and Procedures for Preparing Test Specimens of Slurry Mixed Soils, *Geotechnical Testing Journal (GTJ)*, Volume 34, Issue 1 (January 2011)

Blotevogel, J.; Mayeno, A.N.; Sale, T.C.; Borch, T. (2011): Prediction of contaminant persistence in aqueous phase: A quantum chemical approach. *Environmental Science & Technology*.

Shackelford, C.D, and T.C. Sale, (2011), Using the ZVI-Clay Technology for Source Zone Remediation, *American Society of Civil Engineers, GeoStrata*, No. 2, Vol. 15 pp. 36-42.

Blotevogel, J.; Borch, T.; Desyaterik, Y.; Mayeno, A.N.; Sale, T.C. (2010): Quantum chemical prediction of redox reactivity and degradation pathways for aqueous phase contaminants: An example with HMPA. *Environmental Science & Technology*, 44 (15), 5868-5874.

Sale, T., J. Zimbron, and D. Dandy, (2008), Effects of reduced contaminant loading on downgradient water quality in an idealized two layer system, *Journal of Contaminant Hydrology*, Vol 102, pp 72-85.

Sale, T., G. Taylor, G. Iltis, and M. Lyverse, (2007), Measurement of LNAPL Flow Using Single-Well Tracer Dilution Techniques, *Ground Water*, Vol. 45, No.5, September-October, pp. 569-578.

Petersen, M.A., T.C. Sale, and K. F. Reardon, (2007), Electrolytic trichloroethene degradation using mixed metal oxide coated titanium mesh electrodes, *Chemosphere* Volume 67, Issue 8, April 2007, Pages 1573-1581.

Gilbert, D. and T. Sale. (2005), Sequential Electrolytic Oxidation and Reduction of Aqueous Phase Energetic Compounds. *Environmental Science Technology* 39:9270-9277.

McWhorter, D. and T. Sale, (2003), Reply to comments by P.S.C. Rao and J.W. Jawitz on "Steady state mass transfer from single-component dense nonaqueous phase liquids in uniform flow fields" by T.C. Sale.

Sale, T. and D. McWhorter, (2001), Steady-state mass transfer from single-component DNAPLs in uniform flow fields. *Water Resources Research*, 37(2): 393-404.

Simpkin T., T. Sale, B. Kueper M. Pitts, and K. Wyatt, (1999), *Surfactants and Cosolvents for NAPL Remediation: A Technology Practices Manual*, ATDF Editors. Lowe, D.F., K., Oubre, C.L., Ward, C.H., Lewis Publishers.

Sale, T. and D. Applegate. (1997). Mobile NAPL recovery: Conceptual, field, and mathematical considerations. *Ground Water*. 35(3). pp. 418-426.

Sale, T. and D. Applegate. (1996). Oil recovery at a former wood-treating facility. *Water Environment Research*. 68(7). pp. 1116-1122.

Admire, J., J. de Albuquerque, J. Cruze, K. Piontek, and T. Sale, (1996), Case Study: Natural Attenuation of Dissolved Hydrocarbons at a Former Natural Gas Plant. *Society of Petroleum Engineers. Advanced Technologies Series, Health, Safety, and Environmental Issues*. SPE 29755, Pages 619-630.