

CURRICULUM VITAE

ROBERT L. SIEGRIST, Ph.D., P.E., BCEE

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RESEARCH AREAS AND PROFESSIONAL EXPERIENCE

Water quality monitoring, site characterization, and risk assessment
In situ remediation of contaminated soil and ground water systems
Chemical treatment processes for degradation of organics and metals removal
Onsite and small town water supply and wastewater treatment and disposal/reuse
Water conservation and waste recycling and reuse
Intermediate and field-scale experimentation and technology demonstration

EDUCATION

Ph.D. - Civil and Environmental Engineering, University of Wisconsin, Madison, WI	05/86
Major: Environmental Engineering Minor: Soil Science	
M.S. - Civil and Environmental Engineering, University of Wisconsin, Madison, WI	05/75
B.S. - Civil Engineering (<i>High Honors</i>), University of Wisconsin, Madison, WI	12/72

POSITIONS HELD

Professor and Division Director	05/01 - present
Colorado School of Mines, Environmental Science and Engineering Division, Golden, CO	
Associate Professor	01/95 - 04/01
Colorado School of Mines, Environmental Science and Engineering Division, Golden, CO	
Faculty Affiliate	01/00 - 12/03
Colorado State University, Chemical and Bioresource Engineering, Fort Collins, CO	
Adjunct Faculty R&D Participant	01/95 - 09/00
Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, TN	
Group Leader, Environmental Engineering	06/90 - 12/94
Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, TN	
Associate Professor (Adjunct)	09/92 - 12/94
The University of Tennessee, Civil Engineering Department, Knoxville, TN	
Visiting Senior Scientist	03/88 - 04/89
Agricultural Univ. of Norway, Institute for Georesources and Pollution Research, Aas, Norway	
Senior Engineer and Project Manager	05/86 - 02/88; 06/89 - 06/90
Ayres Associates, Inc., Environmental Management Division, Madison, WI	
Principal Engineer and Partner	06/82 - 12/84
RSE, Inc., Madison, WI	
Research Staff Member	02/75 - 12/84
University of Wisconsin, Dept. of Civil and Environmental Engineering, Madison, WI	

HONORS AND ACHIEVEMENTS

Board Certified Environmental Engineer, American Academy of Environmental Engineers, Annapolis, MD, 2007
Outstanding Project of the Year Award, DoD Strategic Environmental Research and Development Program (SERDP),
Washington, D.C., 2005
Inducted into the Wall of Fame, Waukesha High School, Waukesha, Wisconsin, 2004
NATO Fellow, NATO Committee on Challenges to Modern Society, 1995 – 2002

Best Paper Award, Spectrum '98 International Conference, American Nuclear Society, Denver, CO, 1998
Technical Achievement Award, X-231B In Situ Treatment Project, Oak Ridge National Laboratory, 1995
Best Poster Presentation, WEFTEC '94, Water Environment Federation, 1994
Best Paper Award, Waste Management '93 Symposium, February 1994
Significant Event Awards, Oak Ridge National Laboratory, 1992 and 1995
Distinguished Performance, Oak Ridge National Laboratory, 1991 and 1992
Visiting Senior Scientist, Research Council of Norway, 1988-1989
Vilas Fellow, University of Wisconsin, 1973
B.S. degree conferred with High Honors, University of Wisconsin, 1972
Ray and Theo Owen Scholarship, University of Wisconsin, 1972

PATENTS

“Method and Compositions for Treatment of Subsurface Contaminants” by P.J. Dugan, R.L. Siegrist, and M.L. Crimi.
Patent application filed on October 10, 2006, application number: 11/585,417. Patent pending.

“Oxidative Particle Mixtures for Ground Water Treatment” by R.L. Siegrist and L.C. Murdoch (Clemson Univ.).
Patent issued on August 15, 2000. U.S. Patent No. 6,102,621.

PROFESSIONAL REGISTRATION AND RECENT SERVICE ACTIVITIES

Registered Professional Engineer, Wisconsin E-18239 (1978 to date)
Member - Association of Environmental Engineering and Science Professors
Member - Water Environment Federation
Member - National Ground Water Association
Member - American Society of Civil Engineers
Member - National Environmental Health Association
Member - Colorado Environmental Health Association
Member - National Onsite Wastewater Recycling Association
Member - USEPA Office of Research and Development, Board of Scientific Counselors, Subcommittee on Land Preservation and Restoration (2005-2006; 2008)
Member - Water Environment Research Foundation, Decentralized Research Advisory Committee (2003-2006; 2007-date)
Member - Program Committee, Water Environment Federation (2000-2005)
Member - Executive Committee, Consortium of Institutes for Decentralized Wastewater Systems (1996-2003)
Chair - Research Committee, Consortium of Institutes for Decentralized Wastewater Systems (1996-2003)
Member - State Steering Committee, Colorado Board of Health and Water Quality Control Commission (2001-2003)
Member - ISDS Technical Advisory Committee, Colorado Department of Health and Environment (1998-2003)
Ad Hoc Peer Reviewer for *Environmental Science & Technology*, *Water Research*, *Journal of Environmental Engineering*, *Groundwater Monitoring & Remediation*, U.S. EPA, DOE, DOD, and others.

RESEARCH GRANTS AND CONTRACTS

Grants and Contracts Acquired at CSM

“Florida Onsite Sewage Nitrogen Reducing Strategies Study.” \$176,564. 2009. Florida Department of Health through Hazen & Sawyer. PI with Co-PI's John McCray and Kathryn Lowe.

“In Situ Chemical Oxidation for Groundwater Remediation – Technology Practices Manual.” \$995,619. 2006-2009. DoD Environmental Security Technology Certification program (ESTCP). PI with Co-PI's, Michelle Crimi, Tissa Illangasekare, with Junko Munakata-Marr and Tom Simpkin (CH2MHILL), Tom Palaia (CH2MHILL), and Mike Singletary (Navy).

“Improved Monitoring Methods for Performance Assessment during Remediation of DNAPL Source Zones.” \$209,600. 2006-2009. DoD Strategic Environmental Research and Development Program (SERDP). PI with co-PI, Michelle Crimi.

“Evaluation of Engineered Treatment Units for Removal of Endocrine Disrupting Compounds and Other Organic Wastewater Contaminants During Onsite Wastewater Treatment.” \$49,746. 2007-2008. USGS through the Colorado Water Resources Research Institute. PI with co-Investigators, K.D. Conn, and L.B. Barber (USGS).

“Reaction and Transport Processes Controlling In Situ Chemical Oxidation of DNAPLs.” \$764,000. 2002-2005. DoD Strategic Environmental Research and Development Program (SERDP). PI with Co-PI's, Tissa Illangasekare and Junko Munakata-Marr.

- “Mass Transfer from Entrapped DNAPL Sources Undergoing Remediation: Characterization Methods and Prediction Tools.” \$890,838. 2002-2005. DoD Strategic Environmental Research and Development Program. Co-PI with PI, Tissa Illangasekare and co-PI’s, Todd Cort, Dong Ping Dai, Junko Munakata-Marr, and Kenishi Soga (Cambridge).
- “Field Performance Evaluation of Engineered Pretreatment Units and their Effects on Biozone Formation in Soils and System Purification Efficiency.” \$199,221. 2003-2004. U.S. EPA. National Decentralized Water Resources Capacity Development Project. PI with co-PI’s, Jorg Drewes, Junko Munakata-Marr, Linda Figueroa, Kathryn Lowe, and Sheila Van Cuyk.
- “Experimental Evaluation of In Situ Chemical Oxidation Activities at the Naval Training Center (NTC) Site, Orlando, Florida.” \$31,000. 2003-2004. Naval Facilities Engineering Command, Port Hueneme, California. co-PI with PI, Michelle Crimi.
- “Hydrogeological Evaluations for Large Cluster and High Density Wastewater Soil Absorption Systems.” \$83,864. 2003-2004. U.S. EPA. Co-PI with PI, Eileen Poeter and co-PI’s, John McCray and Geoff Thyne.
- “Occurrence and Fate of Emerging Organic Chemicals in Onsite Wastewater Systems and Implications for Water Quality Management in the Rocky Mountain Region.” \$106,822. 2002-2004. U.S. Geological Survey, National Institutes for Water Research Competitive Grants Program, Reston, VA. PI with Co-PI’s, John McCray, Kathryn Lowe, and Larry Barber (USGS).
- “Chemical Oxidation Technologies using Permanganate.” \$13,500. 2001. CARUS Chemical Company, Peru, Illinois. Co-PI with PI, Michael Urynowicz.
- “Quantifying Site-Scale Processes and Watershed-Scale Cumulative Effects of Decentralized Wastewater Systems.” \$627,500. 2000-2003. U.S. EPA program on National Decentralized Water Resources Capacity Development. PI with Co-PI’s, John McCray and Tissa Illangasekare (CSM), Robert Goldstein (EPRI) and Ron Harvey (USGS).
- “Integrated Risk Assessment of Decentralized Wastewater Systems.” \$11,000. 2002-2003. Technical Advisor to Oak Ridge National Laboratory. U.S. EPA. Principal Investigator.
- “Wastewater Treatment in Aggregate-Free Soil Infiltration Systems: Virus Fate under Field Conditions.” \$75,000. 2000-2001. Infiltrator Systems, Inc. PI with co-PI, Kathryn Lowe.
- “Quantifying Hydraulic and Purification Processes in Onsite and Alternative Wastewater Treatment Systems.” \$2,100,000. 2000-2005. Program Director for a multi-investigator and multi-institutional research effort funded through the CSM Foundation.
- “Analysis and Experimentation of Environmental Measurement, Assessment, and Treatment of Water, Waste, and Contaminated Soil and Groundwater.” Lockheed Martin Energy Research Corporation. \$743,581. 1995 - 2001. Project Director with faculty and student participants.
- “An Automated Research Microscope for Visualization and Analysis of Environmental Biological Samples.” \$65,186. 2000-2001. National Science Foundation. Co-PI with PI, Junko Munakata-Marr and co-PI’s, Linda Figueroa, Kevin Mandernack, and Kim Williams.
- “Modeling Unsaturated Flow and Transport in Soil-Based Wastewater Treatment Systems”. Infiltrator Systems Incorporated. \$54,000. 1999-2000. Co-PI with PI, Dr. John McCray.
- “Experimental Validation and Reliability Evaluation of Multimedia Risk Assessment Models.” STAR Grant, National Center for Environmental Research and Quality Assurance, U.S. EPA Office of Research and Development. \$256,000. 1996-1999. PI with Co-PI, Dr. Helen Dawson.
- “Wastewater Treatment in Aggregate-Free Soil Infiltration Systems.” Infiltrator Systems Incorporated. \$316,000. 1997-2000. PI with Co-PI, Dr. Linda Figueroa.
- “In Situ Chemical Oxidation of Chlorocarbons in Soil by Multipoint Injection.” Erler & Kalinowski, Inc. \$15,514. 1998. PI.
- “Experiences with the Performance of In Situ Treatment Technologies including Methods for Process Control, Determination of Treatment Efficiency, and Verification of Risk Reduction.” NATO Scientific Affairs Division. \$6,000. 1995 - 1999. PI.
- “Fouling Processes in Environmental Horizontal Wells.” Schumacher Filters America, Inc. \$60,000. 1996-1997. PI.
- “Assistance in Hosting the NATO/CCMS International Meeting on the Cleanup of Contaminated Land and Groundwater.” U.S. EPA Office of Research and Development. \$9,972. 1997. PI.
- “Review and Analysis of the Solar Ponds IM/IRA and Pondcrete Disposition Plan.” DOE Rocky Flats Environmental Technology Site. \$20,600. 1995. PI.

Grants and Contracts Acquired before Joining CSM

- “In Situ Remediation of DNAPLs in Low Permeability Media.” U.S. Department of Energy, Office of Science and Technology, Oak Ridge National Laboratory. \$1,800,000. 1993-1998. Project Director at Oak Ridge National Laboratory (ORNL) and then Technical Advisor to the ORNL team after joining CSM.
- “In Situ Treatment of Mixed Contamination in Groundwater.” U.S. DOE Office of Science and Technology. \$1,100,000. 1993-1997. PI for ORNL from 1993-1995. Co-PI from 1995-1997 with PI, Nic Korte of ORNL.
- “Evaluation and Screening of Treatment Methods for Low Level Mixed Waste Sludges.” DOE Rocky Flats Environmental Technology Site Office. \$160,000. 1994. PI for ORNL.
- “Stability of Volatile and Semivolatile Organic Compounds in Environmental Samples.” U.S. DOE Office of Science & Technology, Laboratory Management Branch. \$650,000. 1992-1997. PI for ORNL from 1992-1995. Technical Advisor to PI, Olivia R. West of ORNL from 1995-1997.
- “In Situ Chemical Oxidation of Soils.” U.S. Department of Energy, Office of Science & Technology. \$300,000. 1993-1997. PI from 1993 to 1994. Co-PI with PI, Dianne D. Gates of ORNL from 1994-1997.
- “Treatment of Organic/Inorganic Contaminants Using Reactive Sorbents.” U.S. Department of Energy, Office of Environmental Restoration. \$300,000. 1993-1994. Co-PI with PI, Liyuan Liang of ORNL.
- “Development of Nationally Consistent Cleanup Criteria for Hazardous Waste Contaminated Sites.” U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. \$150,000. 1992-1993. PI for ORNL, with co-PI, Larry Barnthouse of ORNL.
- “In Situ Treatment of Chlorinated Organic Compounds and Radioactive Substances in Clay Soils.” U.S. Department of Energy, Office of Environmental Restoration. \$3,300,000. 1990-1993. Project Director and PI for ORNL with co-PI's, Olivia R. West and Dianne D. Gates of ORNL.
- “National Symposium on Measuring and Interpreting VOCs in Soil: State-of-the-art and Research Needs.” U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory. \$40,000. 1992-1993. Symposium Organizer and Chairman.
- “In Situ Destruction of Volatile Organic Compounds - An American/German Collaboration.” U.S. Department of Energy, International Technology Exchange Program. \$350,000. 1992-1993. PI for ORNL.
- “In Situ Bioremediation of Diesel Fuel Contaminated Soil on Kwajalein Island, Republic of the Marshall Islands.” U.S. Army. \$750,000. 1991-1992. Co-PI for ORNL with PI, Terry Donaldson, of ORNL.
- “International Perspectives on Establishment of Cleanup Goals for Hazardous Waste Contaminated Land.” Norwegian State Pollution Control Authority. \$25,000. 1988-1989. PI for Agricultural Univ. of Norway.
- “Sampling Method Effects on VOC Measurements in Solvent Contaminated Soil.” Norwegian State Pollution Control Authority. \$25,000. 1988-1989. PI for the Agricultural Univ. of Norway.
- “Design and Performance of Onsite Sewage Disposal Systems in Florida.” State of Florida, Department of Health and Rehabilitative Services. \$900,000. 1985 - 1988. Co-PI for Ayres Associates, with PI, Damann Anderson of Ayres Associates, Inc.
- “Design and Management of Soil Absorption Systems.” U.S. Environmental Protection Agency, Risk Reduction Engineering Laboratory. \$200,000. 1977-1986. Co-PI for the University of Wisconsin (UW) with PI's, William C. Boyle and E. Jerry Tyler of UW.
- “Performance of Ultra-low Volume Flush Toilets in Phoenix, Arizona. Ifö Sanitaire, Inc. \$20,000. 1985. Co-PI for Ayres Associates with PI, Damann Anderson of Ayres Associates, Inc.
- “Onsite Treatment of Commercial Wastewaters.” State of Wisconsin. \$30,000. 1982-1984. PI for UW.
- “Performance Evaluation of Large-scale Wastewater Infiltration Systems.” U.S. Environmental Protection Agency, Risk Reduction Engineering Laboratory. \$60,000. 1981-1983. PI for Ayres Associates with Co-PI, Dave Hargett of Ayres Associates, Inc.
- “Field Evaluation of Water Conservation and Wastewater Reduction Systems for Residential Application.” U.S. Office of Water Research and Technology. \$137,000. 1978-1980. Co-PI for UW with PI, William C. Boyle, of UW.

PUBLICATIONS

Refereed Journal Articles - Published or In Press

- Tomaras, J., J.W. Sahl, R.L. Siegrist, J.R. Spear. 2009. Microbial Diversity of Septic Tank Effluent and a Soil Biomat. *Applied and Environmental Microbiology*, 75(10):xxx-xxx. Accepted and in press.

- Tsitonaki, A., B. Petri, M. Crimi, H. Mosbaek, R.L. Siegrist, P.L. Bjerg. 2009. *In Situ* Chemical Oxidation of Contaminated Soil and Groundwater using Persulfate: A Review. *Critical Reviews in Environmental Science and Technology*. Accepted and in press.
- Oesterreich, R.C., R.L. Siegrist. 2009. Quantifying Volatile Organic Compounds in Porous Media: Effects of Sampling Method Attributes, Contaminant Characteristics and Environmental Conditions. *Environmental Science & Technology*, 43(8):2891-2898.
- Heiderscheidt, J., M.L. Crimi, R.L. Siegrist, M. Singletary. 2008. Optimization of Full-scale Permanganate ISCO System Operation: Laboratory and Numerical Studies. *J. Ground Water Monitoring and Remediation*, Fall 2008, 28(4):72-84.
- Heiderscheidt, J., R.L. Siegrist, T.H. Illangasekare. 2008. Intermediate-Scale 2D Experimental Investigation of In Situ Chemical Oxidation using Potassium Permanganate for Remediation of Complex DNAPL Source Zones. *J. Contaminant Hydrology*, 102(1-2):3-16.
- Lowe, K.S., S.M. VanCuyk, R.L. Siegrist, J.E. Drewes. 2008. Field Evaluation of the Performance of Engineered Onsite Wastewater Treatment Units. *ASCE J. Hydrologic Eng.*, 13(8):735-743.
- Petri, B., R.L. Siegrist, M.L. Crimi (2008). Effects of Groundwater Velocity and Permanganate Concentration on DNAPL Mass Depletion Rates During In Situ Oxidation. *J. Environmental Engineering*, 134(1):1-13.
- Lowe, K.S., R.L. Siegrist. 2008. Controlled Field Experiment for Performance Evaluation of Septic Tank Effluent Treatment during Soil Infiltration. *ASCE J. Environmental Engineering*, 134(2):93-101.
- Sahl, J.W., J. Munakata-Marr, M.L. Crimi, R.L. Siegrist. 2007. Coupling Permanganate Oxidation with Microbial Dechlorination of Tetrachloroethene. *Water Environment Research*, 79(1):5-12.
- Van Cuyk, S.M., R.L. Siegrist (2007). Virus Removal within a Soil Infiltration Zone as Affected by Effluent Composition, Application Rate, and Soil Type. *Water Research*, 41(2007):699-709.
- Conn, K.E., L.B. Barber, G.K. Brown, R.L. Siegrist. 2006. Occurrence and Fate of Organic Contaminants during Onsite Wastewater Treatment. *Environmental Science & Technology*, 40(23):7358-7366.
- Siegrist, R.L., K.S. Lowe, M.L. Crimi, M.A. Urynowicz. 2006. Quantifying PCE and TCE in DNAPL Source Zones: Effects of Sampling Methods Used for Intact Cores at Varied Contaminant Levels and Media Temperatures. *J. Ground Water Monitoring and Remediation*, 26(2):114-124.
- Poeter, E., McCray, J., Thyne, G. R. Siegrist. 2005. Designing Cluster and High-Density Wastewater Soil-Absorption Systems to Control Groundwater Mounding. *Small Flows Journal*, 7(4):24-36.
- Crimi M.L., R.L. Siegrist. 2005. Factors Affecting Effectiveness and Efficiency of DNAPL Destruction Using Potassium Permanganate and Catalyzed Hydrogen Peroxide. *J. Environmental Engineering*, 131(12):1716-1723.
- Urynowicz, M.A., R.L. Siegrist. 2005. Interphase Mass Transfer during Chemical Oxidation of TCE DNAPL in an Aqueous System. *J. Contaminant Hydrology*, 80(3-4):93-106.
- Beach, D.N.H., J.E. McCray, K.S. Lowe, R.L. Siegrist. 2005. Temporal Changes in Hydraulic Conductivity of Sand Porous Media Biofilters during Wastewater Infiltration Due to Biomat Formation. *J. Hydrology*, 311(2005):230-243.
- McCray, J.E., S.L. Kirkland, R.L. Siegrist, G.D. Thyne. 2005. Model Parameters for Simulating Fate and Transport of Onsite-Wastewater Nutrients. *Ground Water*, 43(4):628-639.
- Ross, C., L.C. Murdoch, D.L. Freedman, R.L. Siegrist. 2005. Characteristics of Potassium Permanganate Encapsulated in Polymer. *J. Environmental Engineering*, 131(8):1203-1211.
- Siegrist, R.L., J.E. McCray, K.S. Lowe. 2004. Wastewater Infiltration into Soil and the Effects of Infiltrative Surface Architecture. *Small Flows J.*, 5(1):29-39.
- Crimi, M.L., R.L. Siegrist. 2004. Association of Cadmium with MnO₂ Particles Generated During Permanganate Oxidation. *Water Research*, 38(4):887-894.
- Van Cuyk, S., R.L. Siegrist, K.S. Lowe, R.W. Harvey. 2004. Evaluating Microbial Purification during Soil Treatment of Wastewater with Multicomponent Tracer and Surrogate Tests. *J. Environmental Quality*, 33:316-329.
- Crimi, M.L., R.L. Siegrist. 2004. Impact of Reaction Conditions on MnO₂ Genesis During Permanganate Oxidation. *J. Environmental Engineering*, 130(5):562-572.
- Albert, J.M., J. Munakata-Marr, L. Tenorio, R.L. Siegrist. 2003. Statistical Evaluation of Bacterial Source Tracking Data Obtained by rep-PCR DNA Fingerprinting of *Escherichia coli*. *Environ. Science & Technology*, 37(20):4554-4560.
- Crimi, M.L., R.L. Siegrist. 2003. Geochemical Effects Associated with Permanganate Oxidation of DNAPLs. *Ground Water*, 41(4):458-469.
- Haselow, J.S., R.L. Siegrist, M. Crimi, T. Jarosch. 2003. Estimating the Total Oxidant Demand for In Situ Chemical Oxidation. *Remediation J.*, 13(4):5-15.

- Siegrist, R.L., M.A. Urynowicz, M.L. Crimi, K.S. Lowe. 2002. Genesis and Effects of Particles Produced during In Situ Chemical Oxidation Using Permanganate. *J. Environmental Engineering*, 128(11):1068-1079.
- Struse, A.M., R.L. Siegrist, H.E. Dawson, M.A. Urynowicz. 2002. Diffusive Transport of Permanganate during *In Situ* Oxidation. *J. Environmental Engineering*, 128(4):327-334.
- Logan, A.J., R.L. Siegrist, J. Munakata-Marr. 2002. Experimental Evaluation of Fouling Processes in Porous Polyethylene Well Screens Used for Horizontal Wells. *Ground Water Monitoring and Remediation*, Winter issue. pp. 98-105.
- Lowe, K.S., F.G. Gardner, R.L. Siegrist. 2002. Field Pilot Test of In Situ Chemical Oxidation through Recirculation using Vertical Wells. *Ground Water Monitoring and Remediation*, Winter issue. pp. 106-115.
- Logan, A.L., T.K. Stevik, R.L. Siegrist, R. Ronn. 2001. Transport and Fate of *Cryptosporidium Parvum* through in Intermittent Sand Filters. *Water Research*, 35(18):4359-4369.
- Van Cuyk, S., R.L. Siegrist, A. Logan, S. Masson, E. Fischer, L. Figueroa. 2001. Hydraulic and Purification Behaviors and their Interactions During Wastewater Treatment in Soil Infiltration Systems. *Water Research*, 35(4):953-964.
- Gates, D.D., R.L. Siegrist, S.R. Cline. 2001. A Comparison of Potassium Permanganate and Hydrogen Peroxide as Chemical Oxidants for Organically Contaminated Soils. *J. Environmental Engineering*, 127(4):337-347.
- Murdoch, L.C., W.W. Slack, W. Harrar, R.L. Siegrist. 2000. Embedded Sidewall Samplers and Sensors to Monitor the Subsurface. *Ground Water*, 38(5):657-664.
- Siegrist, R.L., K.S. Lowe, L.C. Murdoch, T. Case, D.A. Pickering. 1999. *In Situ* Oxidation by Fracture Emplaced Reactive Solids. *J. Environmental Engineering*, 125(5):429-440.
- Korte, N.E., P.M. Kearl, R.L. Siegrist, M.T. Muck, R.M. Schlosser. 1999. An Evaluation of Horizontal Recirculation Using Single Well Tests, Pumping Tests, Tracer Tests, and the Colloidal Borescope. *Ground Water Monitoring and Remediation*, Winter 2000, pp.78-85.
- Stevik, T., G. Ausland, R.L. Siegrist, P.D. Jenssen. 1999. Purification of *E. Coli* Bacteria During Intermittent Filtration of Wastewater Effluent as Affected by Dosing Rate and Media Type. *Water Research*, 33(9):2088-2098.
- Murdoch, L., B. Harrar, B. Nilsson, W. Slack, R. Siegrist. 1999. In Situ Measurements in Fractured Till using Sidewall Sensors. *Journal of Nordic Hydrology*, 30(4/5):257-266.
- Labieniec, P.A., D.A. Dzombak, R.L. Siegrist. 1997. Establishing and Evaluating the Risk Implications of Uniform Soil Remediation Goals. *J. Air and Waste Management Assoc.*, 46:1179-1184.
- Gu, B., R.L. Siegrist. 1997. Dehalogenation of Chlorinated Organic Compounds in Strong Alkalis. *J. Environmental Engineering*. Vol. 23, pp. 982-987.
- Labieniec, P.A., D.A. Dzombak, R.L. Siegrist. 1997. Evaluation of Uncertainty in a Site -Specific Risk Assessment. *J. Environmental Engineering*, 123(3):234-243.
- Labieniec, P.A., D.A. Dzombak, R.L. Siegrist. 1996. Risk Variability Due to Uniform Soil Remediation Goals. *J. Environmental Engineering*, 122(7):612-621.
- Labieniec, P.A., D.A. Dzombak, R.L. Siegrist. 1996. SoilRisk: A Risk Assessment Model for Organic Contaminants in Soil. *J. Environmental Engineering*, 122(5):388-398.
- West, O.R., R.L. Siegrist, J. S. Gierke, S.W. Schmunk, A.J. Lucero, H.L. Jennings. 1995. *In Situ* Mixed Region Vapor Stripping of Low Permeability Media. 1. Process Features and Laboratory Experiments. *Environmental Science & Technology*, 29(9):2191-2197.
- Siegrist, R.L., O.R. West, M.I. Morris, D.A. Pickering, D.W. Greene, C.A. Muhr, D.D. Davenport, J.S. Gierke. 1995. In Situ Mixed Region Vapor Stripping of Low Permeability Media. 2. Full Scale Field Experiments. *Environmental Science & Technology*, 29(9):2198-2207.
- Gierke, J.S., C. Wang, O.R. West, R.L. Siegrist. 1995. In Situ Mixed Region Vapor Stripping: 3. Model Development and Application. *Environmental Science & Technology*, 29(9):2208-2216.
- Gates, D.D., R.L. Siegrist. 1995. In Situ Chemical Oxidation of Trichloroethylene Using Hydrogen Peroxide. *J. Environmental Engineering*, 121(9):639-644.
- West, O.R., R.L. Siegrist, T.J. Mitchell, R.A. Jenkins. 1995. Measurement Error and Spatial Variability Effects on Characterization of Volatile Organics in the Subsurface. *Environmental Science & Technology*, 29(3):647-656.
- Gu, B., O.R. West, R.L. Siegrist. 1995. Using ¹⁴C-Radiochemicals Can Cause Experimental Error in Studies of the Behavior of Volatile Organic Compounds. *Environmental Science & Technology*, 29(5):1210-1214.

- Phelps, T.J., R.L. Siegrist, N.E. Korte, D.A. Pickering, J. M. Strong-Gunderson, A.V. Palumbo, J.F. Walker, C.M. Morrissey, R. Mackowski. 1994. Bioremediation of Petroleum Hydrocarbons in Soil Column Lysimeters from Kwajalein Island. *J. Applied Biochemistry and Biotechnology*, Vol. 45/46:835-845.
- Siegrist, R.L., T.J. Phelps, N.E. Korte, D.A. Pickering. 1994. Characterization and Biotreatability of Petroleum Contaminated Soils in a Coral Atoll in the Pacific Ocean. *J. Applied Biochemistry and Biotech.*, Vol. 45/46:757-773.
- Labieniec, P.L., D.A. Dzombak, R.L. Siegrist. 1994. Risk Implications of Alternative Approaches To Setting Cleanup Goals for PCBs. *J. Environmental Engineering*, 120(3):495-511.
- Dzombak, D.A., P.L. Labieniec, R.L. Siegrist. 1993. The Need for Uniform Soil Cleanup Goals. *Environmental Science & Technology*, 27(5):765-766.
- Siegrist, R.L. 1991. Volatile Organic Compounds in Contaminated Soils: The Nature and Validity of the Measurement Process. *J. Hazardous Materials*, Vol. 29, pp. 3-15. September 1991.
- Jenssen, P.D., R.L. Siegrist. 1990. Technology Assessment of Wastewater Treatment by Soil Infiltration Systems. *Water Science & Tech.*, 22(3/4):83-92.
- Siegrist, R.L., P.D. Jenssen. 1990. Evaluation of Sampling Method Effects on Volatile Organic Compound Measurements in Contaminated Soils. *Environmental Science & Technology*, 24(9):1387-1392.
- Siegrist, R.L., D.L. Hargett. 1989. Application of Surface Geophysics for Location of Buried Hazardous Wastes. *Waste Management and Research*, 7:325-335.
- Anderson, D.L., R.L. Siegrist. 1989. The Performance of Ultra-Low-Volume Flush Toilets in Phoenix. *J. American Water Works Assoc.*, 81(3):52-57.
- Siegrist, R.L. 1987. Soil Clogging During Subsurface Wastewater Infiltration as Affected By Effluent Composition And Loading Rate. *J. Environmental Quality*, Vol. 16, pp. 181-187.
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- Seitz, S.J., M.L. Crimi, R.L. Siegrist. 2004. Diffusive Transport During In Situ Chemical Oxidation (ISCO) of DNAPL Sites. Proc. 4th Intern. Conf. on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, May 24-27, 2004.
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- Siegrist, R.L., J. McCray, K.S. Lowe. 2004. Highlights of CSM Small Flows Research and a Focused Discussion of Wastewater Infiltration and the Effects of Soil Infiltrative Surface Architecture." Proc. 4th Onsite Wastewater Captains of Industry Conference, February 23 to 27, 2004, Orlando, Florida.
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- Siegrist, R.L. 2002. Fundamentals of In Situ Chemical Oxidation. USEPA workshop on In Situ Treatment of Groundwater Contaminated with Non-aqueous Phase Liquids, December 10-12, 2002, Chicago, IL.
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- Siegrist, R.L. 2000. Risk Assessment and Management at Contaminated Sites: Process Principles and Practices. NATO Fellow presentation at the NATO/CCMS Pilot Study on Evaluation of Demonstrated and Emerging Technologies for the Treatment of Contaminated Land and Groundwater. June 2000, Wiesbaden, Germany.
- Siegrist, R.L. 2000. Wastewater Treatment in Porous Media Biofilter Systems. 64th Annual Educational Conference and Exhibition, Denver, June 15-19, 2000. National Environmental Health Association. Invited keynote address.
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- Urynowicz, M.A., R.L. Siegrist. 1999. In Situ Chemical Oxidation of TCE DNAPL by Permeation Dispersal: Laboratory Studies using Large Intact Monoliths of Silty Clay Soils. Annual Meeting of the Geological Society of America, October 25-29, 1999, Denver, CO.
- Dawson, H.E., A.B. Sheldon, R.L. Siegrist. 1999. Evaluating Performance and Reliability of Intermedia Transfer Models Used in Probabilistic Human Health Risk Assessment. U.S. EPA Modeling Assurance Workshop. September 9, Seattle, Washington. <http://www.nrcse.washington.edu/events/gaem/abst-dawson.asp>.
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- Siegrist, R.L. 1998. In Situ Chemical Oxidation: Technology Features and Applications. Innovations in In-Situ Ground Water Remediation. Ground Water Remediation Technology Analysis Center, U.S. EPA Technology Innovation Office. December 1998, Atlanta, GA.
- Sheldon, A.B., H.E. Dawson, R.L. Siegrist. 1998. Experimental Studies of Multimedia Model Reliability: Implications of Modeling Error for Human Health Risk Assessment. Annual Conference of the Society for Environmental Toxicology and Chemistry. November. Charlotte, NC.
- Siegrist, R.L., O.R. West, S.R. Cline, F.G. Gardner, R.M. Schlosser, D.A. Pickering, T.L. Case, M.A. Urynowicz, T.C. Houk. 1998. Field-Scale Test of In Situ Chemical Oxidation by Groundwater Recirculation of Permanganate. Invited presentation at the University Consortium on Solvents-In-Groundwater Research, Spring 1998 meeting, 5-7 May 1998, Farmington, Connecticut.
- Siegrist, R.L., K.S. Lowe, L.C. Murdoch, D.A. Pickering, T. Case. 1997. In Situ Chemical Oxidation by Emplaced Reactive Solids. Pre-conference Workshop on In Situ Chemical Oxidation at the Water Environment Federation Conference, October, 1997. Chicago, IL.
- Siegrist, R.L. 1997. Alternative Wastewater Systems: Overview and Considerations. National Park Service training course on water and wastewater systems, September 9-11, 1997. Denver, CO.
- Siegrist, R.L. 1997. Alternative Wastewater Systems: Process Principals and Performance. National Park Service training course on water and wastewater systems, September 9-11, 1997. Denver, CO.
- Bottrell, D.W., O.R. West, S.R. Cline, C.K. Bayne, R.L. Siegrist. 1997. Enhancing VOC Stability in Soil Samples. 13th Annual Waste Testing and Quality Assurance Symposium. July 6-9, 1997. Arlington, VA.
- Pfiffner, S.M., R.L. Siegrist, K.S. Lowe, D.B. Ringleberg, A.V. Palumbo. 1997. Bioremediation Processes Demonstrated in Clay Soils at a Controlled Release Site. 4th International Symposium on In Situ and On-Site Bioremediation. April 28-May 1, 1997. New Orleans.
- Holden, W.L., S.R. Cline, O.R. West, N.E. Korte, R.L. Siegrist, J.L. Baker. 1997. Field Scale Application of Deep Soil Mixing and In Situ Chemical Oxidation. ACS Meeting, San Francisco, CA, April 1997.
- Siegrist, R.L. 1997. Nutrient Removal During Wastewater Treatment in Soil Systems. Colorado Environmental Health Association Annual Meeting, April 9-11, 1997. Silvercreek, CO.
- Siegrist, R.L. 1997. Rehabilitation of Dysfunctioning Wastewater Soil Infiltration and Disposal Systems. Colorado Environmental Health Association Annual Meeting, April 9-11, 1997. Silvercreek, CO.
- Siegrist, R.L. et al. 1997. In Situ Remediation of DNAPLs in Low Permeability Media (1997). NATO CCMS country representatives meeting, Pilot Study on Evaluation of Demonstrated and Emerging Technologies for Cleanup of Contaminated Land and Groundwater. March 16-21, 1997, Colorado School of Mines, Golden, CO.
- Siegrist, R.L., N.E. Korte, D. Smuin, O.R. West, D.D. Gates, J.S. Gunderson. 1996. In Situ Treatment of Contaminants in Low Permeability Soils: Biogeochemical Enhancement by Subsurface Manipulation. First International Conference on Contaminants in the Soil Environment in the Australasia-Pacific Region. February 1996. Adelaide, Australia.
- Gates, D.D., R.L. Siegrist, S.R. Cline. 1995. Chemical Oxidation of TCE Contaminated Soils. Proc. Emerging Technologies for Hazardous Waste Management. Sept. 1995. Atlanta, GA. American Chemical Society.

- Smuin, D.R., R.L. Siegrist, N.E. Korte, O.R. West, J.S. Gunderson, P.M. Kearl. 1995. Bromide Tracer Evaluation of a Multipoint Injection System for Soil Treatment. American Geophysical Union, Fall, 1995 meeting.
- Muck, M.T., P.M. Kearl, N.E. Korte R.L. Siegrist. 1995. Bromide Tracer Evaluation of a Horizontal-Well Recirculation System for Groundwater Treatment. American Geophysical Union, Fall, 1995 meeting.
- Siegrist, R.L., N.E. Korte, et al. 1995. Field Evaluation of Subsurface Manipulation by Fracturing, Permeation Dispersal, and Horizontal Well Recirculation Using Unconfined Test Cells. National Ground Water Association Annual Educational Conference, October, 1995, Indianapolis, IN.
- Muck, M.T., R.L. Siegrist, N.E. Korte, R.M. Schlosser, M.E. Mumby, D.T. Davenport, I. Sass, K. Kleiser, K. Palz. 1995. Installation of a Horizontal Well Recirculation System. Proc. KfK/TNO Conference on Contaminated Land. October, 1995, Maastricht, The Netherlands.
- Siegrist, R.L. 1993. VOC Measurement in Soils: The Nature and Validity of the Process. Proc. National Symposium on Measuring and Interpreting VOCs in Soils. Jan. 1993, Las Vegas, NV. U.S. Environmental Protection Agency.
- Mitchell, T.J., O.R. West, R.L. Siegrist. 1993. Statistical Simulation and 3-Dimensional Visualization for Analysis of VOC Datasets. Proc. National Symposium on Measuring and Interpreting VOCs in Soils. Jan. 1993. Las Vegas, NV. U.S. Environmental Protection Agency.
- Siegrist, R.L., M.I. Morris, O.R. West, D.D. Gates, D.A. Pickering, et al. 1992. Evaluation of In Situ Treatment Technologies for Contaminated Clay Soils: Highlights of the X-231B Technology Demonstration. Proc. 8th Annual Oak Ridge Model Conference. Oct. 1992. Oak Ridge, TN. U.S. Department of Energy.
- Siegrist, R.L., M.I. Morris, O.R. West, et al. 1992. In Situ Treatment of Contaminated Clay Soils: Highlights of the X-231B Technology Demonstration. Proc. Emerging Technologies for Hazardous Waste Management. Sept. 1992. Atlanta, GA. American Chemical Society.
- Siegrist, R.L. 1990. Methods Development for Sampling Contaminated Soils and Sediments for Volatile Organic Compound Measurements. In: F. Arendt, M. Hinsenveld, and W.J. van den Brink (eds.). Contaminated Soil '90. Proc. Third International KfK/TNO Conference on Contaminated Soil. Karlsruhe, Germany. Kluwer Academic Publishers, The Netherlands. pp. 761-763.

Presentations at Seminars, Workshops & Symposia (note: associated published papers/abstracts are listed above)

- “A Protocol for In Situ Chemical Oxidation Screening, Design, and Implementation.” 6th Conf. on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-22, 2008.
- “Assessment of Remediation Performance Considering Treatment-Induced Changes in Soil Properties and Contaminant Partitioning Behavior.” 2008 North American Environmental Field Conference & Exposition. Tampa, FL. January 14-16, 2008.
- “Controlled Field Performance Evaluation of a Drip Dispersal System Used for Wastewater Reclamation in Colorado.” 11th National Symposium on Individual and Small Community Sewage Systems, Warwick, RI, October 21-24, 2007.
- “Engineering Soil Treatment Units as a Unit Operation in Onsite Wastewater Reclamation Systems.” 11th National Symposium on Individual and Small Community Sewage Systems, Warwick, RI, October 21-24, 2007.
- “Onsite and Decentralized Wastewater Reclamation: Critical Approaches and Technologies for a Sustainable Infrastructure.” Center for Water and Waste Technology, University of New South Wales, Sydney, Australia, October 5, 2007. Invited.
- “Onsite and Decentralized Wastewater Reclamation Using Soil Treatment Units.” Water Research Laboratory, University of New South Wales, Sydney, Australia, October 4, 2007. Invited.
- “Advancing the Science and Engineering and Integration of Onsite Wastewater Systems.” On-Site '07: Innovation and Technology for On-site Systems, Armidale, Australia, September 24-28, 2007. Invited keynote.
- “Occurrence and Fate of Organic Chemicals During Onsite Wastewater Reclamation.” On-Site '07: Innovation and Technology for On-site Systems, Armidale, Australia, September 24-28, 2007.
- “In Situ Chemical Oxidation for Site Remediation: State of Science and Practice.” ATV-Soil and Groundwater Seminar, Danish Technical University, Lyngby, Denmark, May 29, 2007. Invited.
- “Advances in Soil Infiltration: Highlights of CSM Research to Enable System Engineering.” Norwegian University of Life Sciences, Aas, Norway, June 4, 2007. Invited.
- “Decentralized Wastewater Reclamation and Reuse: Critical Approaches and Technologies for a Sustainable Infrastructure”. Upper Clear Creek Watershed Association, Idaho Springs, CO, April 25, 2007. Invited.
- “Innovations for Sustainable Onsite Wastewater Reclamation Systems.” IWA/NOWRA/WERF conference, “Water for All Life - A Distributed Infrastructure for a Sustainable Future”, Baltimore, Maryland, March 10-14, 2007. Invited.

- “Integrated Research to Enhance the Engineering of Onsite Systems using Soil Treatment Units.” .”
IWA/NOWRA/WERF conference, “Water for All Life - A Distributed Infrastructure for a Sustainable Future”,
Baltimore, Maryland, March 10-14, 2007. Invited.
- “Reaction and Transport Processes Controlling In Situ Chemical Oxidation of DNAPLs.” Chang Mai University, Chiang
Mai, Thailand, December 13, 2006. Invited.
- “Onsite and Decentralized Wastewater Reclamation and Reuse: Critical Approaches and Technologies for a Sustainable
Infrastructure.” Thailand Department of Pollution Control, Bangkok, Thailand, December 8, 2006. Invited.
- “Characterization of Volatile Organic Compounds in the Subsurface and the Effects of Sampling Methods.” Guest
lecture at Chulalongkorn University, Bangkok, Thailand, December 7, 2006. Invited.
- “Remediation of Contaminated Soil and Ground Water.” Silpakorn University, Nakhon Pathom, Thailand, December 4,
2006. Invited.
- “In Situ Chemical Oxidation for Clean Up of DNAPL Contaminated Ground Water.” Session 3B – “Recent Advances in
the Characterization and Remediation of DNAPL.” SERDP/ESTCP Partners in Environmental Technology
Symposium, November 28 -30, 2006, Washington, D.C. Invited.
- “Remediation of Contaminated Sites Using In Situ Chemical Oxidation and Coupled Technologies.” Presentation at the
NATO Advanced Research Workshop on “Methods and Techniques for Cleaning Up Contaminated Sites”, October 9-
11, 2006, Sinaia, Romania. Invited.
- “Decentralized Wastewater Reclamation and Reuse: Critical Approaches and Technologies for a Sustainable
Infrastructure.” U.S. EPA Region 8 Forum, Denver, CO, August 31, 2006. Invited.
- “Soil as a Treatment Media: Soil Treatment Units.” NOWRA 15th Annual Technical Education Conference &
Exposition, Denver, CO, August 28-31, 2006. Invited.
- “Site Remediation Using Chemical Oxidation Techniques.” Presentation at the NATO/CCMS Pilot Study meeting on
Prevention and Remediation in Selected Industrial Sectors: Small Sites in Urban Areas, June 4-7, 2006, Athens,
Greece. Invited.
- “Chemical Oxidation for Clean Up of Contaminated Groundwater.” Presentation at the NATO Advanced Research
Workshop on Environmental Security Threats in Urban Settings, June 8-9, 2006, Athens, Greece. Invited.
- “Reaction and Transport Processes Controlling In Situ Remediation of DNAPLs.” Poster presentation at the DoD
SERDP and ESTCP Symposium, Washington, D.C., November 29-30, 2005.
- “In Situ Remediation of Contaminated Soil and Ground Water.” Seminar presentation at the Institute for Environmental
Technologies, Vietnamese Academy of Science and Technology, Hanoi, Vietnam, November 18, 2005. Invited.
- “Onsite and Decentralized Wastewater Reclamation and Reuse: Critical Approaches and Technologies for a Sustainable
Infrastructure.” Presentation at the USA-Vietnam Workshop on Water Pollution Prevention Technologies, Hanoi,
Vietnam, November 16, 2005. Invited.
- “Onsite and Decentralized Wastewater Reclamation and Reuse.” Presentation at the Hanoi University of Civil
Engineering, Hanoi, Vietnam, November 15, 2005. Invited.
- “Onsite and Decentralized Wastewater Reclamation and Reuse: Advancing the Science and Technology through
Research.” Presentation at the workshop on Distributed and Nonstructural Water Resource Infrastructure: Science and
Technology Needs and Opportunities. Washington, D.C. November 10, 2005. Invited.
- “Characterization of Wastewater Effluents for Onsite System Design.” Presentation at the National Onsite Wastewater
Recycling Association, Annual Educational Conference and Exhibition, Cleveland, OH, October 9-12, 2005.
- “Factors Affecting Infiltration of Wastewater Effluents.” Presentation at the National Onsite Wastewater Recycling
Association, Annual Educational Conference and Exhibition, Cleveland, OH, October 9-12, 2005.
- “Onsite and Decentralized Wastewater Reclamation and Reuse: Advancing the Science and Technology through
Research.” Presentation at the 50th Annual Educational Conference and Exhibition. Estes Park, CO. September 21-
24, 2005. Invited.
- “Reaction and Transport Processes Governing In Situ Chemical Oxidation of DNAPLs.” Presentation at the SERDP
Interim Progress Review meeting, Arlington, VA, May 20, 2005. Invited.
- “Water Quality Monitoring and Modeling for Watershed-Scale Decision Support.” Presentation to the Society of Public
Health Engineers of Nepal (SOPHEN), Kathmandu, Nepal, April 3, 2005. Invited.
- “Ecological Engineering Using Onsite Wastewater Systems.” Presentation at Tribhuvan University, Kathmandu, Nepal,
April 3, 2005. Invited.

- "Ecological Engineering Using Decentralized Wastewater Systems." Presentation to the Environmental Engineering Association of Thailand, Bangkok, Thailand, March 31, 2005. Invited.
- "In Situ Chemical Oxidation (ISCO) and Coupled Technologies for Remediation of Contaminated Groundwater." Presentation at Kasetsart University, Bangkok, Thailand, March 30, 2005. Invited.
- "Decentralized Wastewater Management ~ An Evolving Paradigm for Sustainable Water Resources." Presentation to the Joint Technical Advisory Committee, RMSAWWA / RMWEA, February 23, 2005, Denver, CO. Invited.
- "Ecological Engineering Using Onsite and Decentralized Wastewater Management." Presentation at the Norwegian University of Life Sciences, Aas, Norway, February 7, 2005. Invited.
- "In Situ Chemical Oxidation for DNAPL Source Zone Treatment." Presentation at the Danish Technical University, Lyngby, Denmark, January 28, 2005. Invited.
- "In Situ Chemical Oxidation for DNAPL Source Zone Treatment." SERDP/ESTCP Symposium on Meeting DoD's Environmental Challenges, Washington, D.C., November 30 - December 2, 2004. Invited.
- "Quantifying Site-Scale Processes and Watershed-Scale Cumulative Effects of Decentralized Wastewater Systems." Presentation at the NDWRCDP Principal Investigator Forum, October 19, 2004, St. Louis, MO. Invited.
- "Optimizing Onsite Wastewater System Performance: Some Perspectives and Ideas." NOWRA 13th Annual Education Conference Exposition, Albuquerque, NM, November 6-11, 2004.
- "Decentralized Wastewater Management ~ An Evolving Paradigm for Sustainable Water Resources." 2004 RMSAWWA / RMWEA Joint Annual Conference, Grand Junction, CO, September 13-15, 2004.
- "Quantifying Site-Scale Processes and Watershed-Scale Cumulative Effects of Decentralized Wastewater Systems." Presentation at the NDWRCDP Community Decision-Making Forum: Community Process and Analytic Tools - Assessment of Applicability and Development of a Guide, 28-29 July 2004, Arlington, VA. Invited.
- "Decentralized Wastewater Management: An Evolving Paradigm for Sustainable Water Resources." Presentation for the Environmental Science and Engineering Division seminar series, April 1, 2004. Invited.
- "Highlights of CSM Small Flows Research and a Focused Discussion of Wastewater Infiltration and the Effects of Soil Infiltrative Surface Architecture." 4th Onsite Wastewater Captains of Industry Conference, February 23 to 27, 2004, Orlando, FL. Invited.
- "Onsite Wastewater Systems: Use and Performance Perspectives." Presentation at the Boulder Creek Watershed Forum, January 27, 2004, Boulder, CO. Invited.
- "Wastewater Infiltration into Soil and the Effects of Infiltrative Surface Architecture." National Sales Meeting for Infiltrator Systems, Inc., January 22, 2004, St. Amelia Island, FL. Invited.
- "Reaction and Transport Processes Controlling In Situ Chemical Oxidation of DNAPLs". Poster presentation at the Strategic Environmental Research and Development Program annual conference, Dec. 2-6, 2003, Washington, D.C.
- "Groundwater Quality Research." Presentation at the Colorado Water Congress workshop on Groundwater, November 14, 2003, Denver, CO. Invited.
- "The Role of Research in Sustaining the Future of Onsite Wastewater Systems." Presentation at the 12th Northwest On-Site Wastewater Treatment Short Course and Equipment Exhibition, September 23, 2003, University of Washington, Seattle. Invited keynote.
- "Quantifying Site-Scale Processes & Watershed-Scale Effects Of Decentralized Wastewater Systems." Presentation at the 12th Northwest On-Site Wastewater Treatment Short Course and Equipment Exhibition, September 23, 2003, University of Washington, Seattle. Invited.
- "Fundamentals of In Situ Chemical Oxidation." Presentation at the International Symposium, II EPOA Advanced Oxidation Processes. August 25-27, 2003, Campinas, Brazil. Invited keynote.
- "In Situ Chemical Oxidation: Principles and Practices for Source Zone Treatment." Presentation at the National Academy of Sciences, Committee of Source Removal of Contaminants from the Subsurface, April 14, 2003, Washington, D.C. Invited.
- "Advancing the Science and Engineering of Onsite Wastewater Systems." Presentation at the Colorado Environmental Health Association workshop, Eagle, CO, April 9, 2003. Invited.
- "Fundamentals of In Situ Chemical Oxidation." Presentation at the USEPA workshop on In Situ Treatment of Groundwater Contaminated with Non-aqueous Phase Liquids, December 10-12, 2002, Chicago, IL. Invited.
- "In Situ Chemical Oxidation of Trichloroethylene and the Genesis and Effects of Particles Produced as Reaction Products." Presentation at the 2nd Intern. Conf. on Oxidation and Reduction Technologies for In Situ Treatment of Soil and Groundwater, November 17-21, 2002, Toronto, Ontario.

- “Chemical Oxidation for In Situ Remediation of DNAPL Contaminated Sites.” Presentation at the Geological Society of America Annual Conference, October 27-30, 2002, Denver, CO. Invited.
- “Water Quality Protection Provided by Onsite Wastewater Systems.” Presentation at the 2002 South Platte River Forum, Longmont, Colorado, October 23-24, 2002. Invited.
- “Quantifying Site-Scale Processes & Watershed-Scale Effects of Onsite Wastewater Systems Using Soil as a Porous Media Biofilter (PMB).” Presentation at the Swedish University of Technology, Uppsala, Sweden, September 27, 2002. Invited.
- “Infiltration Rate Behavior During Wastewater Treatment in Soil Systems.” Presentation at the NOWRA 11th Annual Conference and Exhibition, Kansas City, MO, September 18-21, 2002.
- “Sampling Technologies for Site Characterization and Long-term Monitoring.” Presentation at the NATO/CCMS Pilot Study meeting, May 6-7, 2002, Rome, Italy. Invited.
- “Advancing the Science and Engineering of Decentralized Wastewater Systems through Research and Education.” Presentation at the 1st Northeast Onsite Wastewater Treatment Short Course and Equipment Exhibition, Newport, RI March 25-26, 2002. Invited.
- “Modeling Nitrogen Transport and Fate in Decentralized Systems at the Single Site to Watershed Scales.” Presentation at the 1st Northeast Onsite Wastewater Treatment Short Course and Equipment Exhibition, Newport, RI March 25-26, 2002. Invited.
- “Accelerated Loading for Evaluation of Long-term Performance of Soil PMBs used for Wastewater Renovation.” Presentation at the 11th Northwest On-Site Wastewater Short Course and Exhibition. April 3-4, 2002, Seattle, WA. Invited.
- “Onsite System Performance-Based Design and Evaluation.” Presentation at the NACo/NACCHO Wastewater Grantee Kickoff Training, Natl. Assn. of City and County Health Officials. November 8-9, 2001, Denver, CO. Invited.
- “Verification of In Situ Remediation Performance ~ An Overview.” Presentation at the NATO/CCMS Pilot Study meeting, September 10-14, 2001, Liege, Belgium.
- “Chemical Processes for the In Situ Oxidation of Contaminants in Soil and Groundwater.” Presentation at the 1st Intern. Conf. Oxidation and Reduction Technologies for In Situ Treatment of Soil and Groundwater. June 25-29, 2001, Niagara Falls, Ontario, Canada. Invited keynote.
- “In Situ Chemical Oxidation Overview.” Presentation at the meeting of the State Coalition for Remediation of Drycleaners, April 19, 2001. Scottsdale, AZ. Invited.
- “Advancing the Science and Engineering of Onsite Wastewater Systems.” Presentation at the ASAE national conference on Onsite Wastewater Treatment, March 11-14, Fort Worth, TX. Invited keynote.
- “Wastewater Soil Absorption Systems: The Performance Effects of Process Design and Environmental Conditions.” Presentation at the ASAE national conference on Onsite Wastewater Treatment, March 11-14, Fort Worth, Texas.
- “Onsite Wastewater Treatment using Soil as a Porous Media Biofilter.” Presentation at the Utah Onsite Wastewater Association Workshop, January 17, 2001. Utah State University. Invited.
- “In Situ Chemical Oxidation.” Van Tuyl Lecture series, Geology and Geological Engineering Department, Colorado School of Mines, Golden, CO. November 16, 2000. Invited.
- “In Situ Chemical Oxidation: Process Principles and Practices.” Monsanto Lecture series, School of Engineering, Purdue University, West Lafayette, IN. November 7, 2000. Invited.
- “Use of Modeling to Understand and Predict Wastewater Treatment for Onsite Wastewater Systems”. Annual Conference of the National Onsite Wastewater Recycling Association, October 31 - November 3, 2000, Grand Rapids, MI.
- “In Situ Chemical Oxidation for Remedation of Contaminated Soil and Ground Water.” Presentation at the 73rd Annual Exhibition and Technical Conference on Water Quality and Wastewater Treatment. Water Environment Federation, October 14-18, 2000, Anaheim, CA.
- “Risk Assessment and Management at Contaminated Sites: Process Principles and Practices and Dealing with Issues of Uncertainty.” NATO Fellow presentation at the NATO/CCMS Pilot Study on Evaluation of Demonstrated and Emerging Technologies for the Treatment of Contaminated Land and Groundwater. June 2000, Wiesbaden, Germany.
- “Wastewater Treatment in Porous Media Biofilter Systems.” 64th Annual Educational Conference and Exhibition, June 15-19, 2000, Denver, CO. National Environmental Health Association. Invited.
- “In Situ Chemical Oxidation.” Advances in Innovative Ground-Water Remediation Technologies Conference, June 6-7, 2000, Boston, MA. U.S. EPA Technology Innovation Office. Invited.

- “Design and Performance of Onsite Wastewater Soil Absorption Systems.” Decentralized Wastewater Management Research Needs Conference, Washington University, St. Louis, MO. May 19-20, 2000. Sponsored by U.S. EPA, EPRI’s Community Environmental Center, and the National Decentralized Water Resources Capacity Development Project. Invited.
- “Purification of Chemicals and Microbes in Wastewater Soil Treatment Systems as Affected by Infiltrative Surface Character and Soil Depth.” Annual Conference of the National Onsite Wastewater Recycling Association, November 3-6, 1999, Jeckyll Island, GA.
- “Technology Enhancements: Emerging Technologies.” Preconference Workshop on Evaluation and Application of Passive Groundwater Remediation Systems. 72nd Annual Exhibition and Technical Conference on Water Quality and Wastewater Treatment. Water Environment Federation, October 9-13, 1999, New Orleans, LA. Invited.
- “An Overview of In Situ Chemical Oxidation Technology Features and Applications.” Conf. on Abiotic In-Situ Technologies for Groundwater Remediation. August 31-September 2, 1999, Dallas Texas. U.S. EPA Center for Environmental Research Information. Cincinnati, OH.
- “In Situ Chemical Treatment Using Hydraulic Fracturing to Emplace Fe⁰ Metal and KMnO₄ Reactive Solids.” Conf. on Abiotic In-Situ Technologies for Groundwater Remediation. August 31-September 2, 1999, Dallas Texas. U.S. EPA Center for Environmental Research Information. Cincinnati, OH.
- “In Situ Chemical Oxidation Technology Features and Applications.” Colorado Hazardous Waste Management Society Environmental Technology Workshop on Chemical Oxidation. April 13, 1999, Denver, CO. Invited.
- “In Situ Chemical Oxidation.” Advances in Innovative Ground-Water Remediation Technologies Conference, December 15, 1998, Atlanta, GA. U.S. EPA Technology Innovation Office. <http://www.gwrtac.org>. Invited.
- “Innovative Technology: In Situ Chemical Oxidation.” Colorado Hazardous Waste Management Society. September 8, 1998. Denver, CO. Invited.
- “A Field-scale Test of In Situ Chemical Oxidation Through Recirculation.” Spectrum ’98 International Conference on Nuclear and Hazardous Waste Management. September 13-18, Denver, CO.
- “Field-Scale Test of In Situ Chemical Oxidation by Groundwater Recirculation of Permanganate.” University Consortium on Solvents-In-Groundwater Research, Spring 1998 meeting, 5-7 May 1998, Farmington, CT. Invited.
- “Horizontal Treatment Barriers of Fracture-Emplaced Iron and Permanganate Particles.” 1998 Special Session on Treatment Walls and Permeable Reactive Barriers, NATO/CCMS Pilot Study on Evaluation of Demonstrated and Emerging Technologies for the Treatment of Contaminated Land and Groundwater. February 1998, Vienna.
- “In Situ Chemical Oxidation at DNAPL Sites Using KMnO₄ Reactive Solids and Solutions.” National Academy of Scientists review workshop, February 19, 1998, Augusta, GA. Invited.
- “In Situ Chemical Oxidation by Emplaced Reactive Solids.” Pre-conference Workshop on In Situ Chemical Oxidation at the Water Environment Federation Conference, October, 1997. Chicago, IL.
- “Alternative Technologies: Overview and Considerations.” National Park Service training course on water and wastewater systems. September 9-11, 1997, Denver, CO. Invited.
- “Alternative Technologies: Process Principals and Performance.” National Park Service training course on water and wastewater systems. September 9-11, 1997, Denver, CO. Invited.
- “Nutrient Removal in Soil-Based Wastewater Treatment Systems.” Colorado Environmental Health Association Annual Conference. April 9-11, 1997, Silvercreek, CO. Invited.
- “System Dysfunction and Rehabilitation Strategies for Onsite Systems.” Colorado Environmental Health Association Annual Conference. April 9-11, 1997, Silvercreek, CO. Invited.
- “In Situ Remediation of DNAPLs in Low Permeability Media.” NATO CCMS country representatives meeting, Pilot Study on Evaluation of Demonstrated and Emerging Technologies for Cleanup of Contaminated Land and Groundwater. March 16-21, 1997, Colorado School of Mines, Golden, CO.
- “Alternative Wastewater Treatment by Soil Infiltration and Wetland Technologies.” Nordic workshop on Onsite and Alternative Wastewater Treatment and Disposal/Reuse. June 1996, Aas, Norway. Invited.
- “Soil Infiltration of Wastewater for Treatment and Disposal”. Colorado Environmental Health Department annual workshop, April, 1996, Aurora, CO. Invited.
- “In Situ Treatment of Contaminants in Low Permeability Soils: Biogeochemical Enhancement by Subsurface Manipulation.” First International Conference on Contaminants in the Soil Environment in the Australasia-Pacific Region. February 1996, Adelaide, South Australia. Invited.

- “Environmental Technology Development Through Industry Partnership.” DOE Morgantown Energy Technology Center, October 1995, Morgantown, WV. Invited.
- “Evaluation of Soil Fracturing and Permeation Dispersal, and Horizontal Well Recirculation Using Unconfined Test Cells”. Second International Conference On Challenges and Innovations in the Management of Hazardous Wastes. Air and Waste Management Conference, May, 1995, Washington, D.C. Invited.
- “Sampling Method Effects on Volatile Organic Compounds in the Subsurface.” First International Conference on Sampling Environmental Media. ASTM. April 6, 1995. Denver, CO.
- “Biological Factors in Soil Infiltration of Wastewater for Treatment and Disposal”. Colorado Environmental Health Department annual workshops, April, 1995, Aurora, CO and July, 1995, Grand Junction, CO. Invited.
- “Characterizing Contaminated Subsurface Regions: Limits Imposed by Site Variability and Measurement Error and Their Effects on Cleanup Goal Setting and Verification.” Northeast Environmental Conference. American Laboratory, December 1994. Invited.
- “Data Sufficiency for Site Remediation Decision Making.” University of Wisconsin Engineering Professional Development. Workshops held in Oak Ridge, TN, May 1993 and Chicago, June 1993. Invited.
- “Mass Flux Through Infiltrative Surfaces as Affected by Interface Conditions.” National Environmental Health Association Conference, Orlando, FL, June 1993. Invited.
- “Measurement and Spatial Modeling of VOC Contamination in Soils.” 34th ORNL-DOE Conference on Analytical Chemistry, Gatlinburg, TN, November 1993.
- “In Situ Physical/Chemical Treatment of Contaminated Soil.” 4th Technology Information Exchange Meeting, U.S. Department of Energy, Knoxville, TN, May 1993. Invited.
- “Risk Implications of Approaches to Setting Soil Remediation Goals.” Poster presentation by D. Dzombak at the Gordon Research Conference for Environmental Sciences - Water. New Hampton, NH, June 1992.
- “Data Sufficiency for Site Remediation Decision Making.” University of Wisconsin Engineering Professional Development. Workshops held in Orlando, FL, June 1992 and Madison, WI, November 1992. Invited.
- “Risk Variability Resulting from Uniform Remediation Goals for Soils.” Presented by P.A. Labieniec at the Society of Risk Analysis 1992 Annual Meeting, San Diego, CA. 1992.
- “Bioremediation of Polluted Soils.” Jordforsk workshop on contaminated land, Norwegian Centre for Soil and Environmental Research, Aas-NLH, Norway, September 1991. Invited.
- “Balance in Environmental Measurements: Issues and Challenges Associated With Sampling at Contaminated Sites.” 33rd Rocky Mountain Analytical Conference on Analytical Chemistry. July 1991, Denver, CO. Invited.
- “Data Sufficiency for Site Remediation Decision Making.” University of Wisconsin Engineering Professional Development. Workshops held in San Diego, CA, June 1991 and Madison, WI, November 1991. Invited.
- “Environmental Sampling at Contaminated Sites: Issues and Challenges.” Varian Press Briefing, Field Museum, Chicago, IL, as part of the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, March 1991. Invited.
- “Data Sufficiency for Site Remediation Decision Making.” University of Wisconsin Engineering Professional Development. Workshops held in Orlando, FL, March 1990 and Madison, WI, November 1990. Invited.
- “Volatile Organic Compound Measurements in Soils as Affected by Sampling Practices and Some Implications for Soil Remediation.” National Symposium on Soil Venting, U.S. Environmental Protection Agency, Houston, TX, April, 1991. Invited.
- “Environmental Quality Criteria: A Status Report.” Contaminated Sites Consultation Workshop on Environmental Quality Criteria Development, Canadian Council of Ministers of the Environment, Toronto, Ontario, November 1990. Invited.
- “Volatile Organic Compound Measurements in Contaminated Soils: The State of Practice, Methods Development and Implications for Remediation Projects.” Symposium on Characterization and Cleanup of Chemical Waste Sites, American Chemical Society National Meeting, Washington, DC., August 1990. Invited.
- “International Review of Approaches to Establishing Cleanup Criteria for Contaminated Land” and “Sampling Method Effects on Volatile Organic Compound Measurements.” NATO/CCMS meeting, Oslo, Norway, March 1990. Invited.
- “Critical Issues and Realistic Goals For Remediation of Contaminated Soils.” State of the Art Symposium on Remediation of Contaminated Soil. Soil Science Society of America meeting, Las Vegas, October 1989. Invited.
- “How Clean Is Clean? An International Perspective.” University of Wisconsin Shortcourse on Selecting Technologies for Reclamation of Contaminated Land, July 1989. Invited.

“Hazardous Waste Management Practices in the USA.” Swedish Geotechnical Institute, Linkoping, Sweden, September, 1988. Invited.

“New Municipal Wastewater Treatment Technology.” U.S. Environmental Protection Agency sponsored technology transfer meetings in San Francisco and Portland, OR, 1984. Invited.

Selected Project Technical Reports (see also Peer-Reviewed Technical Reports presented earlier)

Siegrist, R.L., M.L.Crimi, B. Petri, R. Oesterreich, L. Woods. 2007. Improved Monitoring Methods for Performance Assessment of DNAPL Source Zones and Chlorinated Solvent Sites. Annual progress report to SERDP for project ER-1490, December 1, 2007. 63 pg.

Siegrist, R.L., M.L.Crimi, B. Petri, R. Oesterreich, L. Woods. 2006. Improved Monitoring Methods for Performance Assessment of DNAPL Source Zones and Chlorinated Solvent Sites. Annual progress report to SERDP for project ER-1490, December 1, 2006. 39 pg.

Crimi, M.L., R.L. Siegrist. 2004. Experimental Evaluation of In Situ Chemical Oxidation Activities at the Naval Training Center (NTC) Site, Orlando, Florida. Final Report Prepared for the Naval Facilities Engineering Command, Port Hueneme, California by the Colorado School of Mines, Golden, CO. 27 pg.

Siegrist, R.L., B. Satijn. 2002. Performance Verification of In Situ Remediation Technologies. Report from the 2001 Special Session of the NATO/CCMS Pilot Study on Evaluation of Demonstrated and Emerging Technologies for the Treatment of Contaminated Land and Groundwater. September 10-14, 2001, Liege, Belgium. EPA 542-R-02-002. www.epa.gov/tio.

Lowe, K.S., S. Van Cuyk, E. Dodson, R.L. Siegrist, 2001. Field Evaluation of Virus Treatment Efficiency by Wastewater Soil Absorption Systems with Aggregate-Free and Aggregate-Laden Infiltrative Surfaces. Final project report prepared for Infiltrator Systems, Inc. Colorado School of Mines, Golden, CO, 80401-1887. 45 pg.

Siegrist, R.L., S. Van Cuyk, S. Masson, E. Fischer. 2000. Field Evaluation of Wastewater Soil Absorption Systems with Aggregate-Free and Aggregate-Laden Infiltrative Surfaces. CSM final project report submitted to Infiltrator Systems, Inc., Old Saybrook, CT. May, 2000.

Sheldon, A.B., R.L. Siegrist, H.E. Dawson. 2000. Experimental Validation and Reliability Evaluation of Multimedia Risk Assessment Models. CSM final project report to U.S. EPA NCERQA. ORD. Grant no. R825411. Washington, D.C. March, 2000.

Siegrist, R.L., M.A. Urynowicz, M. Crimi, A.M. Struse. 2000. Experimental Studies of Particle Genesis and Effects during In Situ Chemical Oxidation of Chlorinated Solvents in Ground Water using Permanganate. CSM project report submitted to Oak Ridge National Laboratory, Grand Junction, CO. January, 2000.

Siegrist, R. L., D. R. Smuin, N. E. Korte, D. W. Greene, D. A. Pickering, K. S. Lowe, J. S. Gunderson. 2000. Permeation Dispersal of Treatment Agents in In Situ Remediation in Low Permeability Media: 1. Field Studies in Unconfined Test Cells. Project Report prepared by Oak Ridge National Laboratory for the U.S. DOE Office of Science & Technology. ORNL/TM-13596.

West, O.R., R.L. Siegrist, S.R. Cline, F.G. Gardner. 2000. The Effects of In Situ Chemical Oxidation through Recirculation (ISCOR) on Aquifer Contamination, Hydrogeology, and Geochemistry. Project Report prepared by Oak Ridge National Laboratory for the U.S. DOE Office of Science & Technology. ORNL/TM.

Siegrist, R.L., M.A. Urynowicz. 1998. Chemical Oxidation of Chlorocarbons in Soil and Ground Water by Potassium Permanganate. CSM project report to Erler & Kalinowski, Inc. Englewood, CO. December 1998.

Lowe, K.S., F.G. Gardner, R.L. Siegrist, D.A. Pickering. 1998. In Situ Chemical Oxidation Recirculation Pilot Test at the 5-Unit Investigative Area Using Vertical Wells. Project Report submitted by Oak Ridge National Laboratory to Bechtel Jacobs Company, LLC, DOE Portsmouth Gaseous Diffusion Plant, Piketon, OH. October 1998.

Siegrist, R.L., K.S. Lowe, L.D. Murdoch, W.W. Slack, T.C. Houk. 1998. X-231A Demonstration of In Situ Remediation of DNAPL Compounds in Low Permeability Media by Soil Fracturing with Thermally Enhanced Mass Recovery or Reactive Barrier Destruction. Oak Ridge National Laboratory report, ORNL/TM-13534. March 1998.

Siegrist, R.L., K.S. Lowe, D.R. Smuin, O.R. West, J.S. Gunderson, N.E. Korte, D.A. Pickering, T.C. Houk. 1998. Permeation Dispersal of Reactive Fluids for In Situ Remediation: Field Studies. Project Report prepared by Oak Ridge National Laboratory for the U.S. DOE Office of Science & Technology. ORNL/TM-13596.

Urynowicz, M.A., R.L. Siegrist. 1998. Permeation Dispersal of Reactive Fluids for In Situ Remediation: Laboratory Studies. CSM project report to Oak Ridge National Laboratory for the U.S. DOE Office of Science & Technology.

- Siegrist, R.L., A. Logan, T.C. Case, J.M. Marr. 1997. Performance of Advanced Polyethylene Screens for Horizontal Environmental Wells. CSM project report to Schumacher Filters America, Inc. Asheville, N.C. November 1997.
- Korte, N.E., L. Liang, B. Gu, M.T. Muck, J.L. Zutman, R.M. Schlosser, R.L. Siegrist, T.C. Houk, Q. Fernando. 1997. In Situ Treatment of Mixed Contaminants in Groundwater: Application of Zero-Valence Iron and Palladized Iron for Treatment of Groundwater Contaminated with Trichloroethene and Technetium-99. Project report by Oak Ridge National Laboratory for the U.S. DOE Office of Science & Technology. ORNL/TM-13530. April 1997.
- Siegrist, R.L., K.S. Lowe, L.D. Murdoch, W.W. Slack, T.C. Houk. 1997. X-231A Demonstration of In Situ Remediation of DNAPL Compounds in Low Permeability Media by Soil Fracturing with Thermally Enhanced Mass Recovery or Reactive Barrier Destruction. Interim rep. to DOE Office of Science & Technology, Washington, D.C.
- West, O.R., R.L. Siegrist, T.C. Houk, L. Liang, et al. 1997. The X-625 Treatment Facility: Assessment of Reactive Barrier Technology at PORTS. Summary of 1997 Activities. Oak Ridge National Laboratory report, POEF-LMES-174. November, 1997. 52 pp.
- Muck, M.T., P.M. Kearl, R.L. Siegrist, N.E. Korte, R.M. Schlosser, M.E. Mumby, D.T. Davenport, D.W. Greene, D.A. Pickering, C.A. Muhr. 1997. Field Evaluation of a Horizontal Recirculation System for Groundwater Treatment: Pilot Test at the Clean Test Site, Portsmouth Gaseous Diffusion Plant. Final project report by Oak Ridge National Laboratory for U. S. Department of Energy. ORNL/TM-13531. January.
- Lowe, K.S., P. McKay, R.L. Siegrist. 1997. Perspectives on the Environmental Situation and Opportunities in Argentina. Final report by Oak Ridge National Laboratory and Colorado School of Mines. U.S. DOE Office of Science and Technology, International Technology Exchange Program. 61 pp.
- Siegrist, R.L., J.A. Hill, T.J. Phelps, S. Pfiffner, A.V. Palumbo. 1997. Intrinsic Bioremediation Potential in Fractured Low-Permeability Media: Literature Review and Conceptual Model Development. Oak Ridge National Laboratory report.
- Siegrist, R.L., K.S. Lowe (eds.). 1996. In Situ Remediation of DNAPL Compounds in Low Permeability Media: Fate/Transport, In Situ Control Technologies, and Risk Reduction. A series of focus papers by an ad hoc consortium. Oak Ridge National Laboratory report for the U.S. DOE Office of Science & Technology, ORNL/TM-13305. 200 pp.
- Falta, R., T. Jarosch, B. Kueper, B. Looney, D. Sabatini, R. Siegrist, K. Udell. 1996. Technical Resource Document on Enhanced Recovery of DNAPLs. Expert Panel report prepared for U.S. DOE Office of Science & Technology.
- West, O.R., C.K. Bayne, R.L. Siegrist, D.W. Holden, S.S. Scarborough, D. Bottrell. 1996. Stability of VOCs in Water Samples During Preanalytical Holding. Oak Ridge National Laboratory report, ORNL/TM-13240/v1.
- Gu, B., R.L. Siegrist. 1996. Alkaline Dechlorination of Chlorinated Volatile Organic Compounds. Oak Ridge National Laboratory report, ORNL/TM-13263. 39 pp.
- Siegrist, R.L., K.S. Lowe (ed.). 1995. In Situ Remediation of DNAPLs in Low Permeability Media. Interim report to U.S. DOE Office of Science & Technology by Oak Ridge National Laboratory.
- Korte, N.E., R.L. Siegrist et al. 1994. In Situ Treatment of Mixed Contaminants in Groundwater: Review of Candidate Processes. Oak Ridge National Laboratory report, ORNL/TM-12772. 102 pp.
- Siegrist, R.L., K.S. Dickerson, et al. 1994. Evaluation and Screening of Treatment and Disposal Options for The Solar Pond Sludges at Rocky Flats. Los Alamos National Laboratory report, LA-UR-94-4414. 373 pp.
- Hudson, W.L., R.L. Siegrist, L.W. Barnhouse. 1995. Development and Implementation of Nationally Consistent Cleanup Criteria for Hazardous Waste Contaminated Sites: International Perspectives. Oak Ridge National Laboratory report for U.S. Environmental Protection Agency.
- Siegrist, R.L., M.I. Morris, O.R. West, D.D. Gates, D.A. Pickering, R.A. Jenkins, T.J. Mitchell, D.W. Greene, C.A. Muhr, S.E. Herbes, T.M. Gilliam, H.L. Jennings, A.J. Lucero, J. Zutman, T. McKnight, and J.S. Watson. 1995. The X-231B Technology Demonstration for In Situ Treatment of Contaminated Soils: Field Demonstration and Testing of Vapor Stripping, Peroxidation, and Solidification. Oak Ridge National Laboratory report, ORNL/TM-12261.
- West, O.R., R.L. Siegrist, A.J. Lucero, H.L. Jennings, D.W. Greene, S. Schmunk. 1993. The X-231B Technology Demonstration for In Situ Treatment of Contaminated Soils: Laboratory Evaluation of Vapor Stripping Processes. Oak Ridge National Laboratory report, ORNL/TM-12260, June 1993.
- Gates, D.D., R.L. Siegrist. 1993. The X-231B Technology Demonstration for In Situ Treatment of Contaminated Soils: Laboratory Evaluation of Chemical Oxidation Using Hydrogen Peroxide Injection. Oak Ridge National Laboratory report, ORNL/TM-12259, June 1993.

- West, O.R., R.L. Siegrist, T.J. Mitchell, D.A. Pickering, et al. 1993. The X-231B Technology Demonstration for In Situ Treatment of Contaminated Soils: Contaminant Characterization and 3-Dimensional Spatial Modeling. Oak Ridge National Laboratory report, ORNL/TM-12258, August 1993.
- Siegrist, R.L., M.I. Morris, T.L. Donaldson, A.V. Palumbo, S.E. Herbes, R.A. Jenkins, C.M. , Morrissey, M.T. Harris. 1993. The X-231B Technology Demonstration for In Situ Treatment of Contaminated Soils: Technology Evaluation and Screening. Oak Ridge National Laboratory report, ORNL/TM-12257, August 1993.
- Siegrist, R.L., M.I. Morris, O.R. West, D.D. Gates, D.A. Pickering. 1993. The X-231B Technology Demonstration for In Situ Treatment of Contaminated Soils: Executive Summary. Oak Ridge National Laboratory report, ORNL/TM-12256, August 1993.
- Siegrist, R.L., O.F. Webb, M.O. Ally, W.E. Sanford, P.M. Kearl, J.L. Zutman. 1993. In Situ Treatment of VOCs by Recirculation Technologies. Oak Ridge National Laboratory report, ORNL/TM-12317, DOE International Technology Exchange Program. June 1993.
- Siegrist, R.L., R. Smed-Hildmann, P.D. Jenssen, Z. Filip. 1993. Humic Substance Formation During Soil Infiltration of Wastewater. Research report from the Institute for Georesources and Pollution Research, Aas, Norway and the Federal Institute for Water, Soil and Air, Langen, West Germany.
- Phelps, T.J., R.L. Siegrist. 1992. Bioremediation of Petroleum-Contaminated Soil on Kwajalein Island: Column Biotreatability Studies. Oak Ridge National Laboratory report, ORNL/TM-12273, December 1992.
- Siegrist, R.L., T.J. Phelps, R. Mackowski. 1992. Respirometric Evaluations. In: Bioremediation of Petroleum-Contaminated Soil on Kwajalein Island: Microbiological Characterization and Biotreatability Studies. Adler, H.I., R.L. Jolley, and T.L. Donaldson (eds.). Oak Ridge National Laboratory rep., ORNL/TM-11925, May 1992. p. 52-69.
- Phelps, T.J., R.L. Siegrist, R. Mackowski, M. Pfiffner. 1992. Microbial Activity and Biomass. In: Bioremediation of Petroleum-Contaminated Soil on Kwajalein Island: Microbiological Characterization and Biotreatability Studies. Adler, H.I., R.L. Jolley, and T.L. Donaldson (eds.). Oak Ridge National Laboratory report, ORNL/TM-11925, May 1992. p. 37-43.
- Siegrist, R.L., N.E. Korte, D.A. Pickering, T.J. Phelps. 1991. Site Characterization and Onsite Biotreatability Studies. Bioremediation technology demonstration at U.S. Army Kwajalein Atoll, Republic of the Marshall Islands. ORNL/TM-11894. Oak Ridge National Laboratory, Oak Ridge, TN. September 1991. 227 pp.
- Siegrist, R.L., et al. 1990. Report on Comprehensive Environmental Assessment of Potential Environmental Contamination on Doty Island in Menasha, WI. Ayres Associates, Inc. project report for Wangelin Barrel Environmental Repair Fund Project, Wisconsin Dept. of Natural Resources, Madison, WI.
- Siegrist, R.L., et al. 1990. Report on Remedial Investigation of Soil and Ground Water Gasoline Contamination in DeSoto, Wisconsin. Ayres Associates, Inc. project report for DeSoto Environmental Repair Fund Project, Wisconsin Department of Natural Resources, Madison, WI.
- Siegrist, R.L., et al. 1989-1990. Reports on Underground Storage Tank Investigation, Removal and Closure Assessment of the Humphrey Site in Milwaukee, WI. Ayres Associates, Inc. project report for Marshall & Ilsley Trust Company, Milwaukee, WI.
- Siegrist, R.L., et al. 1989. Environmental Site Assessments at Ten Plastics Manufacturing Facilities. Phillips Plastics Corporation, Medford, Wisconsin.
- Anderson, D.L., R.L. Siegrist, R.J. Otis, S. Surovchak. 1989. Performance Monitoring and Ground Water Quality Impacts of OSDs in Subdivision Developments. Research progress report to the State of Florida Department of Health and Rehabilitative Services, Tallahassee. 192 pp.
- Siegrist, R.L., P.D. Jenssen. 1989. Sampling Method Effects on Volatile Organic Compound Measurements in Solvent Contaminated Soil. Final research report to the Norwegian State Pollution Control Authority, Oslo, Norway. 75 pp.
- Siegrist, R.L. 1989. International Review of Approaches for Establishing Cleanup Goals for Hazardous Waste Contaminated Land. Final research report to Norwegian State Pollution Control Authority, Oslo, Norway. 81 pp.
- Siegrist et al. 1987-1989. Reports on Remedial Investigation and Cleanup of Multiple Hazardous Waste Sites at an Equipment Manufacturing Facility in Wisconsin. Ayres Associates, Inc. project report to Patz Sales, Inc, Pound, WI.
- Siegrist, R.L., D.L. Anderson, D.L. Hargett. 1986. Large Soil Absorption Systems for Wastewaters from Multiple-Home Developments. Final report to U.S. Environ. Prot. Agency, MERL, Cincinnati, OH. EPA 600/52-86/023. 91 pp.
- Tyler, E.J., W.C. Boyle, J.C. Converse, R.L. Siegrist, M.R. Shoeneman, D.L. Hargett. 1985. Design and Management of Subsurface Soil Absorption Systems. Final research report, PB85-216570, U.S. Environmental Protection Agency, MERL, Cincinnati, OH. 144 pp.

- Siegrist, R.L., D.L. Anderson, J.C. Converse. 1984. Onsite Treatment and Disposal of Restaurant Wastewater. Final research report, College of Eng. and College of Agric. and Life Sciences, University of Wisconsin, Madison. 38 pp.
- Siegrist, R.L., W.C. Boyle, D.L. Anderson. 1981. Field Evaluation of Selected Water Conservation and Wasteflow Reduction Systems for Residential Application. Final research report, WIS WRC 81-02, U.S. Office of Water Res. and Tech., Washington, DC. 119 pp.
- Management of Small Waste Flows. 1978. Contributing author to final research report, EPA 600/2-78-173, U.S. Environmental Protection Agency, MERL, Cincinnati, OH. 810 pp.

UNIVERSITY EDUCATIONAL ACTIVITIES AT CSM

Courses Developed and/or Delivered at CSM

- EGGN 353 - Fundamentals of Environmental Science & Engineering (developed; delivered in 1999, 2000)
- ESGN 473 - Hazardous Waste Management (delivered in 1999, 2001)
- ESGN 457 - Site Remediation Engineering (delivered in 2001-2004, 2006)
- ESGN 460 - Onsite Water Reclamation and Reuse (developed; delivered in 2006, 2007, 2008)
- ESGN 504 - Water and Wastewater Treatment (delivered in 1999)
- ESGN 505 - Experimental Design and Environmental Data Analysis (re-developed; delivered in 1995, 1996)
- ESGN 575 - Hazardous Waste Site Remediation (developed; delivered in 1995-1997, 1999-2004, 2006)
- ESGN 580 - Environmental Science & Engineering Graduate Seminar (delivered in 1996)
- ESGN 598 - Special Topics in Wastewater Treatment (delivered in 2000)
- ESGN 598L - Special Topics in Hazardous Waste Site Treatability Lab (delivered in 2002)
- ESGN 551 - Environmental Field Methods (team taught in 1995)

Development leader and coordinator for the Environmental Engineering Module (42 hr) within an Applied Engineering Fundamentals course for the U.S. Department of Energy (1995, 1996).

Workshops and shortcourses as outlined in other sections of this CV.

Graduate Student Advisees at CSM (as primary advisor or co-advisor)

- Bryce Tillotson. M.S. "Onsite Treatment of Wastewater Effluents During Vadose Zone Transport." Graduate Research Assistant. Graduated January 2009.
- Kathleen (DeJong) Conn. Ph.D. "Occurrence and Fate of Endocrine-Disrupting Compounds and Other Trace Organic in Onsite Wastewater Treatment Systems." Graduate Research Assistant. Graduated September 2008. Advisor with co-advisor Dr. Larry Barber (USGS).
- Jim McKinley. Ph.D. "Occurrence and Environmental Behavior of Humic Substances and Polysaccharides Accumulating in Soil Wastewater Treatment Units." Graduate Research Assistant. Graduated September 2008.
- Pamela Dugan. Ph.D. "Coupling Surfactants/Cosolvents with Oxidants: Effects on Remediation and Performance Assessment." Graduate Research Assistant. Graduated May 2008.
- Leanna Woods. M.S. "In Situ Remediation Induced Changes in Subsurface Properties and Trichloroethene Partitioning Behavior." Graduated May 2008.
- Fritz Krembs. M.S. "Critical Analysis of Field-Scale Application of In Situ Chemical Oxidation for Remediation of Contaminated Ground Water." Graduate Research Assistant. Graduated May 2008.
- Ryan Oesterreich. M.S. "Measurement of DNAPL Compounds in Soil Core Samples as Affected by Sampling Methods and Environmental Conditions." Graduate Research Assistant. Graduated May 2008.
- Rebecca Parzen. M.S. "Nitrogen Movement and Fate in a Wastewater Drip Dispersal System in a Semi-Arid Climate." Graduate Research Assistant. Graduated June 2007.
- Ryan Walsh. M.S. "Effects of Engineering Parameters on Wastewater Reclamation in a Sandy Porous Media Biofilter." Graduate Research Assistant. Graduated May 2006.
- Ben Petri. M.S. "Impacts of Permanganate Flushing Parameters on Mass Transfer from Dense Non-Aqueous Phase Liquid Residuals." Graduate Research Assistant. Graduated December 2005.
- Jeffrey Heiderscheidt. Ph.D. "DNAPL Source Zone Depletion during In Situ Chemical Oxidation (ISCO): Experimental and Modeling Studies." Graduate Research Assistant. Advisor with co-advisor Dr. Tissa Illangasekare. Graduated December 2005.
- Charlotte (Zarter) Dimick. M.S. "Field Evaluation of Vadose Zone Purification and the Effects of Applied Wastewater Quality and Hydraulic Loading Rate." Graduate Research Assistant. Graduated December 2005.

- Sarah Seitz. M.S. "Experimental Study of Mass Transfer Parameters and Matrix Interactions During In Situ Chemical Oxidation Relying on Diffusive Transport." M.S. Thesis. Colorado School of Mines. Graduate Research Assistant. Graduated December 2004.
- Shannon (Taylor) Jackson. M.S. "Comparative Evaluation of Permanganate and Fenton's Reagent for In Situ Remediation of DNAPLs in Groundwater." Graduate Research Assistant. Graduated May 2004.
- Kyle Tackett. M.S. "Characterization and Assessment of Soil Solution Composition in the Vadose Zone During Wastewater Infiltration and Treatment in Soil." Graduate Research Assistant. Graduated May 2004.
- Sheila Van Cuyk. Ph.D. "Fate of Virus during Wastewater Renovation in Porous Media Biofilters." Graduate Research Assistant. Graduated May 2003.
- Abigail Wren. M.S. "Field Evaluation of Advanced Treatment Units Utilizing Textile Media Filtration for Nitrogen Removal in Onsite Wastewater Treatment Systems." Graduate Research Assistant. Graduated May 2003.
- Angelique Diaz. M.S. "Infiltration Rate Behavior in Soil as affected by Infiltrative Surface Architecture: Methods Development and Initial Experimentation." Graduate Research Assistant. Graduated May 2003.
- Jennifer Guelfo. M.S. "Water Quality Monitoring in the Lake Dillon Watershed to Enable Assessment of Development Impacts." Graduate Research Assistant. Graduated December 2002.
- Michelle Crimi. Ph.D. "Particle Genesis and Effects on Metals in the Subsurface During In Situ Chemical Oxidation Using Permanganate." Graduate Research Assistant. Graduated May 2002.
- Andy Logan. Ph.D. "Mechanisms Controlling the Fate and Transport of *Cryptosporidium parvum* in Granular-Media Filtration Systems Used for Drinking Water Treatment." Graduate Research Assistant. Graduated May 2002.
- Seth Terry. Ph.D. "Carbon Metabolism in the Enhanced Biological Phosphorus Removal Process." Advisor with co-advisor Dr. Linda Figueroa. Graduate Research Assistant. Graduated May 2002.
- Shiloh Kirkland. M.S. "Framework to Account for Onsite Wastewater System Contributions to Total Maximum Daily Loads." Graduate Research Assistant. Graduated May 2001. Co-advisor with Dr. John McCray.
- Mike Urynowicz. Ph.D. "Dense Nonaqueous Phase Trichloroethylene Degradation with Permanganate Ion." Graduate Research Assistant. Graduated May 2000.
- Andrew Sheldon. Ph.D. "Experimental Validation and Reliability Evaluation of Selected Soil VOC Leaching and Volatilization Models Used in Environmental Health Risk Assessment." Graduate Research Assistant. Graduated May 1999.
- Emily Troxell. M.S. "Onsite Wastewater Nitrogen Removal using Zeolites." Graduate Project Assistant. Graduated summer 1999. Co-advisor with Dr. Phil Ross.
- Sarah Masson. M.S. "Fate of Microorganisms in a Soil Infiltration System as Affected by Infiltrative Surface Character and Depth." Graduate Research Assistant. Graduated May 1999.
- Elizabeth Fischer. M.S. "Nutrient Transformation and Fate During Intermittent Sand Filtration of Wastewater." Graduate Research Assistant. Graduated May 1999.
- Amanda Struse. M.S. "Mass Transport of Potassium Permanganate in Low Permeability Media and Matrix Interactions." Graduate Research Assistant. Graduated May 1999.
- Geir Ausland. Ph.D. "Hydrodynamic and Purification Processes in Wastewater Infiltration Systems." Advisor during visiting exchange at CSM from the Agricultural University of Norway. Graduated December 1998.
- Terry Jennings. M.S. "Oxidation Kinetics of TCE Destruction by Potassium Permanganate." Graduate Project Assistant. Graduated December 1998.
- Tom Anderson. M.S. "Spatial Variability Effects on Estimates of Contaminant Mass in the Subsurface." Graduate Project Assistant. Graduated May 1998.
- Andy Logan. M.S. "Experimental Evaluation of Fouling Processes in Environmental Horizontal Wells." Graduate Research Assistant. Graduated May 1998.
- Traci Case. M.S. "Reactive Permanganate Grouts for Horizontal Permeable Barriers and In Situ Treatment of Groundwater." Graduate Research Assistant. Graduated December 1997.
- Mike Urynowicz. M.S. "Permeation Dispersal of Chemical Oxidants for In Situ Remediation of DNAPL Compounds in Low Permeability Media." Graduate Research Assistant. Graduated 1997.

Gillian Eaton, M.S. "Establishment and Achievement of Cleanup Goals." Graduate Project Assistant. Graduated May 1996.

Post-Doctoral Associates and Research Associates at CSM

Kathryn S. Lowe, M.S. Senior Research Associate, 1999 to date
Jill Tomaras, M.S. Research Associate, 2005 to 2008
Ben Petri, M.S. Research Associate, 2006 to 2009
Sheila Van Cuyk, Ph.D. Post-Doctoral Research Associate, 2003 to 2004
Jennifer Guelfo, M.S. Research Associate, 2003
Abigail Wren, M.S. Research Associate, 2003
Michelle Crimi, Ph.D. Post-Doctoral Research Associate, 2002

Scholarships and Awards for Students at CSM

Kathy (DeJong) Conn - Fellowship Award. Colorado Water Resources Research Institute. 2005-2006; 2006-2007
Charlotte Zarter - American Water Resources Assn. Rich Herbert Memorial Scholarship. 2004-2005
Pamela Dugan - Graduate Scholarship Award. National Science Foundation. 2004-2005
Sheila Van Cuyk - American Water Resources Assn. Rich Herbert Memorial Scholarship. 2001-2002
Jennifer Guelfo - Graduate Scholarship Award. National Science Foundation. 2002
Michelle Crimi - Graduate Scholarship Award. National Science Foundation. 2000-2002
Sheila Van Cuyk - Graduate Scholarship Award. National Science Foundation. 2000-2002
Abigail Wren - Graduate Scholarship Award. National Science Foundation. 2000-2002
Mike Urynowicz - Colorado Fellowship. State of Colorado. 1999
Andy Logan - Dissertation Enhancement Award. National Science Foundation. 1998-1999
Mike Urynowicz - Intern Fellowship. Edna Bailey Sussman Fund. 1997
Gillian Eaton - Marilyn Lloyd Fellowship. U.S. Department of Energy. 1995-1996
Andrew Sheldon - Intern Fellowship. Edna Bailey Sussman Fund. 1995
Gillian Eaton - Intern Fellowship. Edna Bailey Sussman Fund. 1995

External examiner for Ph.D. or D.Sc. students

Universities in Canada, Australia, Norway, Denmark, and Sweden

RECENT CONSULTING ACTIVITIES

U.S. Government Accountability Office, Washington, D.C.
U.S. Department of Defense, Naval Facilities Engineering Command, Port Hueneme, CA
Dynamac International, Inc., Rockville, Maryland
Swiss Consortium / Novartis International, Zurich, Switzerland
IT Corporation, Denver, CO
Geo Consultants, LLC, Paducah, KY
Erler & Kalinowski, Inc., Englewood, CO
Flour-Daniel GTI, Golden, CO and Sydney, Australia
Battelle, Inc., Richland, Washington and Columbus, Ohio
Parsens Engineering Science, Inc., Cleveland, Ohio, and Denver, Colorado
Lord, Bissell and Brook, Chicago, Illinois
Lockheed Martin Energy Systems, Inc., Oak Ridge, Tennessee
Eastern Research Group, Inc., Arlington, Virginia
Geotech Environmental Equipment, Inc., Denver, Colorado
Synesis Environmental, Inc., Aiken, South Carolina
Infiltrator Systems, Inc., Old Saybrook, Connecticut
Patrick & Stowell, S.C., Aspen, Colorado
U.S. Environmental Protection Agency, Washington, D.C.
Jordforsk Center for Environmental Research, Aas, Norway

PROFESSIONAL COMMITTEE SERVICE AND RELATED ACTIVITIES

Short Course Organizer and Chair, "Principles and Practices of In Situ Chemical Oxidation." SERDP and ESTCP
Partners in Environmental Technology Technical Symposium and Workshop. December 3, 2008, Washington, D.C.

- Workshop Organizer and Chair, "In Situ Chemical Oxidation for Remediation of Contaminated Sites: Technical Practices for Successful Application." 2008 AFCEE Technology Transfer Workshop. March 28, 2008, San Antonio, TX.
- Workshop Organizer and Chair, "In Situ Chemical Oxidation for Remediation of Contaminated Ground Water." March 7-8, 2007, Golden, CO.
- Chair, International Expert Panel for evaluation of the Institute of Environment and Resources, Technical University of Denmark, Lynby, Denmark. 2007.
- Break-out Session Chair. "DOD SERDP and ESTCP Expert Panel workshop on Reducing Uncertainty of DNAPL Source Zone Remediation." March 2006. Contributing author to the final proceedings report. August 2006. 92 pg.
- Member, U.S. EPA Board of Scientific Counselors Subcommittee on Land Preservation and Restoration, 2005-2006.
- Session Co-Chair. "USA-Vietnam Workshop on Water Pollution Prevention Technologies," Hanoi, Vietnam, 15-18 November 2005 (2005).
- Expert Advisor, U.S. Government Accountability Office, Report to Congress: "Groundwater Contamination: DOD Uses and Develops a Range of Remediation Technologies to Clean Up Military Sites." (2005).
- Member, Organizing Committee, 4th International Conf. on Oxidation and Reduction Technologies for the In Situ Treatment of Soil and Groundwater, October 2005, Chicago, IL. (2005).
- Member, Organizing Committee, 3rd International Conf. on Oxidation and Reduction Technologies for the In Situ Treatment of Soil and Groundwater, November 2004, San Diego, CA (2004).
- Member, Water Environment Research Foundation, Decentralized Research Advisory Committee (2003-2006; 2007-date).
- Session Chair, "Treating DNAPL with ISCO." 2nd International Conf. on Oxidation and Reduction Technologies for the In Situ Treatment of Soil and Groundwater, November 17-21, 2002, Toronto, Ontario, Canada.
- Member, Organizing Committee, 2nd International Conf. on Oxidation and Reduction Technologies for the In Situ Treatment of Soil and Groundwater, November 2002, Toronto, Ontario, Canada (2001-2002).
- Member, Tiger Team, Naval Air Station, North Island, San Diego, CA. U.S. Department of Defense, Naval Facilities Engineering Command, Port Hueneme, CA (2002).
- Member, U.S. EPA Expert Panel on DNAPL Source Zone Remediation, Office of Research and Development, National Risk Management Research Laboratory, Ada, OK (2001 to date).
- Organizing Chair, Special session (1.5 days) on Evaluating and Verifying Performance of In Situ Remediation Technologies, NATO/CCMS Country Representatives meeting, September 2001, Liege, Belgium (2000-2001).
- Organizing Chair, Workshop (0.5 day) on Principles and Practices of In Situ Chemical Oxidation Using Permanganate. 2001 Intern. Containment and Remediation Technology Conf. and Exhibition, 10-13 June 2001, Orlando, FL, U.S. Department of Energy.
- Member, Organizing Committee, 1st International Conf. on Oxidation and Reduction Technologies for the In Situ Treatment of Soil and Groundwater, June 2001, Niagara Falls, NY (2000-2001).
- Member, International Panel for the Rehabilitation of the Hazardous Waste Disposal Site at Kolliken, Switzerland (1999-2001).
- Member, Advisory Committee, Ground-Water Remediation Technology Analysis Center, U.S. EPA Technology Innovation Office (1999 to 2003).
- Member, Editorial Board. *Small Flows Journal* (1999-2006).
- Member, Technical Advisory Committee. "Interagency DNAPL Consortium." U.S. EPA, U.S. DOE, U.S. Air Force, and NASA. Field Demonstration of *In Situ* Technologies at Launch Complex 34, Cape Kennedy, FL (1998-2000).
- Member, Technical Advisory Committee on High-Strength Waste. U.S. EPA Environmental Technology Verification program for Source Water Protection (1999 to date).
- Member, Scientific Review Panel for a national research program on "Sustainable Urban Water Systems". MISTRA, Swedish Foundation for Strategic Environmental Research. Stockholm, Sweden. Review meeting and report prepared in Stockholm, September 1997 and November 1998.
- Member, Planning Committee. "Workshop on In Situ Treatment Walls." NATO/CCMS country representatives meeting, Pilot Study on Evaluation of Demonstrated and Emerging Technologies for Cleanup of Contaminated Land and Groundwater. February 22-29, 1998. Vienna, Austria.
- Workshop Organizer and Chair. "In Situ Chemical Oxidation for Site Remediation." Pre-Conference Workshop. Water Environment Federation Technical Exhibition and Conference, WEFTEC '97, Chicago, IL, October 1997.

Member, Planning Committee. WEFTEC Asia '98. Singapore. Water Environment Federation.

Coordinator and host. NATO/CCMS country representatives meeting, Pilot Study on Evaluation of Demonstrated and Emerging Technologies for Cleanup of Contaminated Land and Groundwater. March 16-21, 1997, Colorado School of Mines, Golden, CO.

Session Chair. Fifth International Symposium on Field Analytical Methods for Hazardous Waste and Toxic Chemicals. January 29-31, 1997, Las Vegas, NV. U.S. EPA.

Member, Expert Advisory Panel. Design Manual for Onsite and Alternative Wastewater Systems, U.S. Environmental Protection Agency, Washington, D.C. 1996-1997.

Member, Expert Advisory Panel. Technical Resource Document on Enhanced Recovery of DNAPLs, U.S. DOE Office of Technology Development. 1996.

Program Co-organizer and Instructor. Summercourse on "Alternative Wastewater Systems." Nordic workshop on Onsite and Alternative Wastewater Treatment and Disposal/Reuse. June 1996, Aas, Norway. Institute for Soil and Environmental Research and the Agricultural University of Norway.

Session Chair. "Controlled Field Experimentation for Evaluation of In Situ Remediation Technologies." 2nd International Conference on Challenges in the Management of Hazardous Wastes." May 1995, Washington, D.C. Air and Waste Management Assoc.

Session Chair and Planning Committee Member. Specialty Conference on "Development of Clean-up Standards for Contaminated Sites: How Clean is Clean." January 1993, Washington D.C. Water Environment Federation.

Contributing Editor. *Journal of Environmental Engineering*, 1993 to 1995.

Symposium Chair and Planning Committee Member. "National Symposium on Measuring and Interpreting VOCs in Soils: State-of-the-Art and Research Needs." January 1993, Las Vegas, NV. U.S. Environmental Protection Agency.

Member, DOE Planning Committee. In Situ Remediation Technology Development. U.S. Department of Energy, Washington, D.C. 1992 to 1994.

Member, Technical Support Group. DOE Integrated Demonstration for Remediation of VOCs in Non-arid Sites, Hanford, WA. U.S. Department of Energy, Washington, DC. 1992 - 1994.

Member, Committee D-34 on Waste Disposal. American Society of Testing and Materials, Philadelphia, PA. 1989 to 1992.

Session Moderator and Program Committee Member. "6th Natl. Symposium on Onsite and Small Community Wastewater Systems." Dec. 1991, Chicago. Am. Society of Agric. Eng.

Contributor, Committee on Soil Remediation. Dept. of Natural Resources, Madison, WI. 1989 to 1990. Member, ad-hoc committee on analytical requirements for the LUST program. Bureau of Solid and Hazardous Waste, Wisconsin Department of Natural Resources, Madison, WI. 1990.

Invited participant in workshop to prepare an Issue Paper on Soil Sampling for Volatile Organic Analysis, U.S. Environmental Protection Agency, Environmental Monitoring Systems Lab, Las Vegas, NV, June 1990.

Conducted annual study tours of solid and hazardous waste management practices in North America, Scandinavia and Europe, 1988 to 1989.

Organizer and leader of a study tour of hazardous waste treatment practices in North America for a delegation from the Norwegian Ministry of Environment, October, 1988.

Member, Water Conservation Committee. Lake Michigan Federation, Chicago, IL. 1983 to 1984.

Member, Advisory Committee on State-wide Water Conservation. Wisconsin Department of Natural Resources, Madison, WI. 1981 to 1982.

OTHER PROFESSIONAL CAPABILITIES

Security clearance (Q), U.S. Department of Energy (1991 to 2000).

Experience in providing expert testimony.

Extensive worldwide travel (North and South America, Europe, Scandinavia, Australia, Asia).