

CURRICULUM VITAE
As of March, 2016

STANLEY REITSMA, P. Eng.

ADDRESS: Geosource Energy Inc.
1508 Hw 54
Caledonia, ON N3W 2G9
905 928-1407 (cell)
E-mail: sreitsma@geosourceenergy.com

EDUCATIONAL QUALIFICATIONS:

- Ph.D. (1996) - Civil Engineering, Queen's University
- M.A.Sc. (1992) - Earth Sciences, University of Waterloo
- B.A.Sc. (1990) - Geological Engineering, University of Waterloo

EMPLOYMENT RECORD

06/04-present **Geosource Energy Inc., CEO, Owner**

- Began operating Geosource Energy Inc. with one partner and one drill rig in 2004 to start the first geothermal focused drilling company in Ontario at that time
- Built the company to its present state now with two partners, 6 state-of-the-art drill rigs, high speed and capable of drilling most conditions
- Continue research into new drilling techniques, heat exchangers, building control strategies, thermal storage, grouts, plastics etc. related to geothermal systems
- Millions of feet drilled, thousands of geothermal loops installed, hundreds of residential and commercial geothermal systems operating as designed across Ontario

01/98-06/04 **Civil and Environmental Engineering, University of Windsor, Assistant Professor**

- developed active research program in the area of groundwater contamination and remediation and ground source heating
- completing field, laboratory, and numerical modelling research
- successful in attracting research funding through Canadian Foundation of Innovation, NSERC, Canada Research Chair program, and Environment Canada

01/97-12/97 **ENSR Consulting and Engineering, Acton, Massachusetts**

- acted as a hydrogeologic specialist on several contaminated sites.
- provided project management on remediation and research projects.

01/89-08/89 **Mobil Oil Canada, Calgary, Alberta**

- completed hydrogeologic and water chemistry studies for the Swan Hills Member in Southern Alberta for oil exploration initiatives.

PROFESSIONAL ASSOCIATIONS

- Registered Professional Engineer - Ontario
- Member - Heating Refrigeration Air Conditioning Institute (HRAI)
- Board Member, Ontario Geothermal Association
- Corporate member of Building Industry and Land Development Association (BILD), Canada Green Building Council (CaGBC), and Ontario Sustainable Energy Association (OSEA)

CHAPTERS IN BOOKS

1. Bolisetti, T., and S. Reitsma, 2002. Effect of heterogeneity scale on chemical grouting in porous media, in *Developments in Water Science, Computational Methods in Water Resources, Vol. 1*, eds. S. M. Hassanizadeh, R. J. Schotting, W. G. Gray, and G. F. Pinder, Elsevier, Amsterdam, 891-898.
2. Dai, Q., and S. Reitsma, 2002. Kinetic Study of Permanganate Oxidation of Tetrachloroethylene at pH 10.60±0.1, in *Remediation of Chlorinated and Recalcitrant Compounds-2002, Paper 2C-09. Proceedings of the Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 20-23, 2002*, eds. A. R. Gavaskar and A. S. C. Chen, ISBN 1-57477-132-9, Battelle Press, Columbus, OH.
3. Dai, Q., and S. Reitsma, 2002. Two-dimensional experimental studies of permanganate flushing of pooled DNAPL, in *Remediation of Chlorinated and Recalcitrant Compounds-2002, Paper 1A-13. Proceedings of the Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 20-23, 2002*, eds. A. R. Gavaskar and A. S. C. Chen, ISBN 1-57477-132-9, Battelle Press, Columbus, OH.
4. Reitsma, S., W. Pramono, and W. Mpesha, 2002. Simulation of sediment dynamics in Detroit River caused by wind-generated water level changes in Lake Erie, in *Developments in Water Science, Computational Methods in Water Resources, Vol. 2*, eds. S. M. Hassanizadeh, R. J. Schotting, W. G. Gray, and G. F. Pinder, Elsevier, Amsterdam, 1669-1676.
5. Reitsma, S., and J. Randhawa, 2002. Porous media permeability reduction due to manganese dioxide precipitation, in *Remediation of Chlorinated and Recalcitrant Compounds-2002, Paper 2C-39. Proceedings of the Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 20-23, 2002*, eds. A. R. Gavaskar and A. S. C. Chen, ISBN 1-57477-132-9, Battelle Press, Columbus, OH.

6. Bolisetti, T., and S. Reitsma, 2000. Assessment of numerical transverse dispersion for the advection-dispersion equation using the finite analytical technique, in *Computational Methods in Water Resources, Vol. 1 Computational Methods for Subsurface Flow and Transport*, eds. L. R. Bentley, J. F. Sykes, C. A. Brebbia, W. G. Gray, and G. F. Pinder, Balkema, Rotterdam, 411-416.
7. Dai, Q., and S. Reitsma, 2000. BIEM for modelling flow over and through rockfill embankments, in *Computational Methods in Water Resources, Vol. 1 Computational Methods for Subsurface Flow and Transport*, eds. L. R. Bentley, J. F. Sykes, C. A. Brebbia, W. G. Gray, and G. F. Pinder, Balkema, Rotterdam, 21-28.
8. Dai, Q., and S. Reitsma, 2000. Modeling of free surface location behind a sheetpile by BIEM, in *Computational Methods in Water Resources, Vol. 1 Computational Methods for Subsurface Flow and Transport*, eds. L. R. Bentley, J. F. Sykes, C. A. Brebbia, W. G. Gray, and G. F. Pinder, Balkema, Rotterdam, 29-38.
9. Reitsma, S., and Q. Dai, 2000. Reaction enhanced mass transfer from pooled NAPL pools, in *Chemical Oxidation and Reactive Barriers: Remediation of Chlorinated and Recalcitrant Compounds*, eds. G. B. Wickramanayake, A.R. Gavaskar, and A.S. Chen, Battelle Press, Columbus, OH, 33-40.
10. Reitsma, S. and B.H. Kueper, 2000. The use of alcohol flooding to remediate rock fractures containing DNAPL, in *Remediation in Rock Masses*, eds. H. Inyang and C. Bruell, ASCE Press, Reston, Virginia, pp. 220-236.
11. Reitsma, S. and M. Marshall, 2000. Experimental study of oxidation of pooled NAPL, in *Chemical Oxidation and Reactive Barriers: Remediation of Chlorinated and Recalcitrant Compounds*, eds. G. B. Wickramanayake, A.R. Gavaskar, and A.S. Chen, Battelle Press, Columbus, OH, 25-32.
12. LaChance, J., S. Reitsma, R. Baker, D. McKay, and A. Hewitt, 1998. *In situ* oxidation of trichloroethylene using potassium permanganate: Part 1. Background, in *Physical, Chemical, and Thermal Technologies: Remediation of Chlorinated and Recalcitrant Compounds*, eds. G. B. Wickramanayake and R.E. Hinchee, Battelle Press, Columbus, OH, 397-402.
13. McKay, D., A. Hewitt, S. Reitsma, J. LaChance, and R. Baker, 1998. *In situ* oxidation of trichloroethylene using potassium permanganate: Part 2, Pilot study, in *Physical, Chemical, and Thermal Technologies: Remediation of Chlorinated and Recalcitrant Compounds*, eds. G. B. Wickramanayake and R.E. Hinchee, Battelle Press, Columbus, OH, 397-402.

REFEREED PUBLICATIONS

1. D. Gordon, T. Bolisetti, D.S-K. Ting, S. Reitsma, "Short-term fluid temperature variations in either a coaxial or U-tube borehole heat exchanger," Geothermics, under review.
2. Dehkordi, S. E., R.A. Schincariol, S. Reitsma, 2015. "Thermal performance of a tight borehole heat exchanger", *Renewable Energy*, May, pp. 698-704.
3. C.G. Cvetkovski, S. Reitsma, T. Bolisetti, D.S-K. Ting, 2015. "Heat transfer in a U-bend pipe: Dean number versus Reynolds number," *Sustainable Energy Technologies and Assessments*,

11:148-158.

4. C.G. Cvetkovski, S. Reitsma, T. Bolisetti, D.S-K. Ting, 2014. "Ground source heat pumps: should we use single U-bend or coaxial ground exchanger loops?," *International Journal of Environmental Studies*, 71(6): 828-839.
5. Reitsma, S. and Q. Dai, 2001. Reaction-enhanced mass transfer and transport from non-aqueous phase liquid source zones, *Journal of Contaminant Hydrology*, Vol. 49, Issue 1-2, pp. 49-66.
6. Reitsma, S. and B.H. Kueper, 1998. Non-equilibrium compositional alcohol flooding model for immiscible phase remediation: 1. Equation development, *Advances in Water Resources*, Vol. 21, No. 8, pp. 649-662.
7. Reitsma, S. and B.H. Kueper, 1998. Non-equilibrium compositional alcohol flooding model for immiscible phase remediation: 2. Model development and application, *Advances in Water Resources*, Vol. 21, No. 8, pp. 663-678.
8. Reitsma, S. and B.H. Kueper, 1994. Laboratory measurement of capillary pressure-saturation relationships in a rock fracture, *Water Resources Research*, Vol. 30, No. 4, pp. 865-878, April.
9. Kueper, B.H., D. Redman, R.C. Starr, S. Reitsma and M. Mah, 1993. A field experiment to study the behavior of tetrachloroethylene below the water table: Spatial distribution of residual and pooled DNAPL, *Ground Water*, Vol. 31, Num. 5, pp. 756-766, September-October.

CONFERENCE PROCEEDING PUBLICATIONS – Refereed

1. Bolisetti, T., and S. Reitsma, 2003. Numerical simulation of chemical grouting in heterogeneous porous media, *Grouting and ground treatment, Geotechnical Special Publication No. 120*, ASCE, Reston, VA, pp 1454-1465.
2. Tomczak M, KG Drouillard, I Churchill, GD Haffner, S Reitsma, R Lazar, 2001. Comparison of two techniques for organic carbon content determination in Detroit River sediments and its relevance to the distribution of organic contaminants in an AOC. Presented at the 44th Annual International Conference on Great Lakes Research, Jun 10-14, Green Bay, WI, USA.
3. Mpesha, W., M. Tomczak, S. Reitsma, and J.A. Koschik, 2001. Flow pattern analysis of the Detroit River channel using the Acoustic Doppler Current Profiler (ADCP). Presented at the 44th Annual International Conference on Great Lakes Research, Jun 10-14, Green Bay, WI, USA.
4. Reitsma, S. and B.H. Kueper, 1996. Compositional modelling study of alcohol flooding for recovery of DNAPL, In proceedings of ASCE 1996 Annual Convention and Exposition, Non-Aqueous Phase Liquids (NAPLs) in Subsurface Environment: Assessment and Remediation, Washington, D. C., November 12 B 14, pp. 526-537.

CONFERENCE PROCEEDING PUBLICATIONS - Non-refereed

1. Reitsma, S., and Q. Dai, 2002. Influence of manganese oxide precipitation on pooled NAPL removal rate. Second International Conference on Oxidation and Reduction Technologies for In-Situ Treatment of Soil and Groundwater, Toronto, November 17-21.
2. Kueper, B.H., M. Mah and S. Reitsma, 1993. Distribution of dense, non-aqueous phase liquid

residual in a naturally occurring sand aquifer, Proceedings: Eleventh Canadian Hydrotechnical Conference, Fredericton, New Brunswick, Canada, June 8-11.

LIST OF PUBLISHED ABSTRACTS

1. Reitsma, S. and B.H. Kueper, 1992. Laboratory Measurement of Capillary Pressure-Saturation Relationships in Natural Rock Fractures, EOS, Transactions, American Geophysical Union, Vol. 72, No. 44, p. 160.

CONFERENCE PRESENTATIONS

1. Bolisetti, T., and S. Reitsma, 2004. Flow and transport simulation of chemical grouts in porous media: shear effects on gelation, American Geophysical Union Fall Meeting, San Francisco, December 8-12.
2. Reitsma, S., G. D. Haffner G.D., and K.G. Drouillard, 2003. The Detroit River as a loadings source of PCBs and Hg to western Lake Erie . Presented at the 3rd Biennial Conference of the Lake Erie Millennium Network, May 6-7, University of Windsor, Windsor, ON, Canada.
3. Drouillard, K.G., S. O'Rourke, S, D.M. Whittle,, S. Reitsma, and G. D. Haffner, 2003. Trophodynamics of contaminants in western Lake Erie as influenced by the Detroit River. Presented at the 3rd Biennial Conference of the Lake Erie Millennium Network, May 6-7, University of Windsor, Windsor, ON, Canada.
4. Bolisetti, T., and S. Reitsma, 2003. Numerical simulation of chemical grouting in heterogeneous porous media, Grouting and ground treatment, ASCE, New Orleans, Feb 2003.
5. Dai, Q, and S. Reitsma, 2002. Kinetic Study of Permanganate Oxidation of Tetrachloroethylene at pH 10.60±0.1, Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, May 20-23.
6. Reitsma, S., Q. Dai, 2002. Influence of manganese oxide precipitation on pooled NAPL removal rate. Second International Conference on Oxidation and Reduction Technologies for In-Situ Treatment of Soil and Groundwater, Toronto, November 17-21.
7. Bolisetti, T. and S. Reitsma, 2002. Effect of heterogeneity scale on chemical grouting in porous media. XIV International Conference on Computation Methods in Water Resources, Delft, June 23-28.
8. Dai, Q., and Reitsma, S., 2002. Two-dimensional experimental studies of permanganate flushing of pooled DNAPL, Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, May 20-23.
9. Reitsma, S., W. Pramono, and W. Mpesha, 2002. Simulation of sediment dynamics in Detroit River caused by wind-generated water level changes in Lake Erie. XIV International Conference on Computation Methods in Water Resources, Delft, June 23-28.
10. Reitsma, S., and J. Randhawa, 2002. Porous media permeability reduction due to manganese dioxide precipitation, Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, May 20-23.

11. Tomczak M, KG Drouillard, I Churchill, GD Haffner, S Reitsma, R Lazar, 2001. Comparison of two techniques for organic carbon content determination in Detroit River sediments and its relevance to the distribution of organic contaminants in an AOC. Presented at the 44th Annual International Conference on Great Lakes Research, Jun 10-14, Green Bay, WI, USA.
12. Mpesha, W., M. Tomczak, S. Reitsma, and J.A. Koschik, 2001. Flow pattern analysis of the Detroit River channel using the Acoustic Doppler Current Profiler (ADCP). Presented at the 44th Annual International Conference on Great Lakes Research, Jun 10-14, Green Bay, WI, USA.
13. Tomczak, M., G.D. Haffner, J.C. Barrette, B. Fryer, S. Reitsma, and E. Kimball, 2000. Distribution of mercury accumulation in bottom sediments of the Detroit River (1999-2000), 20th Annual Conference, Society of Environmental Toxicology and Chemistry, Nashville, Tennessee, Nov. 12-16.
14. Dai, Q., and S. Reitsma, 2000. Modeling of free surface location behind a sheetpile by BIEM, XIII International Conference on Computation Methods in Water Resources, Calgary, June 25-29.
15. Dai, Q., and S. Reitsma, 2000. BIEM for modelling flow over and through rockfill embankments, XIII International Conference on Computation Methods in Water Resources, Calgary, June 25-29.
16. Bolisetti, T., and S. Reitsma, 2000. Assessment of numerical transverse dispersion for the advection-dispersion equation using the finite analytical technique, XIII International Conference on Computation Methods in Water Resources, Calgary, June 25-29.
17. Reitsma, S., and Q. Dai, 2000. Reaction enhanced mass transfer from pooled NAPL pools, Second International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, May 22-25.
18. Reitsma, S. and M. Marshall, 2000. Experimental study of oxidation of pooled NAPL, Second International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, May 22-25.
19. LaChance, J., S. Reitsma, R. Baker, D. McKay, and A. Hewitt, 1998. *In situ* oxidation of trichloroethylene using potassium permanganate: Part 1. Background, In proceedings of the First International Conference, Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, May 18-21.
20. McKay, D., A. Hewitt, S. Reitsma, J. LaChance, and R. Baker, 1998. *In situ* oxidation of trichloroethylene using potassium permanganate: Part 2, Pilot study, In proceedings of the First International Conference, Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, May 18-21.
21. Reitsma, S. and B.H. Kueper, 1998. Interphase mass transfer during alcohol flooding, First International Conference, Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, May 18-21, 1998.
22. Reitsma, S. and B.H. Kueper, 1996. Compositional modelling study of alcohol flooding for recovery of DNAPL with varied injection concentration and slug size, American Society of Civil Engineers, 1996 Annual Convention and Exposition, November 12-14.

23. Reitsma, S. and B.H. Kueper, 1992. Laboratory Measurement of Capillary Pressure-Saturation Relationships in Natural Rock Fractures, American Geophysical Union Fall Meeting, San Francisco, December 7-11.

10 WORKSHOPS

1. Drouillard KG, S Reitsma, M Tomczak, GD Haffner. 2002. Biomonitors, surficial sediments, and food web datasets on the Detroit River, 1991-2001. Workshop Presentation: Evaluating Ecosystem Results of PCB Control Measures for the Detroit River - Western Lake Erie Basin, June 18, 2002, University of Windsor, Windsor, ON, Canada.
2. Reitsma S, K Drouillard, D Haffner. 2002. Simulation of sediment dynamics in the Detroit River caused by wind-generated water level changes in Lake Erie and implications to PCB contamination. Workshop Presentation: Evaluating Ecosystem Results of PCB Control Measures for the Detroit River - Western Lake Erie Basin, June 18, University of Windsor, Windsor, ON, Canada.

THESES AND REPORTS

1. Reitsma, S., W. Pramono, and W. Mpesha, 2002. Detroit River modeling and management framework modeling report and manual, submitted to Detroit River Canadian Cleanup Committee.
2. Haffner, D., S. Reitsma, K. Drouillard, and M. Tomczak, 2002. Detroit River modeling and management framework interpretive report, submitted to Detroit River Canadian Cleanup Committee.
3. Reitsma, S., 1996. Equilibrium and non-equilibrium compositional models for simulation of alcohol flooding, Ph.D. Thesis, Queen's University, October.
4. Reitsma S., S. Lunn and B.H. Kueper, 1995. The use of alcohol flooding to remediate sites contaminated by dense, non-aqueous phase liquids, Progress Report #2, (Subcontract No. 19Y-GUG26V), prepared for Martin Marietta Energy Systems, February 7.
5. Lunn, S., S. Reitsma and B.H. Kueper, 1994. The use of alcohol flooding to remediate sites contaminated by dense, non-aqueous phase liquids, Progress Report #1, (Subcontract No. 19Y-GUG26V), prepared for Martin Marietta Energy Systems, May 31.
6. Reitsma, S., 1992. Laboratory measurement of capillary pressure-saturation relationships in natural rock fractures, M.Sc. Thesis, University of Waterloo.
7. Reitsma, S., 1990. The effect of upward hydraulic gradients on the downward migration of dense, non-aqueous phase liquids in porous media, B.A.Sc. Thesis, University of Waterloo.

Profile

David L. Hatherton

Accomplishments

- 1980 Co-Founder of WaterFurnace in Canada with Frances Hatherton (wife)
- 1983 Co-Founder WaterFurnace in the USA with Dan Ellis
- 1987 Founding Committee member International Ground Source Heat Pump Association IGSHPA
- 1988 Founding President Canadian Earth Energy Association
- 1989 Founding member Earth Energy Association, Washington DC, Precursor to GHPC
- 1989 Wrote first drafts of CSA 445 standard for ground source heat pumps.
- 1991 Founder Earth Systems Inc. DX heat pump manufacturer, Kitchener Ontario, sold to WF USA
- 1992-95 VP Industry and Government Relations, WaterFurnace
- 1993 Founding member Geothermal Heat Pump Consortium – Washington
- 1993 Testified in US Congress to validate \$100M request for funding, approved.
- 1995-96 VP Industry and Government Relations, ClimateMaster
- 1997-1998 Consultant to Exelon Energy/s GSHP program.
- 1999-2011 Co-Founder of NextEnergy Inc. with Frances Hatherton (wife)
- 2003 Founding Committee member Canadian GeoExchange Coalition.
- 2008 Invited contributor to Obama Administration's report on geothermal by Oak Ridge National Labs which was instrumental in the Administration granting a 30% tax credit for

new and retrofit residential and 10% tax credit with accelerated depreciation for commercial installations.

2010 Harper wins majority, dismantles renewable energy strategies, cancels programs, bails on Kyoto

2011 Sold NextEnergy and Retired.

2015 Paris Accord a wakeup call, Government change in Canada creates new opportunities

Founded or Co Founded Companies have over 500,000 installations, 1,500,000 tons of capacity, and over \$6 billion in installed system retail value.