



## Summary of Qualifications

Mr. Watzlaf has working in the field of mine drainage formation, control and treatment for over 30 years; with the US Bureau of Mines, Department of Energy and now with Hedin Environmental. His expertise in this field has led to invitations to serve on various panels and advisory committees (Casselman River Task Force Technical Advisory Committee, Appalachian Clean Streams Initiative Technical Team Member, Acid Drainage Technology Initiative - Avoidance/Remediation Group). Has also served as referee for several technical papers for publication in scientific journals (Journal of Environmental Quality, Geochimica et Cosmochimica Acta, Mine Reclamation Matters, Mine Water and the Environment). He now applies the knowledge acquired in research to the design and construction of mine water treatment systems. He acquired his P.E. in Environmental Engineering in 2010.

## Current Responsibilities

Mr. Watzlaf serves as the engineer for Hedin Environmental. His duties include the selection, design and sizing of treatment systems for mine water. He is responsible for development of conceptual plans, bid packages and final plan approval for mine water treatment projects. On site construction oversight is also one of his responsibilities.

## Awards

Pittsburgh Research Center, Publication of the Year, Bureau of Mines, 1985  
Pittsburgh Research Center, 1995, Outstanding Team Award  
Pittsburgh Federal Executive Board, 1995, Outstanding Team Award - Bronze  
Three Rivers Environmental Award, Environmental Technology Group, 1995

## Membership in Scientific Societies

American Society for Surface Mining and Reclamation (24 years) and has served as:

- Awards Committee Chairman
- Chairman of the Soil and Overburden Technical Division
- Eastern Section Representative to the National Executive Committee

## Work Experience

1978 - 1979, Coal Miner/Student Trainee, Mid-Continent Resources, Inc., Carbondale, CO  
1979 - 1983, Student Trainee/Mining Engineer, US Bureau of Mines, Pittsburgh, PA  
1983 - 1988, Mining Engineer, US Bureau of Mines, Pittsburgh, PA  
1988 - 1996, Environmental Engineer, US Bureau of Mines, Pittsburgh, PA





1996 - 2007, Environmental Engineer, US Department of Energy, Pittsburgh, PA  
2007 - present, Environmental Engineer, Hedin Environmental, Pittsburgh, PA

## Education

B.S. Secondary Education (Physics), University of Pittsburgh, 1980  
B.S. Mining Engineering, University of Pittsburgh, 1983  
M.S. Environmental Engineering, University of Pittsburgh, 1991

## Presentations

Invited to speak at numerous scientific meetings as an expert in mine drainage remediation, including the Technical Meeting on Water in Mine Closure in Oviedo, Spain; the Conference of Biological Treatment of Mine Drainage Wastewaters in Grahamstown, South Africa; and the International Symposium on Mine Reclamation in Kangwon Land, Ganwon-do, South Korea. Over 60 presentations given (many invited) at scientific meetings, conferences, symposia and workshops.

## Selected Publications

Underground Mine Water for Heating and Cooling using Geothermal Heat Pump Systems. 2006. Watzlaf, G. R. and T. E. Ackman. Mine Water and the Environment, Journal of the International Mine Water Association, 25(1):1-14.

The Passive Treatment of Coal Mine Drainage. 2004. Watzlaf, G. R., Schroeder, K. T., Kleinmann, R. L., Kairies, C. L., and R. W. Nairn. USDOE/NETL Report 2004/1202. 72pp.

Treatment of High-Flow, Low-Iron Mine Drainage with a Semi-Passive System. 2004. Watzlaf, G. R. Proceedings of the National Meeting of the American Society for Surface Mining and Reclamation, Morgantown, WV, pp. 1962-1973.

Design and Performance of Limestone Drains to Increase pH and Remove Metals from Acidic Mine Drainage. 2002. Cravotta, C. A. and G. R. Watzlaf. Chapter 2, In Handbook of Groundwater Remediation Using Permeable Reactive Barriers. Elsevier Science, pp. 19-66.

Passive Treatment of Acid Mine Drainage with Limestone. 1994. Hedin, R. S., Watzlaf, G. R. and R. W. Nairn. Journal of Environmental Quality, 23:1338-1345.

A Method for Predicting the Alkalinity Generated by Anoxic Limestone Drains. 1993. Proceedings of the West Virginia Surface Mine Drainage Task Force Symposium, Morgantown, WV, 12 pp.

Pyrite Oxidation in Saturated and Unsaturated Coal Waste. 1992. Watzlaf G. R. Proceedings of the National Meeting of the American Society for Surface Mining and Reclamation, Duluth, MN, pp. 191-205.

The Effect of Oxygen, Iron-Oxidizing Bacteria, and Leaching Frequency on Pyrite Oxidation.





1989. Proceedings of the West Virginia Surface Mine Drainage Task Force Symposium, Morgantown, WV, 18 pp.

Comparative Tests to Remove Manganese from Acid Mine Drainage. 1985. Watzlaf, G. R. In Control of Acid Mine Drainage. US Bureau of Mines IC 9027, pp. 41-47.

