

BETTY J. SOCHA, PH D, PG

## Education

Ph.D., Geology, University of Wisconsin, 2007

M.S., Geology, University of Wisconsin, 1984

M.S., Environmental Monitoring, University of Wisconsin, 1984

B.S., Earth Science, University of Wisconsin, 1975



## Professional Licenses

Professional Geologist – Wisconsin

## Professional Affiliations

Geological Society of America

American Geophysical Union

Wisconsin Groundwater Association

## Professional Experience

Ms. Socha is a hydrogeologist with expertise and extensive experience in soil and groundwater investigation and remediation, environmental site assessments, field investigation methods, geologic mapping, and interpretation of sedimentology and stratigraphy of glacial and non-glacial deposits for environmental and engineering projects. Since 1985, she has designed and implemented geologic and hydrogeologic investigations at sites in Wisconsin, Minnesota, North Dakota, Illinois, Ohio, and Indiana, including several sites with fractured bedrock and multiple aquifer systems.

## Landfills

**Hilbert, Wisconsin, Hickory Meadows Landfill.** Hydrogeologist for various assignments including:

- Prepared annual reporting to meet landfill requirements for groundwater monitoring and evaluation of landfill underdrain performance.
- Reviewed and summarized the analytical results of environmental compliance monitoring in order to identify potential environmental impacts. Regulatory submittals include certification and a preliminary analysis of the cause and significance of any standard exceedances.
- Evaluated groundwater quality baseline data, coordinated soil and bedrock drilling, performed sampling, performed monitoring well installation, and evaluated karst potential for a recent expansion of the landfill. Prepared or reviewed hydrogeologic sections of the Initial Site Report, Feasibility Study, and Plan of Operation for the expansion.

**Jefferson County, Wisconsin, Valley Meadows Landfill.** Hydrogeologist for various assignments including:

- Prepared annual reporting to meet landfill requirements for groundwater monitoring and evaluation of landfill underdrain performance.
- Reviewed and summarized analytical results of environmental compliance monitoring. Regulatory submittals include certification and a preliminary analysis of the cause and significance of any standard exceedances.

**Eau Claire, Wisconsin, Seven Mile Creek Landfill.** Conducted various assignments including:

- Hydrogeologist for review and summary of analytical results of environmental compliance monitoring. Regulatory submittals include certification and a preliminary analysis of the cause and significance of any standard exceedances.
- Project manager and geologist for identification of potential clay borrow sites for landfill construction.

**Delavan, Wisconsin, Mallard Ridge Landfill.** Conducted various assignments including:

- Hydrogeologist for review and summary of analytical results of environmental compliance monitoring. Regulatory submittals include certification and a preliminary analysis of the cause and significance of any standard exceedances.
- Project manager and geologist for identification of potential clay borrow sites for landfill construction.

**Wisconsin Rapids, Wisconsin, Cranberry Creek Landfill.** Performed various project roles including:

- Designed an alternative to Wisconsin Administrative Code NR 507 and NR 512 requirements for landfill feasibility studies. The alternative focused on shallow groundwater and bedrock and utilized existing site data to reduce drilling and testing costs.
- Evaluated groundwater quality baseline data; and coordinated soil and bedrock drilling, sampling, and monitoring well installation for a recent expansion of the landfill. Prepared hydrogeologic sections of the Initial Site Report, Feasibility Study, and Plan of Operation for the expansion.

**Sarona, Wisconsin, Lake Area Landfill.** Performed various project roles including:

- Project manager and principal hydrogeologist for the design and implementation of a groundwater investigation and monitoring program for a former unlined landfill, documentation of waste removal, and sub-waste soil sampling. Used natural attenuation monitoring to demonstrate stability of the chlorinated volatile organic compound plume and obtained case closure under the Remediation and Redevelopment NR 700 rules, the first in Wisconsin for a relocated landfill.
- Hydrogeologist for the Feasibility Report and Plan of Operation prepared for the most recent expansion. Evaluated groundwater quality baseline data, coordinating soil and

bedrock drilling, sampling, monitoring well installation, and investigation of groundwater contamination from the adjacent unlined landfill.

- Hydrogeologist for the design of an alternative to Wisconsin Administrative Code NR 507 and NR 512 requirements for landfill feasibility studies. The alternative focused on drilling and sampling methods, because of difficult drilling conditions and complex glacial geology and groundwater flow patterns, and utilized existing site data to reduce drilling and testing costs.

**Mapleton, Illinois, Caterpillar, Inc., Industrial Landfill.** Hydrogeologist for a groundwater quality investigation and quarterly groundwater monitoring of a foundry sand landfill. The investigation and monitoring were conducted under the Illinois solid waste rules. Negotiated with the Illinois EPA and was successful in reducing the groundwater analyte list and the geotechnical testing program. Prepared the groundwater assessment report including evaluation of groundwater statistical data.

**Alliance, Ohio, American Steel Foundries, Industrial Landfill.** Hydrogeologist for a groundwater quality investigation, and RCRA closure groundwater monitoring of a foundry sand landfill. Monitoring the groundwater flow system in the area of the landfill was difficult because the landfill was located in an area that was strip mined and then back filled with spoils.

**Richmond, Indiana, Dana Corporation, Industrial Landfill.** Hydrogeologist for a groundwater quality investigation and RCRA closure groundwater monitoring of foundry sand landfill.

**Weyerhaeuser, Wisconsin, Timberline Trail Landfill.** Senior review hydrogeologist for the Feasibility Study conducted for the proposed Rusk County Landfill. Coordinated the hydrogeologic investigation including drilling method evaluation, stratigraphic interpretations, and characterization of groundwater flow.

**Minneapolis, Minnesota, Fort Demolition Landfill, Snelling Air Force Station.** Project manager and principal hydrogeologist for a soil and groundwater investigation of a demolition landfill. The project was done for the U.S. Army Corp of Engineers under the Defense Environmental Repair Amendment (DERA). The project included an extensive soil and groundwater testing program, and conducting an electromagnetic and electrical resistivity survey to identify the location of buried pesticide containers.

**Sawyer, North Dakota, Echo Mountain Proposed Landfill.** Project manager and principal hydrogeologist for a groundwater investigation of USPCI's proposed facility. Prepared an evaluation of groundwater quality and flow in a complex hydrogeologic setting consisting of subsurface coal mines, low permeability strata, and coal bed aquifers. Convinced the North Dakota State Department of Health that the hydrogeology of the site had been defined and that the site could be adequately monitored in spite of the complex setting. The site's development was deemed feasible and a landfill permit was granted.

**Wahpeton, North Dakota, Big Dipper Landfill.** Project manager and principal hydrogeologist for a groundwater investigation. Prepared an evaluation of groundwater quality and flow for this special waste landfill.

**Beulah, North Dakota, Dakota Gasification Company, Coal Ash Landfill.** Principal investigator for a geologic/hydrogeologic review of environmental data. Project manager for a groundwater quality assessment in the area of coal gasifier ash landfill, a desulfurization waste facility, and several cooling and waste water surge ponds.

**Underwood, North Dakota, Coal Creek Generating Station, Coal Ash Landfill.** Geologist and field coordinator for installation of over 50 monitoring wells to monitor a complex hydrogeologic setting consisting of low permeability strata, mining spoils, and coal bed aquifers in the ash disposal area of the 1100 mw generating station. The work was completed in 10 days to meet the schedule imposed by the Falkirk Mine.

**Red Lake County and Others, Minnesota, Radioactive Waste Landfill.** Project hydrogeologist for evaluation of sites in Minnesota for a proposed low-level radioactive waste storage facility. The project required interpretation of detailed geologic stratigraphic information and an extensive drilling and soil testing program. The project, conducted for the Minnesota Waste Management Board, had a high public profile and was very controversial.

**Anoka, Minnesota, Anoka Landfill.** Project manager for compliance groundwater, leachate, and gas monitoring for Waste Management of Minnesota. Hydrogeologist for investigation of the extensive groundwater contaminant plume. Contaminant distribution was controlled by complex glacial sedimentology. Geologist for assessment of clay deposits for landfill clay liner and final cover material.

**Whitelaw, Wisconsin, Ridgeview Regional Landfill.** Project manager for compliance groundwater, leachate, and gas monitoring for Waste Management of Wisconsin. Geologist for assessment of clay deposits for landfill clay liner and final cover material.

**Pierce County, Wisconsin, Proposed Landfill.** Project manager and hydrogeologist for landfill siting and initial site report (ISR) for a proposed landfill. Geologic conditions (shallow bedrock and perched groundwater conditions) in Pierce County are marginally suitable for landfill development, but development of a conceptual design for the landfill with an under drain system resulted in a favorable review of the ISR by the Wisconsin Department of Natural Resources.

## Publications and Presentations

The Quaternary geology of Calumet and Manitowoc Counties, Wisconsin, in press, with Mickelson, D.M., Wisconsin Geological and Natural History Survey Bulletin.

Hydrogeologic characterization of fractured dolomite for regulatory monitoring, 2011, with Clark, S., and Gregg, A., Geological Society of America, Abstracts with Programs, Annual Meeting.

The Hayton Formation, in Lexicon of Pleistocene Stratigraphic Units of Wisconsin, 2011, edited by Mickelson, D.M., Clayton, Lee, Baker, R.W., Mode, W.N., and Schneider, A.F., Wisconsin Geological and Natural History Survey Technical Report 1, p.88-95.

Evidence of tundra plants overridden by ice approximately 16,000 cal yr BP, Sherwood, Wisconsin, Calumet County, Stop 8, 2007, 2007, in Late-Glacial History of East-Central Wisconsin, Guide Book for the 53rd Midwest Friends of the Pleistocene Field Conference, edited by Hooyer, T.S., Wisconsin Geological and Natural History Survey Open-File Report 2007-01, p.49-52.

Late-glacial ice advances and vegetation changes in east-central Wisconsin, 2007, with Mickelson, D.M., Hooyer, T.S., Winguth, C., in Late-Glacial History of East-Central Wisconsin, Guide Book for the 53rd Midwest Friends of the Pleistocene Field Conference, edited by Hooyer, T.S., Wisconsin Geological and Natural History Survey Open-File Report 2007-01, p.72-87.

Preliminary Quaternary geology of Manitowoc and Calumet Counties, Wisconsin, 2005, with Mickelson, D.M., 1:100,000-scale map, Wisconsin Geological and Natural History Survey.

Ice surface profiles and bed conditions of the Green Bay Lobe from 13,000 to 11,000 14C-Years B.P., 1999, with Colgan, P.M., and Mickelson, D.M., Geological Society of America Special Paper 337, p. 151-158.

Depositional environments and correlation problems of the Wedron Formation (Wisconsinan) in northeastern Illinois, 1985, with Johnson, W.H. and Hansel, A.K., Geological Society of America, North-Central Section, field-trip guidebook, 91 p.

Fracture-trace analysis for water well site locations in Precambrian igneous and metamorphic rock in central Wisconsin, 1983, Wisconsin Geological and Natural History Survey Miscellaneous Paper 83-5, 37 p.