

# Matthew P. Tymchak, M.S.

## Senior Hydrologist

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Mr. Tymchak is a hydrologist at Gradient who specializes in analyzing the source, transport, and fate of a broad range of chemicals in the environment. As a consultant for the past 10 years, he has managed investigations at a variety of sites including chemical manufacturers, refineries, solid waste landfills, and some of the nation's largest groundwater National Priorities List sites. Mr. Tymchak's background includes evaluating historical manufacturing operations, waste practices, and the timing and magnitude of chemical releases in support of environmental cost recovery and allocation disputes. He has also applied his water resource expertise to assess the impacts of agricultural pumping on aquifer storage and streamflow to solve complex challenges in a large-scale water-allocation case, and in a national-scale case involving contaminant transport to water suppliers throughout the country.

### Representative Projects

**Water Rights Dispute:** Provided technical evaluation for an equitable water allocation request before the US Supreme Court (Original Action 142). Evaluations included assessments of watershed hydrology, groundwater flow and human water use.

**Hydraulic Fracturing Risk Evaluation:** Provided a review of potential risks to water resources related to hydraulic fracturing in the Marcellus Shale in Pennsylvania. Analyses included potential land use impacts and risks related to fluids migrating upward from the hydraulically fractured formation.

**Stray Gas Migration Investigation:** Evaluated whether methane migrated upward from the Marcellus Shale to shallow water supply wells in Pennsylvania. Analyses included methane, gas isotope, and groundwater geochemistry data, in addition to an evaluation of hydraulic fracture growth in the vicinity of shale gas wells.

**Remedy Evaluation and Cost Analysis:** Performed remedy alternative analysis for addressing TENORM waste in a landfill. Developed remedial action objectives for the impacted media and analyzed costs for each remediation alternative. Resulted in the acceptance of a Corrective Action Plan by the state agency.

**NCP Consistency Evaluation:** Evaluated the NCP consistency of response actions and their costs undertaken by a municipal water purveyor at one of the nation's largest groundwater NPL sites.

**Product Release at a Refinery:** Evaluation at a refinery to determine the timing, storage and transport of a product release. The analysis included forensic chemical data, potential groundwater and contaminant transport pathways, and a review of historical site information to understand the nature and extent of contaminants.

**Former Petroleum Storage Facility:** Analyzed potential pathways for pollutant transport from a petroleum storage facility to a nearby surface water body. Estimated chemical travel times and evaluated other sources of contamination to quantify the proportion of contaminants attributable to the facility.

### Areas of Expertise

- Contaminant Fate and Transport
- Hydraulic Fracturing
- Groundwater-Surface Water Hydrology
- Environmental Cost Analysis
- Remedial Investigation and Design
- NAPLs

### Education

M.S., Geology, University of South Carolina

B.S., Geology, James Madison University

### Selected Presentations and Publications

**Tymchak, MP;** Stahl, M. 2017. "The secret life of rain." *Gradient Trends – Risk Science & Application* 69:3,5.

Fitzsimmons, M; Flewelling, SA; **Tymchak, MP.** 2014. "Will Earthquakes Shake Up The Shale Wastewater Debate?" *Law360*: 6p. Accessed at <http://www.law360.com/articles/539206/will-earthquakes-shake-up-the-shale-wastewater-debate>.

Flewelling, SA; **Tymchak, MP;** Warpinski, N. 2013. "Hydraulic fracture height limits and fault interactions in tight oil and gas formations." *Geophysical Res. Lett.*, 40:3602-3606.

**Tymchak, MP;** Flewelling, SA., 2013. "Evaluating the Gutenberg-Richter Relationship for Induced Seismicity." Abstract 1815439. Presented at 2013 Fall Meeting, AGU, San Francisco, CA.

**Tymchak, MP;** Collins, D; Slater, B; Brown, C; Conrad, JA; Papadeas, P; Goldberg, D; Olsen, PE. 2012. "Evaluation of the Newark Basin for Carbon Sequestration: Data Acquisition and Preliminary Results." Presented at US DOE NETL Carbon Storage R & D Project Review Meeting, Pittsburgh, PA, August 21-23.

**Tymchak, MP;** Torres, R. 2007. "Effects of variable rainfall intensity on the unsaturated zone response of a forested sandy hillslope." *Water Resour. Res.* 43:W06431.



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