

Jarrold D. Gasper

Consultant



Education and Credentials

M.S., Environmental Engineering,
University of Colorado, Boulder,
Colorado, 2003

B.S., Chemical Engineering,
Johns Hopkins University,
Baltimore, Maryland, 1998

Continuing Education and Training

Hazardous Waste Operations and
Emergency Response 40-Hour
Certification (2007; refresher
2014)

Hazardous Waste Operations and
Emergency Response Supervisor
8-Hour Certification (2012)

Professional Profile

Jarrold Gasper is a geochemist and environmental engineer with 13 years of experience. His primary area of expertise is the analysis of the fate and transport of metals and organic chemicals in the environment of mining and industrial sites. Mr. Gasper's background includes aqueous geochemistry, geology, and chemical engineering. His experience includes the study of mercury biogeochemistry in pristine and anthropogenically affected environments, geochemical analyses of the groundwater-sediment-surface water interface, prediction and modeling of physical limnology and water quality at proposed mine pit lakes, analysis and modeling of surface water quality, and remediation of contaminated groundwater.

Relevant Experience

Mining Projects

Proposed Gold Mine, Nevada—Performed geochemical materials characterization over a range of project stages from exploration through the initiation of the permitting process. This characterization included materials selection, analysis, and reporting. In support of this project, managed a State of Nevada-certified laboratory for humidity cell testing.

Open-Pit Mine, Utah—A very large open-pit mine in Utah is approaching the end of mine life. One closure scenario involves the formation of a pit lake. Co-led an effort to model the physical limnology and geochemistry of the potential pit lake. The first phase of the project was numerical modeling of the physical limnology and the second phase was the creation and implementation of a linked geochemical-physical limnology model. These modeling efforts were used to evaluate wet-pit options as part of the closure pre-feasibility study.

Gravel Quarry in California—A proposed gravel quarry for a confidential client in California has a bedrock aquifer system underlying the site that includes a narrow, highly-conductive fracture zone. Performed data analysis and geochemical modeling in support of the ongoing hydrogeological investigation. The



purpose of this investigation was an analysis of water quality related to dewatering activities, and modeling of water quality in the post-closure pit lake.

Old Lead Belt, Missouri—Lead mining in Southeast Missouri began with surface mining in the 1700s and has continued with underground mining at present. The extraction, beneficiation, and smelting of lead ores has resulted in widespread contamination. Designed and led field sampling effort to understand and quantify the sources of lead to residential soils. This sampling effort was focused on quantifying and differentiating between recognized sources of lead including natural background, historical mining activities, modern mining activities, and anthropogenic background sources such as leaded paint and gasoline.

Mine Exploration Project in Ketchikan, Alaska—A hard-rock mine exploration project has an ongoing program for the monitoring of water quality and treatment of water from dewatering activities. Performed statistical analysis of water quality data for monitoring reports. A geochemical analysis of the produced water was used to estimate loading to, and treatment capacity of, the land-application system used for water treatment.

Twin Creeks Mine, Nevada—Prepared model projecting the future geochemical environment in evaporation cells for the treatment of runoff from heap leach pads, as part of an ecological risk assessment for an operating open pit mine in Nevada.

Surface Water Quality

North Park, Colorado—Due to excessive erosion and associated sediment transport, a large ranch in northern Colorado was suffering the loss of the use of irrigation ditches and experiencing associated damages to hay fields from excessive sediment. Developed an understanding of the sediment dynamics of cold climate sand dunes under both historical and current conditions, with the latter demonstrating impacts from high-intensity vehicular recreation. This analysis of sediment dynamics was used for the novel demonstration of an impairment of water quality due to sediment under Section 303(d) of the Clean Water Act.

Cache la Poudre River, Colorado—The Cache la Poudre River is located in northern Colorado and is a major source of water for municipal, agricultural, and industrial users. Additional storage of water from the river has been proposed in a new, off-channel reservoir. Created and implemented a water-quality model for the assessment of project-related impacts on in-river water quality as part of the environmental impact statement for this storage project.

Clear Creek/Standley Lake Watershed, Colorado—Clear Creek and Standley Lake provide the water supply for three cities and more than 250,000 citizens in the Denver area. Led the preparation of annual reports documenting and describing the efforts to maintain and improve water quality in the basin. These reports included detailed analysis of temporal and spatial trends in water quality throughout the basin and in Standley Lake.

Big Thompson River, Colorado—Project manager for the preparation of a “State of the Watershed” report for a nonprofit watershed advocacy group. This involved the compilation of long-term



water quality monitoring data into a single database and the preparation of a written report, performance of a statistical evaluation of the data, and the preparation of accompanying figures.

Contaminated Site Characterization and Litigation

Shenandoah River Modeling, Virginia—Completed a loading model integrating plant operations and streamflow for a viscose rayon facility on the Shenandoah River as part of a natural resource damage assessment. The plant had operated for more than five decades. Also responsible for reviewing and analyzing historical documents to develop a detailed picture of the timing and magnitude of plant releases. The release model was coupled with an analysis of surface water geochemistry to produce an estimate of the likely period of precipitation and sedimentation of metal-containing solids.

Manufacturing Facility, New Jersey—The demolition of a former aluminum manufacturing facility and disposal of the associated building materials led to the contamination of a municipal park. In support of litigation, performed an analysis of PCB concentrations and mass in park soil. In addition, built a model of PCB mass in the facility prior to demolition. This technical analysis was supported by an extensive document review and development of a timeline to identify parties responsible for the contamination.

Portland Harbor RI/FS, Portland, Oregon—The Portland Harbor Superfund site encompasses a 9-mile reach of the Willamette River, where a range of organic and inorganic contaminants are present in surface water, groundwater, and sediments. Performed geochemical modeling and technical analysis to support a geochemical evaluation of groundwater discharge based on mixing and reaction of groundwater, transition zone water, and surface water. Primary analyst for the calculation and statistical analysis of background concentrations of contaminants in sediment and surface water. Prepared estimations of loading to site from surface water and groundwater. Extensive involvement in site-wide data analysis and reporting.

Patrick's Bayou, Houston, Texas—Performed geochemical analysis of groundwater–surface water mixing in a tidal estuary in Houston, Texas, in support of an investigation of effects of groundwater discharge on benthic toxicity. This involved an evaluation of the geochemical fingerprints of groundwater, surface water, and sediment porewater. The analysis considered the temporal and spatial variability in the surface water geochemical fingerprint in response to tidal fluxes and precipitation events.

Former Wood Preservation Facility, Minnesota—Suspected contamination from a former wood preservation facility led to an investigation of ecological and human health risks related to sediment and fish consumption exposure. Performed a statistical comparison of chemical concentrations in fish tissues from locations affected and unaffected by the site.

Shoreham Yard, Minneapolis, Minnesota—Shoreham Yard is an active rail facility that has a history of groundwater contamination from both solvent and petroleum releases. A suite of remediation systems at the site are working to remediate the source zone and control the groundwater plume.



Provided data and geochemical analysis related to remediation activities. Prepared monitoring reports and associated data products.

Blackwell Zinc Site, Blackwell, Oklahoma—The historical operation of a smelter resulted in the extensive contamination of groundwater with zinc and cadmium. Prepared analysis of groundwater levels in context of the application of the pump-and-treat groundwater remedy. Assisted in the permitting process for the operation of the groundwater treatment facility.

Former DDT Manufacturing Facility, Portland, Oregon—As a component of a larger remediation program, this facility installed a system for the conveyance and treatment of stormwater. Performed step backwater modeling of conveyance channels for design storms, provided technical support for the analysis and selection of treatment methods, and modeled design element performance to estimate treatment effectiveness.

Deepwater Horizon Incident, Louisiana—Managed operations and staffing of a sample-handling facility within the context of a natural resources damage assessment in the Gulf of Mexico. Samples were collected over large distances, from inshore to far offshore, and involved diverse media, including water, sediments, and biota. Tasks included the management and QA/QC of sample documentation; logistical coordination of sample pickup from, and equipment resupply of, a fleet of vessels far offshore; and oversight of sample handling staff.

Interactions of Mercury and Dissolved Organic Matter, Florida Everglades—The Everglades are subject to high levels of atmospheric mercury deposition and resulting high burdens of mercury in higher trophic level species. Used field- and laboratory-based research to investigate the processes affecting the fate and transport of mercury in the environment. Performed extensive research into the interactions of mercury with dissolved organic matter, including measurement of binding strength (mercury-dissolved organic material [DOM] stability constants); release and sorption of mercury from Everglades peats; mercury-DOM photochemistry; and dissolution and precipitation of mercuric sulfide. Conducted trace-metal sampling and processed large-volume (2,000 L) samples for organic matter isolation.

Mobilization of Mercury from Historically Contaminated Sediments, Sacramento River Watershed, California—The Sacramento River Watershed is extensively contaminated with mercury due to natural mercury deposits, mercury mining, and mercury use in gold ore processing. Performed and supervised research investigating the chemical parameters affecting the release of mercury from sediments representing the range of contaminated environments. In addition, conducted surface water and sediment sampling.

Analytical Chemistry Experience

Experienced in the analysis and processing of mercury samples, both ultra-trace (cold vapor atmospheric fluorescence spectrometry) and above (cold vapor atomic absorption spectrometry). Wide range of experience with laboratory analytical methods, including liquid chromatography, gas chromatography, atomic absorption spectroscopy, and inductively coupled plasma methods.



Publications

Nagy, K.L., A. Manceau, J.D. Gasper, J.N. Ryan, and G.R. Aiken. 2011. Metallothionein-like multinuclear clusters of mercury(II) and sulfur in peat. *Environ. Sci. Technol.* 45(17):7298–7306.

Gasper, J.D., G.R. Aiken, and J.N. Ryan. 2007. A critical review of methods used for the measurement of mercury (II)-dissolved organic matter stability constants. *Applied Geochemistry* 22(2007) 1583–1597.

Presentations/Posters

Martin, T., W. Locke, J. Gasper, and D. Preziosi. 2009. Evaluation of mixing in sediment pore water: surface water, groundwater, and the effects of sediment geochemistry. Platform presentation at the Fifth International Conference on Remediation of Contaminated Sediments, Jacksonville, FL.

Gasper, J.D., G.R. Aiken, and J.N. Ryan. 2006. A critical review of methods used for the measurement of mercury (II)-dissolved organic matter stability constants. Poster presentation at the Eighth International Conference on Mercury as a Global Pollutant, Madison, WI.

