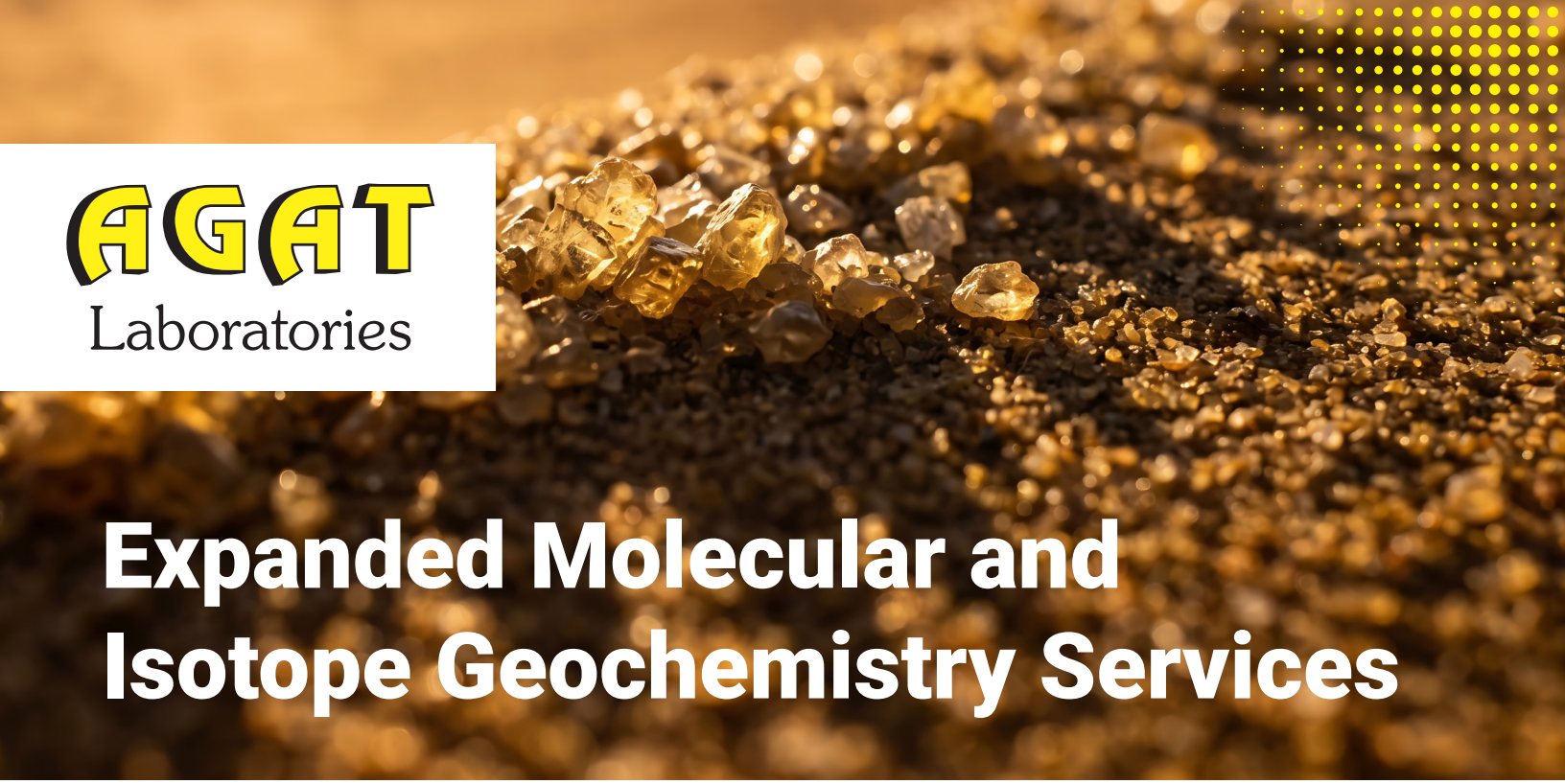


AGAT Laboratories

Expanded Molecular and Isotope Geochemistry Services

With evolving environmental regulations and a growing need for precise site characterization, identifying the exact source, age, and fate of subsurface fluids and contaminants is more critical than ever. We are excited to announce expanded analytical capabilities within the Molecular and Isotope Geochemistry Laboratory at AGAT Laboratories. Our advanced techniques are tailored to solve complex environmental challenges—from tracking fugitive emissions and groundwater migration to monitoring bioremediation efficacy.

Here is an overview of how our expanded analytical suites can support your environmental projects and portfolios:

Contaminant Source Fingerprinting, Plume Tracking, & Environmental Forensics

Differentiating between commingled contaminant plumes, identifying unknown spill sources, and distinguishing natural background levels from anthropogenic inputs. Combine multiple lines of isotopic and geochemical evidence to increase confidence.

- **High-Resolution GC (HRGC) & GC/MS Biomarker Analysis:** Highly specific molecular fingerprinting for complex organics. This allows for precise spill source evaluations, oil-oil correlations, and detailed assessments of weathering, biodegradation, and maturity.
- **Stable Isotope Analysis of Hydrocarbon Gases ($\delta^{13}C$, $\delta^{2}H$):** Crucial for evaluating fugitive gases, monitoring landfill gas migration, and distinguishing biogenic from thermogenic gas generation.
- **Isotope Fingerprinting of Oils and Fractions:** Utilizing $\delta^{13}C$ and $\delta^{2}H$ of whole oils and their fractions to differentiate overlapping signals in complex samples and definitively correlate contamination to specific, complex sources.

Groundwater Characterization & Fluid Migration

Understanding water provenance, mixing ratios, and the origin of intrusive waters in monitoring networks or industrial sites.

- **Water Isotope Analysis ($\delta^{2}H$ and $\delta^{18}O$):** Powerful tool for mapping groundwater

ID: MKTG-27555.001
DATE: Oct 26, 2026

recharge zones, evaluating surface water-groundwater interactions, and delineating mixing zones. These parameters are critical for tracking leachate migration pathways and, in broader studies, determining the regional geographic origin of waters (isoscapes).

- **Sulfur Isotope Analysis of Dissolved Sulfates ($\delta^{34}S_{SO4}$):** Crucial for tracing the origin and fate of sulfate in groundwater networks. This allows you to definitively distinguish natural background concentrations from anthropogenic inputs—such as agricultural runoff, landfill impacts, or mining effluents—and is key for evaluating active redox processes and natural attenuation within aquifers.
- **Dissolved Inorganic Carbon ($\delta^{13}C_{DIC}$):** Tracing the role of biogenic versus abiotic carbon sources and understanding the origin of carbonate precipitating fluids during monitored natural attenuation (MNA) and other remediation efforts.

Soil Geochemistry, Waste Characterization, & Remediation Monitoring

Evaluating geochemical parameters, tracking biochemical cycling, and assessing environmental risks such as Acid Rock Drainage (ARD) and subsurface gas migration.

- **Soil Gas Isotope Analysis ($\delta^{13}C$ of CO_2 and CH_4):** Crucial for vadose zone monitoring, as well as Monitoring, Reporting, and Verification (MRV) for Carbon Capture and Storage (CCS) projects, and site assessments. Utilizing carbon isotopes to clearly distinguish natural biological soil respiration and biogenic methane from the distinct isotopic signature of migrating thermogenic or injected CO_2 plumes.
- **Advanced Extraction (Soxhlet) & SARA Separation:** Isolating saturate and aromatic fractions from complex matrices (like heavy soils or cuttings) to clean up obscured signals, assess organic contamination limits, and monitor active remediation progress.
- **Sulfur Isotope Analysis ($\delta^{34}S$) of Solids and Gases:** Targeted analysis of H_2S and solid-phase sulfates to evaluate waste sulfur sources in excavated materials, assess active Acid Rock Drainage (ARD) generation, and track localized biochemical cycling in soils.
- **Elemental Analysis (EA) & Solid Isotope Analysis:** Comprehensive CNS concentrations and corresponding isotope analyses ($\delta^{13}C$, $\delta^{15}N$, $\delta^{34}S$) for solid samples to evaluate overall waste sulfur sources, contamination levels, and nutrient cycling.

Whether you are managing a complex spill response, monitoring a long-term remediation site, or characterizing baseline environmental conditions for regulatory compliance, our lab is equipped to provide the precise geochemical data your projects demand.

We would welcome the opportunity to discuss how we can customize an analytical package for your upcoming field programs. Please feel free to reach out to one of our technical experts to explore how these expanded services can support your upcoming work.