CORE^{DFN} AT PACE ANALYTICAL

ENVIRONMENT

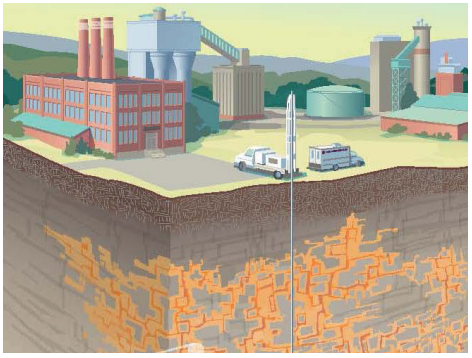
HIGH-RESOLUTION SITE CHARACTERIZATION IN FRACTURED ROCK ENVIRONMENTS

Building on extraordinary growth in understanding of the processes governing fate and transport of contamination in subsurface systems, Pace Analytical provides a unique and powerful approach to the investigation of fractured bedrock contamination. Pace offers these services to the industry via an exclusive licensing agreement with the developers of this technology; Beth Parker and the University of Guelph.

CORE DISCRETE FRACTURE NETWORK APPROACH™

CORE Discrete Fracture Network Approach™, was developed as a means to assess contaminant mass distribution in both the secondary porosity (fracture) and the primary porosity (matrix). The approach also provides a determination of transport pathways. CORE^{DFN} is a high-resolution investigation approach that definitively describes contaminant mass distribution and identifies which fractures are active transport pathways (not just hydraulically active ones).

The approach couples unique proprietary sampling and analytical methods backed up by rigorous QA/QC to provide reliable data that offer an unparalleled understanding of contamination in fractured rock.



In fractured rock with primary porosity of as little as 1%, the vast majority of the contaminant mass may be present in the rock matrix rather than the fractures.

Groundwater flow occurs mainly in the fractures, but an investigation and remedy that focuses only on the transport pathways and not on the contaminant mass has a low likelihood of success.

Pace Analytical®

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WHAT DOES CORE^{DFN} ADDRESS?

- Mass distribution in a dual-porosity system.
- Migration pathway determination.
- Contaminant mass storage in the matrix pore water and sorption to organic matter in the matrix.
- Potential for strong plume retardation resulting from diffusion of mass from fractures into matrix.
- Potential for the matrix to be a long-term source of solutes as contaminant mass diffuses back to the fractures.

In bedrock aquifers comprised of sedimentary rock, the fracture porosity is often orders of magnitude smaller than the matrix porosity. While transport occurs through the fractures, the majority of contaminant mass is often in the matrix where its movement is diffusion rate limited.

Rock core samples are collected at a close spacing; adjacent to fractures and significant geological features and in the rock matrix. The samples are then logged into a custom database on a handheld computer onsite before crushing, microwave extraction, and analysis.

CORE^{DFN} SUPPORT SERVICES

Pace provides the above services using a team-based approach. Starting with project review and planning, Pace will coordinate with our client and the drilling team and provide scientists to conduct all the field sampling and analyses. The analytical portion of the work can be provided either on-site or off-site, depending on the needs of the project. Pace can also support other analytical chemistry needs (i.e., FLUTe Felt Activated Carbon Testing [FACT]) and Compound Specific Isotope Analyses [CSIA]) that are commonly associated with these types of investigations. The final product is a fully defensible, high resolution CORE^{DFN} data report that allows the user to make reliable statements about contaminant levels and distribution, transport pathways and the occurrence (or non-occurrence) of matrix diffusion within the rock environment.

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