

Remediation Test Panel: Collecting and Interpreting Contaminant, Geochemical Isotopic, and Molecular Biology Data

Patrick McLoughlin and Aaron Peacock
(Pace Analytical Energy Services, Pittsburgh, PA, USA)

Background/Objectives. Successful site remediation requires complex analyses of the subsurface to learn about the degradation mechanisms active at a site and the dynamics that support that degradation. The increased availability of powerful tools like compound specific isotope analysis (CSIA) and molecular biology assays adds significantly to the already heavy burden of being able to interpret contaminant and geochemical data. Often the data that is collected is incomplete, and in some instances is left stranded. If it is interpreted, that interpretation often lacks the holistic overview which ties it all together. Increasingly it is being found that there are multiple degradation mechanisms at a site. This is especially true at monitored natural attenuation (MNA) sites where there is no active effort to favor one degradation mechanism over another (for example biostimulation favors reductive dechlorination over direct oxidation). This addition complicates affective MNA implementation at many sites, accentuating the need both for powerful analytical data and careful, holistic and thorough data interpretation.

Approach/Activities. In response to this need our lab has developed the Remediation Test Panel (RTP). The test panel is patterned after OSWER 9200.5-17P requirements and tailored to the contaminants present. It includes four lines of evidence: contaminant, geochemical, isotopic and molecular biology. The role of the compounds or microbes being measured is discussed and the specific results from the site in question are graphed and compared to ideal “textbook cases”. The RTP is designed as a broad assessment tool and is ideal for MNA sites or for transitioning from an active remedy to MNA where there are multiple degradation mechanisms.

Results/Lessons Learned. The RTP was successfully used at several sites where evidence was being gathered to support a request to implement an MNA remedy. In these cases there was evidence of significant roles for multiple degradation mechanisms. By developing the data to show that and providing a report to guide readers through the interpretation of that data the clients were able to present a more well reasoned and confident case for MNA. To demonstrate this, the individual reports will be presented, with emphasis on the supporting data visualizations.