

"Geo-CSI" in the Oil Patch – How Advanced Geochemistry Solves Real World Problems

Scott Mundle¹ and Court Sandau¹

Abstract

Just like the TV shows, there are scientific testing methods (geochemistry) able to age date water and fingerprint gases and liquids. As these geochemical techniques progress into diverse new areas, the insight they provide in solving critical oil-field challenges continues to expand. Compositional and stable isotope ratios provide distinct geochemical 'fingerprints' that can be used to characterize local and regional gas/fluid migration pathways. Combining these geochemical characterizations with appropriate sample collection and sample integrity provides the basis needed to identify the geological source zones that cause surface casing vent flows (gas/fluids) and gas migration issues related to production well abandonment. These techniques dramatically decrease the costs associated with some of the major issues currently emerging in the oil patch. This talk will walk through examples of the investigative approaches, or "Geo-CSI" methodology from sample collection through to data interpretation outlining how we were able to solve our client's problem.

This presentation will cover case studies and describe the geoforensic techniques used in:

- 1. identifying gases emanating of surface casing vents;*
- 2. identifying liquids coming from surface casing vents and how it could be a potential sign of bigger problems;*
- 3. identifying gas sources from complex soil gas migration tests and why existing procedures for soil gas migration are not effective.*

This presentation will demonstrate that geoforensics is a valuable technique for a company's toolbox to aid in successful repair of operating wells and successful abandonments.

¹Chemistry Matters, 2120 First Avenue NW, Calgary, AB T2N 0B5

Scott Mundle is a geochemist working with Chemistry Matters Inc. He has a PhD in chemistry and a postdoctoral fellowship in isotope geochemistry from the University of Toronto. His research is focused on developing new geochemical tracers to characterize gas/fluid transport mechanisms and regional migration pathways. He has been working as a niche-consulting provider in the oil industry since 2012, providing geochemical solutions to a variety of his client's issues.