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Identifying Gas Migration issues and characterizing their source zones using geochemical approaches

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Summary

Gas migration from leaking production and abandoned wells is a known issue in the oil and gas industry. It is often assumed that leaking production/abandoned wells are easily identified by routine gas migration testing. However, there are many circumstances where even though a well is leaking at a large rate, the detection of gas at surface is negligible and often overlooked. These 'false-negative' results in industry stakeholders having a false sense of confidence in moving forward with an abandonment or reclamation that subsequently needs to be re-entered for an intervention. Additionally, it also leads to a service provider having misrepresented the liability for the site, which can lead to potential future conflict with industry stakeholders, landowners, and regulators once the site is reclaimed.

As geochemical techniques improve, the insight they provide in solving these 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 approaches with appropriate sample collection and handling techniques provides the basis needed to identify the geological source zones for surface casing vent flows (gas/fluids) and gas migration issues.

This presentation will use case studies to discuss advanced geoforensic techniques that can be used to identify well integrity issues and characterize the geological source zones of stray gases migrating to surface.