

Many petroleum-contaminated sites remain in long-term monitoring or corrective action because decision makers lack sufficient quantitative support that residual impacts are stable, exposure pathways are incomplete, or natural attenuation processes are protective. The ASTM E3488 Moving Sites to Closure (MStC) framework addresses this challenge by encouraging practitioners to revisit the conceptual site model, identify the technical issues preventing closure, and evaluate alternative closure criteria for LNAPL, groundwater, soil, and soil gas using multiple lines of evidence.

This presentation explores how continuous subsurface monitoring can strengthen the technical basis for risk-based closure decisions across these media. At petroleum sites, high-frequency measurements of hydrocarbon vapours, oxygen, carbon dioxide, methane, temperature, humidity, and pressure can provide insight into source-zone behaviour, biodegradation processes, temporal variability, vapour transport, and changing subsurface conditions. When interpreted within a site-specific conceptual site model, these data can help evaluate whether LNAPL and dissolved-phase impacts are stable or decreasing, whether soil and groundwater exposure pathways are complete, whether petroleum vapour intrusion assumptions are supported, and whether natural attenuation or natural source zone depletion processes are contributing to risk reduction.

The talk will use the MStC process as a practical framework for showing where continuous monitoring can add value: refining the conceptual site model, improving understanding of source-pathway-receptor relationships, documenting attenuation indicators, validating screening assumptions, optimizing monitoring programs, and supporting transparent communication with regulators and stakeholders. The objective is not to replace established regulatory methods, but to show how higher-frequency subsurface data can reduce uncertainty and help practitioners make more timely, defensible, cost-effective, and sustainable closure decisions at petroleum hydrocarbon sites.