Challenges and Assessment Approaches for Methane Risk in Urban Redevelopment: Lessons from Three Case Studies

Urban redevelopment projects frequently encounter methane hazards in subsurface environments, particularly where organic-rich soils, heterogeneous fill, and historical land use intersect. Recent investigations at three (3) representative sites revealed common challenges: uncertain subsurface conditions due to poorly characterized peat and organic layers, localized high-risk zones with methane concentrations reaching explosive limits, and regulatory requirements near closed landfills that mandate methane studies and associated management plans. These complexities were compounded by design integration issues, particularly when aligning mitigation measures with foundation systems and geothermal installations.

Based on the lesson's learned from these three (3) case studies, this presentation explores a structured approach and the application of assessment framework for evaluating and addressing these challenges to provide scalable, cost-effective solutions that balances safety, constructability, and sustainability, offering practical guidance for managing methane risk in urban redevelopment projects, including discussion on:

Combining geophysical imaging techniques with targeted borehole sampling to delineate organic zones and confirm methane presence;

Temporal monitoring protocols to capture seasonal and pressure-driven variability, improving risk modeling accuracy and informing mitigation strategies;

Potential mitigation measures, including passive venting systems, impermeable membranes, and continuous monitoring; and,

On-going evaluation to refine risk profiles and develop proportionate, cost-effective solutions.

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David Wong is a licensed Professional Engineer and designated Consulting Engineer in Ontario (QPESA), serving as Regional Lead – East and Principal Technical Advisor at EnVision Consultants Ltd. He brings 20+ years of environmental risk management experience, with a core practice in site assessment, remediation, and strategy development for complex redevelopment projects. His work spans designing and overseeing groundwater and soil-vapour remediation systems, leading remedial options evaluations, and building decision frameworks that integrate stakeholder input, and regulatory obligations. David has led multidisciplinary teams on high-profile urban development initiatives across Ontario.