

Comparison of Methods for Assessing NSZD at Paved Fuel Retail Sites

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Background/Objectives. Vertical gas transport between the subsurface and atmosphere (e.g., ingress of oxygen and efflux of LNAPL degradation byproducts such as carbon dioxide) is a key component of the NSZD conceptual model. Gas exchange with the atmosphere may be restricted at sites with low permeability ground cover such as asphalt or concrete pavement, which is typical of many fuel retail LNAPL sites. This raises questions as to whether, and to what extent conventional NSZD measurement methods can be applied with confidence at these sites.

Approach/Activities. The results of a study that evaluated how concrete and asphalt pavement affected NSZD processes and data interpretation for three well-documented NSZD assessment methods: 1) soil gas concentration gradient method; 2) thermal gradient method; and 3) carbon dioxide efflux measurements.

Results/Lessons Learned. Results obtained from all measurement methods demonstrated that NSZD was occurring and NSZD rates were generally within the low-end of values reported in literature for unpaved sites. However, there was considerable variability in rate estimates, which highlights the need for careful examination of the conceptual site model and potential interferences for different measurement techniques.

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Jon Smith is a Technical Leader with AECOM, located in Southfield, Michigan. Jon has worked in environmental site investigation and remediation since 2003, specializing in characterization and remediation of sites with nonaqueous phase liquids. His experience includes the planning and execution of site investigations using a diverse set of characterization and data evaluation techniques, development of conceptual site models, assessment of NAPL mobility and recoverability, evaluation of natural source zone depletion (NSZD), and remediation technology screening and implementation. Jon has helped lead applied field research projects on LNAPL tracer testing, LNAPL transmissivity measurement, NSZD, and in situ bioremediation. He has provided technical training on NAPLs to several regulatory agencies within the U.S. and Canada and has served as a technical leader on NAPL projects in the U.S., Canada, Europe, Australia, and Western Asia.