

Hydrogeology Complications in Urban Environments and the Impact on Remedy Selection

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Background/Objectives: The global market for environmental technology goods and services reached USD 1.05 trillion in 2015 as reported in the United States Department of Commerce 2016 Top Markets Report. Despite a growing industry and advancing technology, environmental remediation is often crippled with incomplete or incorrect conceptual site models. High resolution site characterization has been gaining traction over the last ten plus years with advances in membrane interface probes; however, high resolution data is limited without a broader understanding of the dynamic urban hydrogeology.

The importance of considering variable urban hydrogeology cannot be overemphasized in preparation of a conceptual site model. Urban hydrogeology can be complicated by many factors including:

- Dense utility networks which provide preferential flow paths for dissolved contaminants;
- Cracks in aging sewer infrastructure influencing groundwater flow direction;
- Subsurface building walls, vaults and tunnels which provide partial or complete groundwater cutoff;
- Construction dewatering which can drive contaminant plumes against the natural hydraulic gradients
- Filled land and reworked land driven by elevated urban property values

Approach/Activities: This presentation will include multiple New York City remediation case studies that highlight: 1) changing hydraulic gradients driven by nearby construction dewatering and historic topography, 2) complications of urban utility networks impacting dissolved contaminant migration, and 3) contaminant source removal premiums to expedite regulatory approvals.

Results/Lessons Learned: Aggressive source removal is favored in most remedial sites; however, it has an added importance in urban environments. Conventional approaches to remediation may not be applicable in an urban environment due to the dynamic urban hydrogeology.