

## **Use of In Situ Remediation Technology at Redevelopment Sites: An Overview and Lessons Learned**

**Stewart H. Abrams** (sabrams@langan.com), Lingke Zeng, Omer Uppal, Jason Hayes, Howard Nichols, Joseph Good, Michael Burke, Jeff Ludlow  
(Langan Engineering and Environmental Services, Inc., Lawrenceville, NJ; New York City; San Francisco, CA; Parsippany, NJ)

**Background/Objectives.** The use of remedial technology at redevelopment and Brownfield sites has become ever more common in recent years. Technologies that have been widely used by government and industry for conventional clean-ups (bioremediation, chemical oxidation/reduction, soil vapor extraction, etc.) have been applied by developers at urban infill and other redevelopment sites. How these technologies are applied and the need to balance the often accelerated time schedules of redevelopment with the sometimes slow kinetics of these technologies will be reviewed. The objective of this presentation will be to articulate the differences in project approach to redevelopment sites requiring remediation technology, as opposed to more conventional sites. A new paradigm for utilizing remediation technology under these circumstances is emerging.

**Approach/Activities.** Through a series of project case studies, we will present the unique challenges of using in situ technologies at redevelopment sites. Examples of issues related to redevelopment include: inaccessibility to the contamination, insufficient time to perform treatability or pilot studies, coordination of remediation with construction, integration of remediation systems into the structural/architectural design of buildings and the special case of landfill redevelopment (notably, landfill gas recovery). Discussion of creative regulatory approaches to these fast-moving projects will also be presented.

**Results/Lessons Learned.** Key lessons learned are that the typical approach to deriving a remediation design may not apply to redevelopment sites – the usual process may simply be too time consuming or, in some cases, not sufficiently protective. However, just because the approach has to be different or accelerated, does not mean that success cannot be assured. The old adage that “Time-is-Money” applies to most of these projects. The key is to understand what the tradeoffs between time and cost really are. Getting buy-in from stakeholders, particularly the Owner/Developer, Municipality and Regulator are critical.