

New Delivery Method to Inject Remedial Amendments into a Difficult Aquifer (Case Study)

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Delivery of remediation amendments may be the most important aspect of a successful in-situ remediation project. "It's a contact sport" is often used when describing in-situ remediation. The industry's current preferred delivery approach is the use of temporary injection points advanced by direct push methods. This method allows for excellent distribution of remedial amendments both horizontally and vertically. Unfortunately, direct push delivery has significant limitations when it comes to deep treatment zones, cobbled sites, and weathered bedrock. With regards to deeper injection into bedrock, a viable injection method utilizes pressure packers to deliver remedial amendments into bedrock boreholes. But what about those "in-between" treatment zones? Those zones that are inaccessible for direct push injection but not competent enough for pressure packer systems? At some project sites, this transition zone is where much of the contamination may be present and yet it is also the most difficult zone to properly use the standard in-situ delivery methods.

This talk will showcase recent advances in the in-situ delivery of remedial amendments to remediate this "in-between" treatment zone. The talk is based on a real-world case study site with a deep treatment zone that proved inaccessible using industry-standard delivery methods. Case study project components to be profiled include:

- Data review and gap analysis for the site;
- Bench-scale proof-of-concept treatability testing;
- Overview of historical remedial activities;
- "In-between" zone pilot-test results;
- Detailed design for the full-scale in-situ remediation program;
- Completion of the full-scale in-situ injection into the "in-between" zone; and,
- Follow-up performance monitoring of treatment effectiveness.

This talk will present the methods, observations and results of each step of the remediation process, and will detail the current state-of-the-art in these regards. Lessons learned on in-situ treatment of the "in-between" zone will be presented.

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Mr. Lichti is an Environmental Engineer at Vertex Environmental Inc., and has designed and implemented more than 120 in-situ remediation injection projects over the past decade involving chlorinated solvents and petroleum hydrocarbons across Canada. Mr. Lichti holds a Bachelor's degree in Engineering from the University of Waterloo, and is a Professional Engineer in Ontario.

Gerren Feeney, BSc

Mr. Feeney is a Project Manager at Premier Environmental Services Inc., with over 11 years of experience in Environmental Site Assessment, Risk Assessment and Remediation. His project experience has extended across Canada and the United States working within the regulatory frameworks of these jurisdictions. Mr. Feeney holds a Bachelor's degree from the University of Guelph in Environmental Science and a Post-Graduate Diploma in Environmental Engineering from Conestoga College.