

Cascade Remediation Services LLC – PEMA Abstract Submission 9.12.22

Title: “Using the Waterloo Aquifer Profiling System and the Membrane Interface Probe/Hydraulic Profiling Tool (MiHPT) to Define Contaminant Mass and Flux and Support Traditional and Automated Injection Approaches”

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Discussion/Results/Evaluation: While this is a classic chicken & egg scenario, where high resolution technologies were developed before advancement in injection technologies, their timelines are now parallel and in sync. Automated injection approaches are now available to be able to capitalize on high resolution data and modelling capabilities to optimize the injection of liquid and colloidal solids into flux zones to cut off downgradient risks. High resolution technologies can better define metals, petroleum, solvents and PFAS flux. New automated technologies can inject oxidants, reductants, bioremediation products and colloidal solids like ZVI and activated carbon.

Traditional injection technologies (high pressure, hydraulic and pneumatic fracturing) can inject ZVI, activated carbon, and solid oxidants into heterogeneous or fine grained lithologies more common in source areas.

Conclusions/implications: Over the past 20 years in situ remediation has had to overcome many challenges, including emerging contaminants and matrix back diffusion. With the integration of high resolution characterization and traditional and advanced automated injection, these challenges are becoming more manageable and providing a more predictable path to site closures.