

Rapid Natural Attenuation at a Central Alberta Well Site

Margaret Allan, Matrix Solutions

When a river in central Alberta changed course in response to high flows, an adjacent well site that was undergoing decommissioning became washed out. An approach based on conceptual site modelling focused the next steps and answered the question, "Where did the contamination go?" Matrix Solutions Inc mapped topography before and after the river changed course and conducted geophysical and drilling programs to map stratigraphy and determine if any of the previously identified contaminated soil remained in place. Refraction seismic data indicated differences in seismic velocity that were interpreted as different strata: unsaturated sand/gravel, saturated sand/gravel, and underlying fine-grained soil. Drilling and soil sampling confirmed stratigraphy along the seismic lines and indicated that no contaminated soil remained in areas previously impacted. The data were entered into a Leapfrog® model to give a three-dimensional view of the site. From this, the scale of natural forces became apparent: the model revealed that the river scoured away 53,000 m³ clay till and laid down 34,000 m³ gravel, scouring deeper than the contamination had been. Matrix Solutions Inc estimated the concentrations of petroleum hydrocarbons that would have been in the river during the scouring event, and determined that guidelines for freshwater aquatic life would not have been exceeded. Concluding recommendations advocated removing the well access road and providing gentle slopes down to the river terrace to complete surface reclamation. Remediation was not required, as scouring by the river had taken care of the impacts.

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Margaret Allan is a Principal Engineer has been a contaminated sites consultant for 30 years. Her prime area of interest is the environmentally responsible management of contaminated sites and remediation to risk-based standards that facilitate site re-use. Margaret is dual-registered as a Professional Engineer and Professional Geoscientist, having attained degrees in Geo-Engineering and Engineering for the Environment. She is also a certified environmental compliance auditor and travels throughout the prairie provinces helping site owners better manage the environmental aspects of their industrial facilities.

Chris Pooley, P.Geoph.

Chris Pooley is a Geophysicist with Matrix Solutions Inc. and has worked in the environmental consulting industry for 12 years. He is a key person for geophysical survey planning and technique selection for site characterization, having gained experience in near surface geophysics, GIS analysis, and hydrogeological modelling. Mr. Pooley is a technical reviewer for geophysics work performed at Matrix Solutions Inc. and also spends time developing new and innovative strategies to streamline processing of geophysics data.