LNAPL Modeling and Site Closure, Otter Creek Tank Farm Areas 1 & 2, Goose Bay, NL

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Dillon was retained to update a light non-aqueous phase liquid (LNAPL) conceptual site model (LCSM) and implement site management framework (for closure) that addressed outstanding data gaps around LNAPL and dissolved phase impacts associated with two areas at a former tank farm (i.e., Areas 1 & 2 of the Otter Creek Tank Farm) that historically contained eight above ground storage tanks ranging in size from 1,600,000 to 2,400,000 L. Using available data (both historical and data collected during the activities), Dillon evaluated primary lines of evidence of LNAPL behaviour scenarios which included LNAPL characterization, LNAPL stability (mobility of LNAPL around periphery of LNAPL body), LNAPL mobility (within stable LNAPL body), LNAPL recoverability, dissolved phase plume stability (i.e., Mann-Kendall and Ricker plume stability analyses), monitored natural attenuation, and natural source zone depletion (NSZD) evaluation using carbon dioxide and methane gas flux. The combination of stability, mobility, and natural source zone depletion evaluations were used to identify the appropriate site management strategy for the LNAPL plume that had in select wells more than one meter of LNAPL. Based on Dillon's study, the LCSM identified a behaviour scenario that demonstrated that there was no unacceptable dissolved phase or LNAPL mobility risk, which suggested a site management strategy could be used that did not require compositional control, saturation reduction, or contaminant containment. Consequently, the residual LNAPL plume was risk managed in place obviating the need for expensive long-term remediation and monitoring. Dillon's strategic approach toward achieving the objective resulted in significant costs saving (i.e., >$100,000) associated with optimized monitoring (reducing the number of wells sampled from 120+ to 82) , use of innovative technology to measure CO2/CH4 flux, and timely and recurring data analysis that ultimately obviated the need for a round of data collection. This presentation will describe the weight of evidence approach (with multiple lines of evidence) and the associated data analysis/interpretation that permitted the reduction and subsequent cessation of monitoring and ultimately acceptance of no further action ahead of schedule.

Andrew Thalheimer

Andrew Thalheimer is a Partner with Dillon Consulting Limited in Dillon's Halifax office and serves as Dillon's National Remediation and Risk Control Leader. Andrew is a Site Professional and senior environmental engineer with over 30 years' experience in various aspects of environmental liability management including due diligence, contaminated site investigation, risk assessment, risk management, remedial design, remediation, construction oversight, emergency response, litigation support, and strategic contaminated site management. Andrew has developed and implemented work plans associated with various phases of environmental assessment; groundwater monitoring optimization; human health and ecological risk assessment; LNAPL characterization, assessment, and management; environmental effects monitoring; and, remediation via multiphase extraction, in-situ chemical oxidation, capping, excavation, and bioremediation. He has successfully achieved regulatory closure on numerous LNAPL impacted sites through remediation and risk management.