

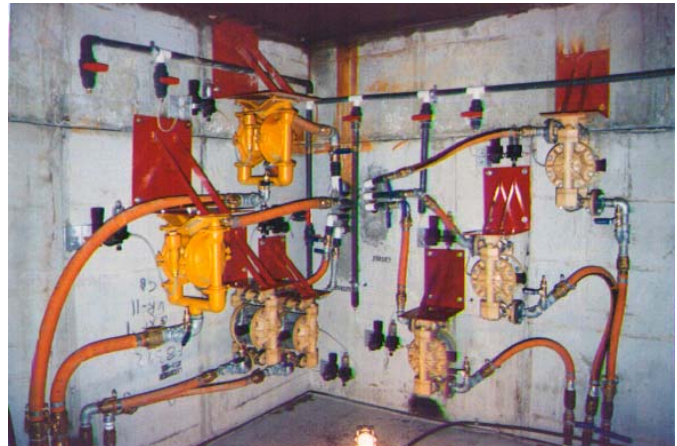
PROJECT DESCRIPTION

Characterization Restoration Hydrogeology Modeling Risk analysis
 Research and development

GROUNDWATER PUMPING AND TREATMENT AT QUEBEC INDUSTRIAL SITE

Parameters of

Concern : Benzene and acetone
Project Duration: Active since 1995
Performance : Hydraulic barrier designed to prevent contaminant migration
Cost: \$400 000
Client : Textile plant



Issue

In 1994, a hydrogeological characterization of an industrial site located east of Montreal documented the presence of a 50,000 square meter plume of dissolved benzene and acetone. In order to control the migration of the contaminant plume, as well as to reduce the observed concentrations (up to 2,000,000 µg/l), a number of mitigation measures were proposed and implemented.

Work Performed

The first step was the construction of a hydraulic barrier consisting of 15 pumping wells which are controlled from an underground control station. These wells were designed to intercept and pump contaminated water to a treatment system for filtration, aeration and the addition of nutrients. Mathematical modelling was used to determine the number and location of each pumping well. To enhance the natural biodegradation processes, a portion of the treated, oxygenated and nutrient-amended water was returned to the aquifer. The oxygen level within the plume was also increased by the injection of air into 15 wells and the installation of magnesium peroxide cartridges.



Results

Based on piezometric data, the hydraulic barrier, with an average pumping rate of 135 L/min, has successfully prevented the off-site migration of the dissolved benzene plume. Approximately 140 kg of benzene was removed from the 32,000 m³ of contaminated water pumped prior to February 1997. Microbiological and genetic analysis, together with microcosm studies, demonstrated that benzene degradation was most efficient under aerobic conditions.