Botany Groundwater Cleanup Project

Fact Sheet 7 **Updated February 2005**

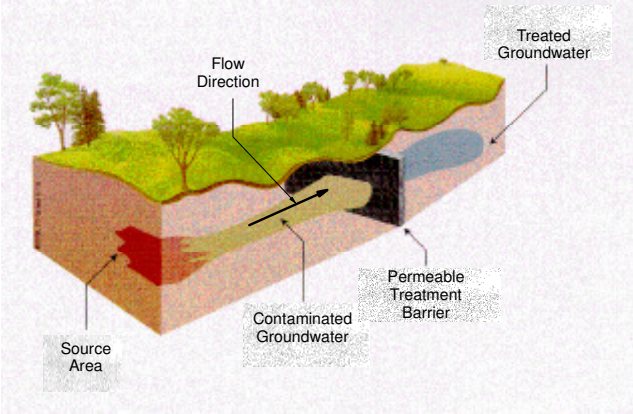
Fact sheets are designed to provide lay people with simple and easy-to-understand information on environmental science and technology. Readers requiring greater detail should contact Orica:

- by email to info@oricabotanygroundwater.com
- by phoning our Community Feedback Line - 1800 025 138
- by writing in to - Community Matters, 16-20 Beauchamp Road, Matraville 2036

Reactive Iron Barrier

How does Reactive Iron Barrier technology work?

A trench is dug into the soil, intercepting the contaminated groundwater plume. It is then filled with granular iron which is more permeable than the surrounding soil. As the groundwater flows through the iron barrier the chlorine in the CHCs reacts with the iron and is removed from the groundwater. When all the chlorine has reacted only harmless gases and salts remain.



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Where has it worked elsewhere in the world?

The first reactive iron barrier was installed in California in 1992. Since then, approximately 100 pilot scale or full scale reactive iron barriers have been installed in the United States, United Kingdom, Germany, Denmark, Japan and Australia. They have largely been very successful. The extent of each project's success has been based on the thoroughness of site characterisation, planning and coordination, design and construction, operation and maintenance.[1]

[1] For more detail on the lessons learned from the projects, see United States Environmental Protection Agency, 2002, *Field Applications of In Situ Remediation Technologies: Permeable Reactive Barriers*, accessed online at www.eti.ca on 15/04/04.

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Advantages/Disadvantages

Advantages:

- Mechanically simple;
- Cost effective;
- Long-term treatment;
- Destroys contaminants;
- No toxic end-products;
- No energy consumption;
- Conserves water;
- Allows productive use of treatment area;
- Minimal operations and maintenance cost;
- Can be combined with other treatment technologies for full *in-situ* remediation; of a broad-range of groundwater contaminants.

Disadvantages:

- Currently restricted to shallow plumes;
- The plume must be very well characterised and delineated;
- Does not degrade EDC or dichloromethane.

How will it be applied to the Botany groundwater?

In February 1999 Orica installed a pilot scale reactive iron barrier to test its effectiveness in destroying a range of CHCs in groundwater.

The trials were successful and Orica subsequently completed pre-design work for a full scale barrier at Orica Southlands, an unused block of land to the south-west of the manufacturing site. At this stage, however, Orica will not be proceeding with the full scale construction as it would unnecessarily duplicate the contaminant containment function of the hydraulic containment system currently being constructed. Orica has obtained approval from DEC to defer construction of the full scale RIB.

Links to reference papers/sites:

EnviroMetal Technologies Inc. website: www.eti.ca

United States Environmental Protection Agency, 1997, *Permeable Reactive Subsurface Barriers for the Interception and Remediation of Chlorinated Hydrocarbon and Chromium (VI) Plumes in Ground Water*, accessed online at http://clu-in.org/download/toolkit/remediat.pdf on 15/03/04.