

# Remediation

of polluted site

## CLIPPER OIL

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## Construction of an active barrier with Drain Panel® gates at a site contaminated with hydrocarbons and derived products

The Clipper Oil site a few kilometres from Granollers in the Barcelona suburbs (Spain) was occupied for many years by a waste oil treatment shop. Ignoring environmental protection rules, this activity seriously contaminated the soil and ground water table with hydrocarbons and related products such as PCBs, PAHs and phthalates. When the business collapsed, the “Junta de Residus”, responsible for contaminated soils and sites as an agency of the Generalitat de Catalunya, invited proposals for remediating the site, which was threatening to pollute an abstraction well and nearby river.



View of site during construction

### Successful proposal

Fifteen proposals were submitted. The successful one jointly tendered by TQMA (Tecnologia Quimica y Medio Ambiente), Rodio and Soletanche Bachy was for an active barrier using Drain Panel® technology and in situ bioremediation.

This approach was the only one offering the following advantages:

- It ensured adequate protection of the water resources downstream of the site because

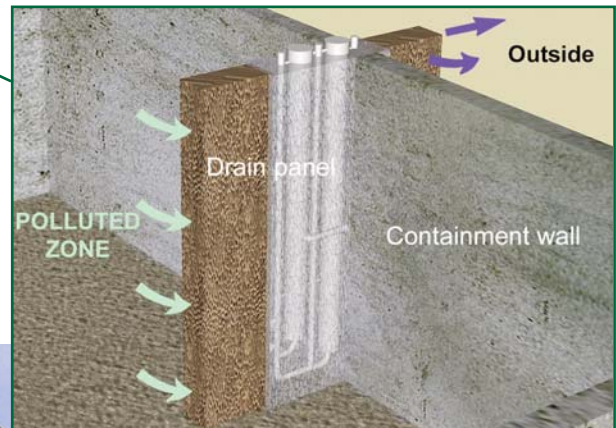
OWNER:	JUNTA DE RESIDUS (GENERALITAT DE CATALUNYA)
MAIN CONTRACTOR:	TQMA - RODIO - SOLETANCHE BACHY
PERIOD:	AUGUST - NOVEMBER 2000

#### MAIN WORKS QUANTITIES:

- Slurry trench wall: 2,153 m<sup>2</sup>
- Filter gates: 2 no.



▲ Basic active barrier principle



View of a filter gate ➤

the polluted area is contained within a confining barrier.

- Industrial activity (mechanical engineering and glassware shop) would not be interrupted (this was one of the major specification requirements) because the remediated area did not have to be covered.

Excavation and processing of the most severely polluted soil involved no risk of aggravating pollution of the water table.



The active barrier operates on a simple principle. The enclosure is open at the top and when it rains, the water escapes through the Drain Panel® gates which have filters to trap the pollutants coming from the natural leaching process or disturbed by excavation of contaminated soil.

### Description of works

Rodio, assisted by Soletanche Bachy, undertook the following works:

- Surrounding slurry trench wall, 5.2m deep, dug with a long-reach backhoe. Wall permeability was less than  $5 \times 10^{-9}$  m/s.

- Two filter gates built with patented Drain Panel® technology in which filters trap organic contaminants such as heavy hydrocarbons, PAHs, PCBs and phthalates. The gates can operate either in series or in parallel.

### Performance monitoring and maintenance

The gate filters are:

- designed to be replaced yearly on the basis of the foreseeably slow flow rate in this Mediterranean climate and the high degree of pollution,
  - fitted with sampling tubes to test the filter medium for saturation.
- Gate inflow and outflow analysis revealed better than 90% reduction in dissolved hydrocarbons.

All parts of the gate are readily accessible for cleaning, which simplifies maintenance.

Monitoring piezometers inside and outside the barrier indicate satisfactory overall performance of the system.



Drain Panel® gate with filters and sampling tubes

Clipper-Oil: Filter gate performance			
Trap efficiency			
<b>HCT East gate (ppm)</b>			
Date			10/05/01
Inflow			9400
Outflow			770
Observed efficiency (%)			-91,81
<b>HCT West gate (ppm)</b>			
Date			10/05/01
Inflow			54000
Outflow			1400
Observed efficiency (%)			-97,41

Filter efficiency after 9 months of operation