

# Remediation

of polluted site

## PASSIVE CONFINEMENT OF A FORMER INDUSTRIAL WASTE DISPOSAL SITE



BEAUCAIRE - GARD - FRANCE

### Total confinement of a former agrochemical site in Beaucaire

This former agrochemical site was operated for the manufacture of herbicides and pesticides in the commune of Beaucaire until 1996. The waste produced by the manufacturing operations was stored in a former gravel pit adjacent to the site. The solution selected and approved by the authorities, for financial as well as health and safety reasons, consisted of confining the site rather than evacuating the waste to a class 1 landfill site.

The preparatory work involved the shifting of the waste in order to establish an operating platform to protect the operating personnel from the pollutants and provide the perfect stability required by the drilling equipment.

The 135m long boundary slurry wall was constructed by Solétanche Bachy using a cable bucket operated on a tiny patch of land of just 900m<sup>2</sup>. The wall is anchored in the marl at its base at a depth of between 16 and 20m. Since the geomembrane waterproofing system is located 1,5m below the natural earth



General view of the wall construction site

CONTRACTING AUTHORITY:	AVENTIS AGRICULTURE
ASSISTANT TO THE CONTRACTING AUTHORITY:	ENVIRON
GENERAL CONTRACTING:	SOL ENVIRONMENT
CONSTRUCTION OF THE CONFINEMENT PARTITION:	SOLETANCHE BACHY
DURATION OF WORK:	JULY - DECEMBER 2006

#### WORKS QUANTITIES:

- Shifting and elimination of 3,500t of manufacturing waste
- Partitioning with slurry wall: 2,300m<sup>2</sup>
- In situ confinement of waste, contaminated earth and present formations - confinement volume of approximately 13,000m<sup>3</sup>
- Horizontal waterproofing and drainage: 900m<sup>2</sup>
- Long-term monitoring of the confined area: bore plus two piezometers for the monitoring of the confined water



Earthworks up to the level of the waterproofing system

level, the top of the wall was reinforced using metal sections; an additive was introduced into the bentonite-cement slurry to improve its resistance to compression which was increased to 2 Mpa after 28 days and to make it possible complete the earthworks in total safety. The geomembrane waterproofing system also helps drain any penetrating water which is channeled to the waterway in the trench running alongside the nearby main road.

The excavated volume was then filled with clean, well-draining materials up to the natural earth level. The surface layer consists of humus.

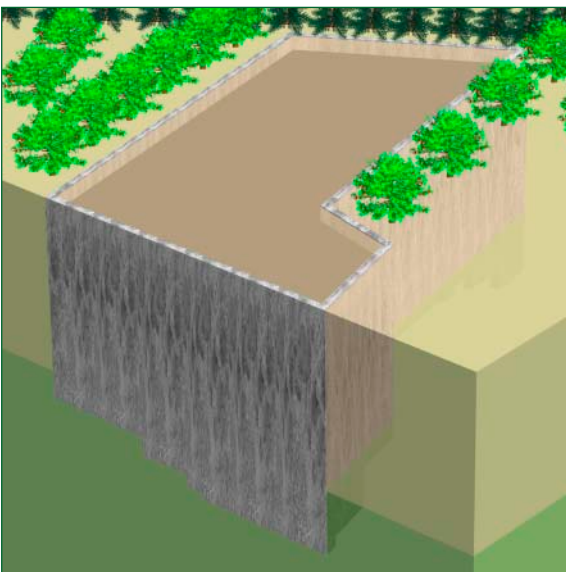
The long-term monitoring of the confinement is ensured by a network of boreholes and piezometers welded to the horizontal waterproofing system.



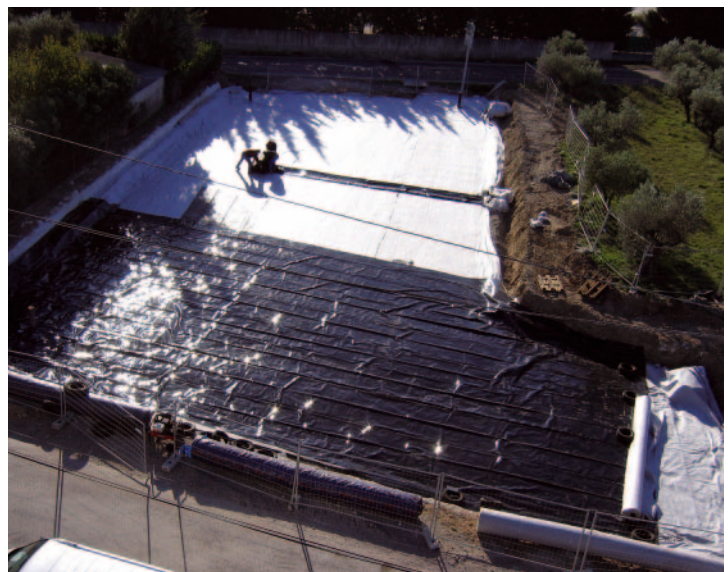
Watering of the earth during the earthworks

### Work performed

- Earthworks and waste handling for the installation of an operating platform.
- Construction of a cement slurry boundary wall next to the polluted area and anchored in the underlying impermeable marl.
- Movement of the waste within the confinement zone for the deep installation of the geomembrane waterproofing system.
- Infill with clean materials and erection of a boundary fence.



Diagrammatic section of the confined zone



Installation of the waterproofing system