

## CASE STUDY

# PROVIRON - REMEDIATING A FORMER COKE AND GAS PLANT



At a former coke and gas production plant owned by Proviron in the Port of Ostend, Belgium, RSK is responsible for planning the demolition of underground structures and the remediation work.

The former coke and gas plant covers about 10 ha of the approximately 40-ha site. The site is contaminated with heavy metals, polyaromatic organic compounds, polycyclic aromatic hydrocarbons, chlorinated and non-chlorinated volatile organic compounds, and cyanides in the soil and groundwater. RSK has also detected pure liquid tar in large areas of the site. The contamination is mainly at depths of 0.5–2 m.

The top 2 m of soil contains a vast amount of bricks. Underneath, a 5-m-deep layer of clay acts as a barrier to the contamination. A sandy layer with higher permeability lies below the clay. To prevent the contamination dispersing off-site, a 400-m drainage system has been installed. As the contaminated area is not in use, there are currently minimal risks for human health, but this will change if the intended industrial development takes place.

The remediation work will involve excavating approximately 70,000 m<sup>3</sup> of contaminated soil and demolishing underground structures such as pipelines, floors and basements. The total cost of this work is estimated at €14 million.

In the area with the highest benzene concentration, a multiphase extraction (air, water, pure product) system was installed to reduce the benzene concentration. This did not produce the desired result, mainly because of the heterogeneity of the soil. However, test pitting revealed an area consisting mainly of cinders; in this area, a simple pump-and-treat system (drains and submersible pumps) is removing high contaminant masses. Further monitoring is needed to evaluate if this remedial action is sufficient to remove the risks for future use and whether additional excavation work will be needed. The contaminated groundwater from the different multiphase extractions is buffered in an open reservoir where the pure product is skimmed off and is further treated with a sand filter, a bio-rotor and an active carbon filter. The contaminated vapour is treated with a compost filter.

Pending excavation work, the groundwater concentrations are being monitored off site from the drainage system and underneath the clay layer. After 10 years of monitoring, no further dispersion of the contamination has been seen.

A nearby manufacturing plant that uses ambient air for the production of a base product for toothpaste has raised concerns about the odours associated with the high benzene and hazardous air pollutant concentrations in the contaminated soil. The wind direction therefore will need monitoring during excavation and may necessitate work

stopping intermittently. An on-site stockpiling area has been constructed to retain the soil on-site temporarily so that soil can be sampled to evaluate the treatment needed.

The Flemish authorities are pushing the client to commence excavation work. RSK has stressed that this excavation is not urgent, as the contamination has been on-site since 1960 and there are no human risks or risks for dispersion. The client is looking into developing parts of the site starting from 2014, which will involve excavation of contaminated areas.



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