

Client
Location

Caltex
Carlton, Victoria, Australia

ACQUA Product

Induced Cyclonic Separator (IC-SEP*)
Vertical Gravity Separator (VGS*)

Objective

To purify groundwater contaminated by petroleum hydrocarbons.



Background

The site in Carlton was previously a Caltex petrol service station that had been decommissioned and the storage tanks removed. During operation and decommissioning of the service station large amounts of petroleum products leaked in to the surrounding soil. Soil-sampling and groundwater investigations determined that the degree of contamination was high enough that development of the site was unable to proceed without complete site decontamination.

Solution

ACQUA designed, installed and commissioned a groundwater treatment system to remove hydrocarbons. Since the site was to be redeveloped for residential purposes, the complete removal of dissolved phase hydrocarbons from the aquifer level was of paramount importance. The groundwater decontamination process involved placing spear points around the site according to the land topography and where pockets of contaminated groundwater lie.

The IT Group were responsible for delivering groundwater to the treatment system, and ACQUA were responsible for undertaking the processing of the groundwater and to ensure discharge of clean water from the site to sewer. ACQUA designed a system that utilizes an IC-SEP*, an OWS VGS* and a series of carbon filters. The complete system is capable of treating 3,000 liters per hour.

The contaminated groundwater is pumped to a preliminary holding tank capable of storing 3,600 liters of effluent. A floating skimmer removes free and floating hydrocarbons to the VGS*. Within the VGS*, a pure hydrocarbon phase is separated from the water and directed into a vessel for containment and disposal. Water containing the remaining dissolved phase hydrocarbons is pumped to the IC-SEP* system.

This oil/water mixture is mixed with a dissolved air stream from the IC-SEP* unit. Separation of the oil phase from the water phase occurs in the flotation tank where the dissolved air comes out of solution and rises slowly to the surface collecting the hydrocarbons and bringing them to the surface for removal. A floating skimmer removes these floating hydrocarbons with some of the water from the top of the flotation tank, and this stream is also pumped to the OWS VGS*.

Treated water from the IC-SEP* system is finally passed through two carbon adsorption columns where any remaining hydrocarbons are removed. This is the final polishing step before the clean water is stored in a final holding tank for testing prior to eventual discharge to sewer.

A vapor removal system is installed to each of the tanks and pulls out any volatiles given off in the process. These volatiles are removed in a carbon adsorption canister. All equipment is in a hazardous area and appropriate measures had to be taken to eliminate any sources of explosion. Special attention was paid to classification of areas and design of electrical panels.

Performance data for the ground remediation process is shown below:

Parameter (µg/L)	Groundwater Inlet	Post VGS	Post IC-SEP	Post Carbon Filter
Benzene	0.54	0.44	0.053	<0.001
Ethylbenzene	0.053	0.074	0.004	<0.001
Toluene	3.1	1.6	<0.010	<0.001
Xylene	31	3.6	0.003	<0.001
TPH c6-c9	280	15	2.7	<0.05
TPH c10-c14	240	23	6.3	0.48
TPH c15-c28	240	25	5.0	0.1
TPH c29-c36	2.4	0.3	0.1	<0.1