

Coke Oven Wastewater Remediation

Contaminated Water Solutions Case Study



The Whyalla steelworks is located approximately 400 km North of Adelaide, Australia. In Australia, reed beds have been used for storm-water run-off and sewage treatment, but little was known about applications to steelworks wastewater treatment.

Overview			
Type of Effluent	Area	Load	Notes
Coke oven effluent in arid conditions containing ammonia, cyanide and phenol.	16 beds (60m x 20m)	Up to 300m ³ / day mixed coke oven waste	Successful reduction of very high COD and ammonia.



During the production of coke, a concentrated liquid effluent arises which must be treated before the water can be safely discharged or recycled. This effluent contains a range of substances of concern, including ammonia, phenols, tars, mono and polycyclic nitrogen containing compounds, cyanides, sulphides and PAH's. While many of these substances are amenable to traditional biological treatment process, the complex composition, along with the inclusion of ammonia remains a problem.

The Llanwern plant at Whyalla represented the first reed bed technology trial on coke oven effluent. In soil-based reed bed systems, the effluent to be treated percolates through the biologically active soil and roots of a large bed of reeds, and then drains through a pipe at the base of the bed.



After trials, a large scale (2 ha) trial system was constructed and commissioned in 1997. This involved the adaptation of the plants and biological life within the system to pollutants in the wastewater.

The reed bed successfully treats the ammonia, phenol and cyanide to levels where the treated effluent can be re-used in the coke production process, thus also saving on freshwater use.

The reed bed waste water treatment system provides a low cost solution (particularly in terms of maintenance and additives) to the coke oven discharge problems, but has also enhanced the environmental value of the land at the steelworks.