

Large-scale leachate treatment in a membrane bioreactor - the domestic landfill of Qizishan, Suzhou (China)



Case Study:

Improving the water production capacity and stability by adjustment of the filtration process and membrane material optimization

The Challenge

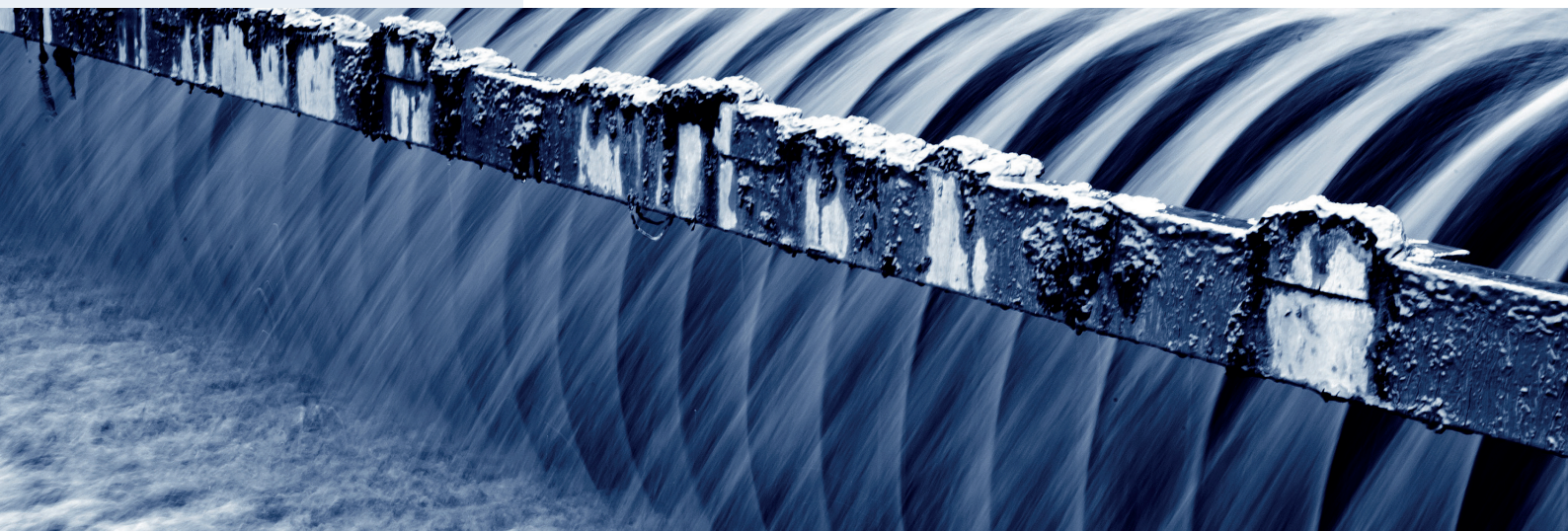
The Qizishan domestic landfill is located in Suzhou, a Chinese city with a population of 10 million people and a capacity of thousands of tons of waste water each year.

The landfill had been put into operation in 1993, just to be shut down again 16 years later after having treated about 780 million tons of waste. To keep on receiving domestic waste a big capacity expansion project had to be launched in August, 2012, aiming at adding an additional storage capacity of 800 million m³. The project utilizes vertical pile-filling on the old landfill area and is the first vertical pile-filling project in China ever. The landfill was put back into operation in 2014.

At present, the average amount of domestic garbage accepted by the landfill is about 1000 tons with a maximum of up to 2000 tons – per day. The amount of leachate emerging from this waste is huge and of a complex composition. The so-called mixed liquor activated sludge downstream the biochemical treatment is unstable, which is a big challenge for the later-stage membrane system.

The generation of permeate from the leachate treatment is based on a membrane bioreactor system separating sludge from water. In order to deal with varying sludge properties and conditions, tubular membrane based filtration modules were selected. Parameter adjustments of the treatment process as well as membrane material optimization contribute to overall efficiency improvements.

Location	Qizishan landfill, Suzhou, China
Type of waste water	Landfill leachate
Capacity	900m ³ per day
Process	Two-stage A/O, UF+RO
UF Product	Customized solution T-CUT UF series (8.2 mm) / PVDF



Technical Data T-CUT Tubular Modules

Length (L) / mm	3,000
Module diameter / mm	219
Membrane area / m ²	27.4
Housing material	FRP
Membrane diameter / mm	8.2
Membrane material	PVDF
MWCO / kda	100

The Solution

In the first step, the raw effluent exiting the biochemical system passes through bag filters in order to remove large particle impurities and fibers and minimize the risk of fouling on the membrane surface. This pre-filtration is a requirement for the T-CUT UF modules with a comparatively small inner tube diameter in the downstream process.

The membrane tube diameter used in this case is a compact 8.2 mm - a selection resulting from trial-based continuous improvement attempts to find the optimal inner diameter ratio and thus enhance the packing density. In addition, the reduction of the membrane fouling risk by pre-separation is another reason why the T-CUT modules maintain a stable circulation flow.

The key to success of the project is a membrane tube manufactured in highest precision and most durable, using a unique PVDF formula for the filter layer that enables the generation of optimal permeate flow rates and long-term process stability.



Customized Filtration Solutions

For more information on our case studies please contact us via info@cut-membrane.com, +49 (0) 2104 17632-0 or visit our website www.cut-membrane.com.