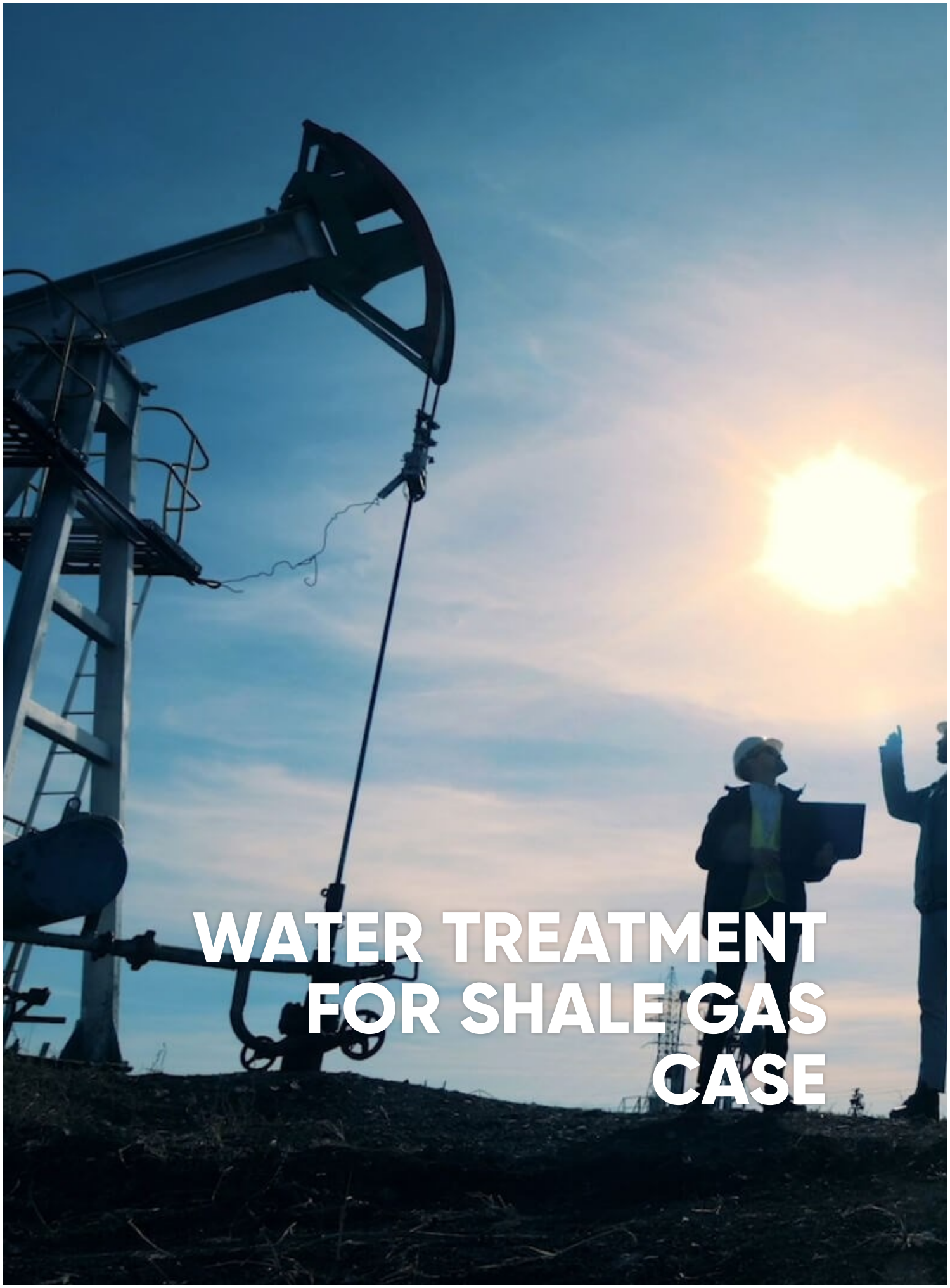
LIQTECH



WATER TREATMENT FOR SHALE GAS CASE

Water treatment for shale gas oil production fracking flow back water treatment

LiqTech silicon carbide membrane technology removes solids and oil from flow back water produced when fracking for shale oil and gas. The high quality of treated water allows for re-injection or further desalination for low salinity enhanced oil recovery.

The Case

LiqTech entered a joint development project with a leading solution provider for upstream oil & gas. The purpose was to configure a mobile container unit with appropriate technologies to treat flow back water on-site for re-injection purposes. Significant savings can be achieved by reusing the flow back water compared to trucking freshwater and wastewater to/from the site. The flow back is characterized by high solids and high viscosity due to gums and polymers, which challenges conventional water treatment solutions.

The Solution

The oil company has a shale oil production facility in an area distant from both freshwater supply and a frac water disposal well. Frac water is first separated near the wells from solids, bulk oil, and gas. The water is then piped to the central treatment location, where several gun barrel tanks are installed. From the tanks, water is sent to the small pond, where residual oil is skimmed once again and water is sent to the treatment unit.

LiqTech supplied a fully automated SiC ceramic UF membrane system, with integrated backwash and chemical cleaning in place (CIP) modules. The system comes with a self-cleaning prefiltration module to protect the membranes from larger debris. The system is assembled on a single skid – ready for plug and play installation at the customer site. Together with primary and secondary upstream treatment, the SiC membrane system in combination with an additional disinfection process produces a very high quality of water which can be re-used directly. Addition of polymers to the treated water will be needed to achieve certain outcomes.

LiqTech System Design

Materials and Components

The UF ceramic membranes are made from silicon carbide material which proved to be extremely robust with high permeability and stable flux. Further, the membranes are chemically inert and very temperature resistant. These superior properties of SiC membranes provide operational robustness when dealing with challenging media like flow back water.

Operational performance

The SiC membrane system has shown a very satisfying process robustness and treated water quality. The system is operating at typical values shown in the picture.

Table: Operational performance of SiC membrane system for flowback water treatment.

MEDIA	FLOWBACK
TMP	0.4-0.8 bar
Recovery	50-70 %
Permeability	300-800 LMH/bar
Cross-flow	1.2 m/s
Temperature	35C

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