

### PolyCera<sup>®</sup> Titan

## UF membranes for O&G, iron and solid removal before electro dialysis reversal (EDR) in a commercial produced water desalination application

### Overview

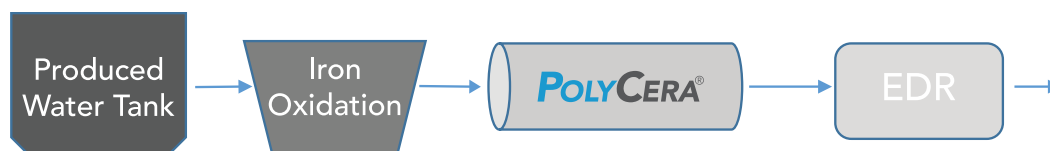
- Reuse and recycle of oil and gas produced water constitutes a new frontier of desalination. Traditional salt removal technologies such as reverse osmosis (RO) and electro dialysis reversal (EDR) have been impractical in this application without reliable pretreatment. Conventional oil-field pretreatment processes do not have the ability to sustain a consistently low-level of free oil & grease, iron, turbidity and SDI in their effluent.
- A produced water treatment facility in Central Wyoming, USA, was seeking a process solution to consistently and dependably treat their produced and fracking water to meet site-specific environmental requirements while minimizing CapEx and OpEx.
- PolyCera Titan robust ultrafiltration (UF) membranes, designed for produced water treatment, offer improved fouling resistance, lower energy requirements and less intensive cleaning to maintain a reliable and sustainable operation.

### Demonstration

- PolyCera Titan UF membrane system was tested in a 7-week demonstration to evaluate its performance separation of oils, solids, iron and other remaining contaminants from produced and flowback water.
- The key objective of the demonstration was to gather the necessary information to determine an optimal solution for full-scale implementation and to achieve the quality standards defined by post EDR requirements (iron < 0.5 ppm, TSS and O&G < 1 ppm) and overall client goals.



Process Flow Diagram



**PolyCera®  
Titan**

**89%  
Net Recovery**

**0.027  
kWh/bbl  
SEC**

**< 1 NTU  
Filtrate  
Turbidity**

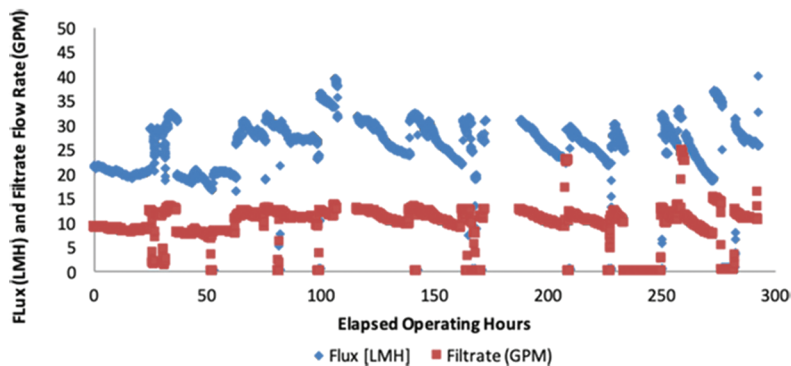
**< 1 ppm  
O&G**

**~0.044  
\$/bbl  
UF OPEX**

## Results

- Despite the challenging feed water quality (up to 25 ppm of O&G, 95 NTU of turbidity, 450 ppm of TOC and up to 8 ppm of iron), PolyCera Titan based system produced excellent water quality suitable to feed an EDR system.
- The PolyCera Titan UF system provided net recovery of 89%, and average specific energy consumption (SEC) of 0.027 kWh/barrel of throughput, what lead to operational cost of ~ 0.044 \$/bbl.
- The PolyCera Titan UF system met the client’s water quality requirements, providing a unique, effective, and low cost solution for produced water treatment.

Figure 1. Consistent UF filtrate production during the 300 hours of operation



## Value Proposition

- PolyCera Titan UF membranes provide effective and reliable pretreatment before advanced treatment technologies, including desalination, in water reuses applications.
- PolyCera Titan membranes are made from a polymer material that has superior threshold for withstanding highly fouling prone waters, and they exhibit high cleanability and complete flux recovery after fouling.
- PolyCera Titan membranes bridge the gap between the performance of ceramic membranes and the low cost of polymeric membranes and provide more water at lower cost.

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