

## PolyCera® Titan UF membranes demonstrated superior performance against ceramic membranes in commercial produced water treatment application

### Overview:



- Today, membrane technology is gaining increasing attention in upstream oil and gas produced water management and beneficial reuse applications. Market drivers for water treatment in the industry include stringent environmental regulations, increasing produced water volumes and fluctuations in water composition.
- A produced water treatment facility in California's Central Valley collects multiple streams from local oil and gas producers for beneficial reuse. Unfortunately, the best available ultrafiltration (UF) technology capable of treating water with highly variable quality is typically limited to costly ceramic membranes.



### Demonstration:



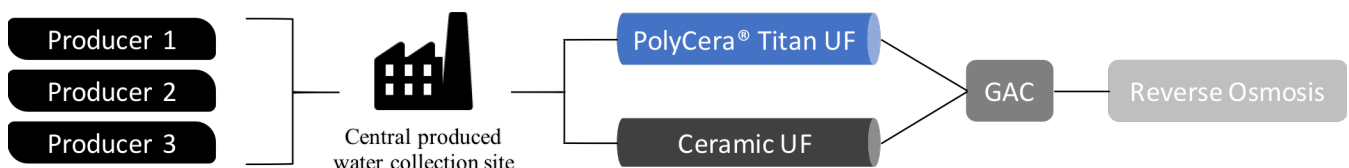
- Innovative **PolyCera Titan** Spiral Monolith® elements were selected to treat the produced water as a pretreatment to the RO for beneficial reuse.
- **PolyCera Titan** were benchmarked against industry leading titanium coated aluminum oxide ceramic membranes. The systems were operated in parallel, each targeting a constant feed flow rate of 7 GPM.
- Key economic drivers evaluated were specific energy consumption (SEC), process recovery (i.e., total filtrate to feed flow) and net recovery (accounts for the sum of all waste and backwash streams.)



*PolyCera (in the front) and ceramic (in the container) membrane skids.*



### Process Flow Diagram



*PolyCera Titan*

**Results:**

- Despite the inherently variable feed water quality, with measurable spikes in turbidity up to 130 NTU and free oil and grease (FOG) up to 871 mg/L, through the operation, **PolyCera Titan** membranes lost only 1% of their initial permeability, versus the ceramic membranes lost 25%.
- **PolyCera Titan** membranes used 63% less water for backwashing. Significant reduction in backwash frequency combined with a higher process recovery (feed to filtrate ratio) supported Titan’s net recovery. Significant SEC reduction was exhibited by the **PolyCera Titan** membrane, due to an 18X lower recirculation rate required by the **PolyCera Titan** membranes in addition to a 2 psi lower hydraulic pressure drop.

**11%**

Higher Water Recovery

**72%**

Lower Energy Demand

**63%**

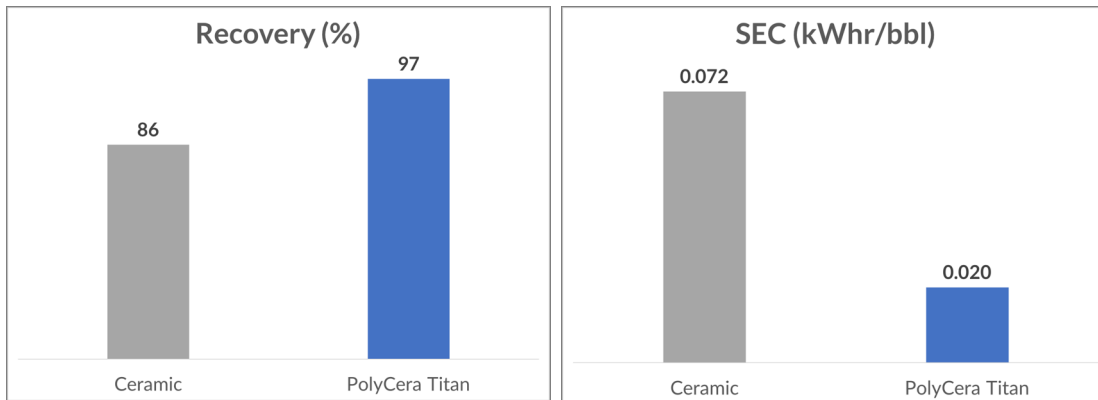
Less Backwash Water Wasted

**58%**

Lower CAPEX

**70%**

Lower OPEX



**Figure 1.** Water recovery and SEC for ceramic and PolyCera Titan membranes

**Value Proposition:**

- **PolyCera Titan** exceptional hydrophilicity and the material packaged in a unique Spiral Monolith<sup>®</sup> backwashable form factor, makes it extremely easy to clean solids and FOG from its surface.
- **PolyCera Titan** membrane chemistry, which is intrinsically less fouling prone and easy to clean, provides **more water at a lower cost**.
- **PolyCera Titan** membranes were selected over the ceramic to a full scale, 5,000 bbl/day, system which is installed in Wasco, CA and operated by a third party entity, starting in January 2018.

*Check other available case studies for PolyCera Titan and Hydro membranes performing in produced and industrial wastewater treatment applications.  
Learn about other PolyCera membranes, properties, and configurations.*