

CASE STUDY

MICRODYN *iSep*™ 500 UF

Produced Water Treatment



MICRODYN
NADIR

ADVANCED SEPARATION TECHNOLOGIES



Project Goal

Cost efficient treatment of produced and flow back waters using spiral-wound polymeric UF membrane modules.

Feed

- Produced Water
- Oil & Grease: ≥ 300 mg/L
- Turbidity: $\geq 1,000$ NTU
- Feed TSS: $\geq 1,000$ mg/L

Membranes

- MICRODYN *iSep*™ 500-PVDF UF modules

Parameters Measured

- Operating flux: 51 l/mh (30 gfd)
- Oil & Grease
- Turbidity
- TSS
- Effluent Silt Density Index
- Effluent Bacteria
- Power Consumption
- Chemical Consumption

Objective

Water scarcity and stricter discharge regulations are critical issues at the forefront of today's oil & gas industry. Fresh water is a critical resource needed for unconventional oil & gas exploration and is an important factor for future growth. In light of ongoing water issues, oil & gas producers have taken on new sustainability goals that place greater emphasis on water conservation and reuse.

Materials & Methods

MICRODYN *iSep*™ 500-PVDF ultrafiltration (UF) modules were operated directly downstream of primary oil removal steps in produced and flow back water treatment systems. The high quality effluent can be directly reused, discharged, or sent to reverse osmosis (RO) for further treatment.

Results

iSep UF membranes act as a distinct barrier layer that does not allow oil, suspended solids or bacteria to pass through. The operating flux and effluent quality remained the same, even when drastic changes in the feed water occurred.

Oil levels in the feed reached as high as 300 mg/L (Figure 1) while suspended solids (TSS) reached as high as 1,000 mg/L. Despite these spikes, the *iSep* UF modules continued to operate at a stable flux of 51 l/mh (30 gfd). Undeterred by the spikes in the incoming water quality, the UF system provided consistent effluent quality: removing 99% oil, TSS and bacteria (Table 1).

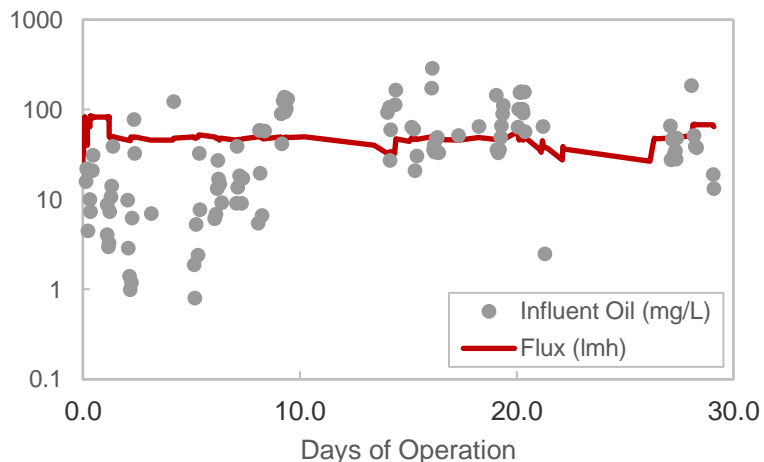


Figure 1. The operating flux remained stable at 51 l/mh (30 gfd) despite the spikes in influent oil (up to 300 mg/L).



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Table 1. MICRODYN *iSep*™ 500 PVDF UF effluent quality.

Parameter	Typical Treatment Results
Oil & Grease	<1.0 mg/L
Turbidity	<0.1 NTU
Suspended Solids (TSS)	<1.0 mg/L
Silt Density Index	<2.0
Bacteria	Non-detect
Power Consumption	<0.01 kW-hr per bbl
Chemical Consumption	<\$0.01 per bbl

Conclusion

MICRODYN *iSep*™ 500 PVDF UF modules help oil producers achieve their sustainability goals by providing highly effective and cost efficient treatment of produced and flow back waters. The high oil & solids tolerance of *iSep* UF membranes enables oil & gas producers to reuse produced and flow back waters, preserving valuable fresh water resources while reducing disposal costs.



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