



NANOBUBBLES INCREASE OIL RECOVERY IN EAGLEFORD BY 11%

Client Case Study: Metis Energy LLC

Type: Oil Extraction	Unit Type: 50 XTB	Minimum Oil Recovery Rate: 11%	Monthly Revenue Increase: \$7,920	Benefits: <ul style="list-style-type: none"> • Increased oil recovery rate • Lowered produced water volume
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Nanobubble technology applied to oil separation processes helped Metis Energy LLC recover additional oil from produced water saving the company money and increasing their revenue.

Problem:

Metis Energy LLC owns mineral rights to a lease in Carrizo Spring, Texas, 53 miles from the Texas Mexico border. The company's two wells produce on average of fifty barrels per day (BPD) at a 6-to-1 water to oil ratio. Well production goes through a heater separation unit to distinct water and oil storage tanks; however, the separation process varies between 80% and 90% effectiveness resulting in oil in the water storage tank and produced water and emulsion in the oil storage tank. This process leads to 'lost' oil in every produced water shipment.

Metis Energy sought a solution that would recover more oil from the produced water. Recovery to Metis meant greater oil revenue and reduced produced water disposal costs. Moleaer nanobubble treatment offered a means to achieve these objectives.



The 50 XTB nanobubble generator treated produced water in a third tank.

	Batch Size (barrels)	Recovery (barrels)	Recovery %
Batch 1	163	24	14%
Batch 2	175	19	11%
Batch 3	196	26	16%
TOTAL	534	69	13%

Produced water was treated with nanobubbles in batches with an average of 13% oil recovery.

Solution:

Produced water was treated by pumping the water with an XTB nanobubble generator from the produced water tank to the separation tank. The process was done in batches to test the oil recovery rates.

During a 60-day trial, Moleaer's nanobubble treatment was able to recover Metis 11-16% salable oil from the produced water tank totaling 69 additional barrels of oil. When applied to their entire monthly operation of around 1200 barrels of produced water at 11% recovery, Metis had a monthly revenue increase of \$7920 value at \$60 per barrel valuation. In addition to recovering oil from the produced water, Metis saved money due to lower produced water transport and disposal volume, reduced use of chemicals to treat emulsion, reduced oil transport demurrage, improved oil and water transport scheduling, reduced site supervision during transport and reduced tank gauging for transport. Overall Metis was able to save an additional \$1290 per month, \$15,480 annually.

Metis Energy LLC is enthusiastic about the savings potential of Moleaer's nanobubble technology for their organization. "We ran a 60-day trial using Moleaer's nanobubble treatment system for oil / water separation on our production tanks. The results led to recovery of an additional 11% oil from our produced water! This oil recovery adds an additional \$7,900 of monthly revenue from this two-well site," states Scott Hoskins, Chief Technology Officer at Enhanced Solution Services LLC, a Metis Company.

"We have agreed to continue to deploy the Moleaer systems on any locations in which there is significant oil content in our produced water. This Moleaer technology contributes to our goal of being the lowest cost operator in North America."

Metis has the potential to gain \$96,600 per year in revenue by implementing nanobubbles into their system. Oil/water separation and oil recovery is a huge industry challenge. Metis Energy LLC serves as a working business model for others in the industry. Moleaer's nanobubble technology can be adjusted to fit other sized operations and designed to run continuously for high-production situations.

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