

CarboNet's NanoNet Fe[™] Provides Cost-Saving Chemistry for Produced Water Treatment

INTRODUCTION

Operators, midstream companies and water services providers are continually seeking impactful solutions to make produced water treatment and recycling more efficient and economical. Enter CarboNet, which has successfully demonstrated our new-generation NanoNet Fe[™] chemistry at multiple sites across the Permian Basin, proving an unprecedented ability to optimize treatment processes and enable clients to consistently meet their KPIs - all while reducing their operating costs.

CHALLENGE

In June 2020, CarboNet piloted NanoNet Fe[™] at an operator's asset in the Texas Permian Basin, where the operator was treating 51,000 bbl/d in a 24/7 operation. The operator had been experiencing difficulties achieving its KPIs and facing soaring operating costs related to high dosing of aluminium chlorohydrate (ACH) coagulant. Additionally, the operator wanted to explore options that could contribute to reduced polymer consumption and sludge generation.

TRIAL DETAILS

CarboNet recommended and delivered NanoNet Fe[™], pumps, lines and personnel for the 48-hour trial. We determined optimal NanoNet Fe[™] dosing on location to be 0.385 liters per minute, a rate at which the effluent met nearly all operator KPIs. Oxygen reduction potential (ORP) levels fluctuated between 335 mV and 360 mV, despite heavy additions of hydrogen peroxide. NanoNet Fe[™] performs to dramatically lower oxidant requirements; therefore, the unstable ORP levels and high oxidant needs are likely related to issues specific to the location's unique characteristics. Lab testing allowed CarboNet identify three potential causes for the unstable and dropping ORP levels:

1. Substantial amounts of bacteria in the influent
2. Iodide in the influent
3. The presence of an oily surfactant, such as compressor oil

Parameter	Operator KPIs	With NanoNet Fe [™]	
		Raw Water	Effluent
pH	6.5-7	6.55	6.72-6.89
Iron (ppm)	<1 ppm	15.12	0.79-0.85
Turbidity (NTU)	<3 NTU	64	N/D
ORP (mV)	350	-100	335-360

RESULTS

The introduction of NanoNet Fe™ to the operator's water treatment regime promoted coagulation efficiency, resulting in multiple benefits: not only was the operator able to eliminate ACH dosing, but sludge volumes also decreased by 50%. These and significant polymer reductions together contributed to cost savings of approximately \$2,000 per week. In addition, CarboNet continues to support the operator, which is now our customer, in addressing unstable ORP levels and lower hydrogen peroxide dosing. This partnership further optimizes operating costs and ongoing efficiencies – a true win-win.

MORE ABOUT CARBONET

CarboNet's NanoNet Fe™ platform comprises a proprietary blend of polymer and surfactant nanoparticles designed to treat industrial wastewaters. Our flagship product is NanoNet Fe™ concentrate, which provides oil & gas and water midstream operators with a cost-effective, low-risk way to remove iron species from produced water. The chemistry can also help address other key produced water constituents, including dissolved and suspended solids, bacteria and hydrocarbons, ultimately resulting in a clean brine suitable for recycling.

NanoNet Fe™ concentrate is generated onsite, can be delivered at various points in the treatment train, and reduces or eliminates flocculant, coagulant and biocide needs. The nanoparticles

agglomerate to form a light, stable flocculant that binds to target constituents and lifts them to the surface where they can be removed with standard skimming equipment. Applying just 1 bbl of NanoNet Fe™ concentrate for every 2,000-4,000 bbl of water can typically lower total iron content to 0-10 ppm, though final results depend on raw water quality.

EASY
SAFE
STABLE

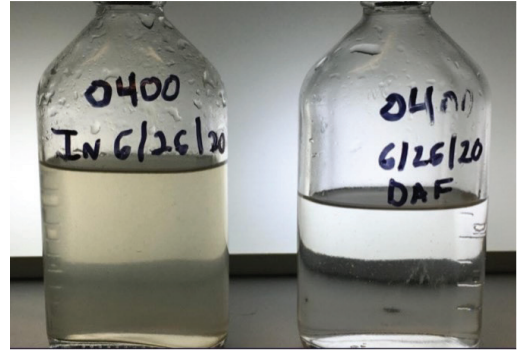


FIGURE 1

Raw water and water treated with NanoNet Fe™



FIGURE 2

Sludge following use of NanoNet Fe™ compared to use of PAC

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