CarboNet™
water treatment

Significant sludge reduction delivers standalone value & ROI

INTRODUCTION

With 7 barrels (bbls) of produced water generated for every bbl of oil, the need for water treatment and reuse has never been greater. The fraction of produced water currently being recycled (20%) continues to create opportunities to bring optimization and innovation to water treatment and recycling.

INDUSTRY:
OIL & GAS

PRODUCT:
NANONET FE™

CHALLENGE

One Houston-based water midstream company that operates one of the Permian Basin's largest produced water recycling facilities, was experiencing water variability that cost them high dosing of Polyacrylamide (PAM) to treat, resulting in high levels of sludge. The sludge exceeded their on-site dewatering capacity which meant that they were forced to turn to third-party salt water disposal (SWD) sites for sludge disposal, despite the lower efficiencies and additional expense of shipping offsite. The poor flocculation efficiency also limited water throughput in the system, reducing profitability of the site.

The company recognized an opportunity to put CarboNet's unconventional chemistry to the test. Designed around drug delivery methods with precise targeting capabilities, CarboNet's NanoNet platform powers solutions that specifically address the biggest issues of current water treatment processes.

SOLUTION

CarboNet introduced NanoNet Fe™ as part of a scaled two-week field trial to improve the site's system efficiency and reduce sludge production. Results were benchmarked against a comparable period, with similar conditions at the same site, where waters were normally treated with peroxide and flocculant.

While NanoNet Fe can typically be used as a coagulant replacement, testing was conducted without changes to the existing coagulants, rather it was an additive solution.

Figure 1: Floc tube samples LEFT: Sample of the flocculated influent pre NanoNet Fe™ RIGHT: Post NanoNet Fe

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50% Decrease in sludge production, from 2.8% of total volume to 1.5%	**20%** Increase in throughput, an increase in 151,000 bbls	**$0.03** m3 cost of NanoNet Fe

Significant reduction in sludge. Following the two week treatment period, NanoNet Fe cut sludge production in half—from 2.8% in total volume to 1.5%—when compared to the prior period of treatment with peroxide and flocculant.

Boost in capacity Flow rate improved by 20% and despite higher treatment volumes, they experienced firmer sludge that reduced the volume of sludge to be dewatered considerably, mitigating the ongoing risks and costs of disposal. The NanoNet Fe's floc-boosting action and higher efficacy allowed 151,000 additional barrels of water to be processed, thereby creating greater in-house processing capacity.

Immediate ROI and bottom-line impact. The more efficient system and higher throughput led to the ability to receive 20 additional trucks from satellite locations, resulting in efficiencies and thousands in savings, previously spent on disposal. For the ability to process another 151,000 barrels and take in another additional trucks, the usage overall was just slightly more than 2 totes of product, demonstrating NanoNet Fe as the solution for achieving more with less, while keeping the disposal costs the same.
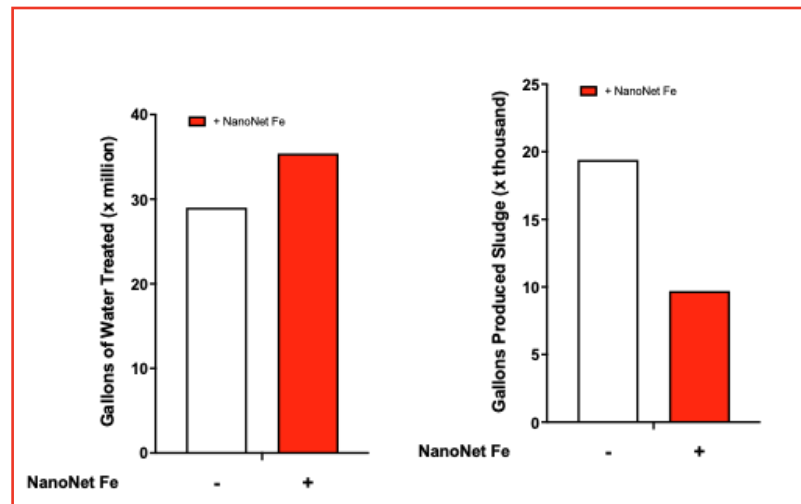
MORE ABOUT CARBONET

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.

EASY SAFE STABLE

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.

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