



Reference Project

Produced Water Treatment
Overhaul in the Permian Basin

CarboNet ●●

New regulations required operators to recycle more water and dispose less, leading a major E&P in the Permian to overhaul their treatment.

New rules: New Mexico regulators tightened their water recycling requirements, forcing an E&P operating on 800,000 acres in the Permian to simultaneously increase the quality of its treated water while reducing its per barrel treatment cost.

↳ **Prior to the new regulations**, the operator used a mix of oxidizer, coagulant, and flocculant to treat produced water—an expensive and complex scenario that struggled under the new regime.

↳ **The flocculant required make-down** and created inconsistent flocs, forcing crews to babysit rigs, regularly caused mis-dosing of the other chemicals, and gumming up filters and presses.

Behind the scenes: CarboNet's SimpleFloc, a no make-down flocculant adopted by operators in the Permian, was recommended as a solution.

SimpleFloc's plug-and-play chemistry had the immediate effect of reducing costs while improving treatment:

- ↳ Coagulant reduced 90%
- ↳ Flocculant dosing cut 30%
- ↳ Oxidizer cut 50%

Additionally:

↳ Water for makedown was removed, reducing freshwater drawdown 20% (and cutting trucking costs and their associated emissions).

↳ Effluent quality was boosted, with sludge reduced by 50%.

↳ OPEX was greatly improved. With make-down removed, crew costs were cut 35%.

↳ Significantly less chemicals were introduced into the operating envelope, ensuring no permits were breached

↳ Crews enjoyed safer working conditions not having to deal with dry make-down dust or slips from emulsion slop

The bottom line: CarboNet chemistry shaved millions off the P&L and optimized an otherwise inefficient treatment process.

PRIMARY RESULTS

- 90% reduction in coagulant
- 30% reduction in flocculant dosing
- 80% elimination of PAM
- 50% reduction in oxidizer

SECONDARY RESULTS

- 50% reduction in sludge
- 20% reduction in freshwater consumption
- 35% reduction in crew costs

CarboNet: As freshwater becomes increasingly scarce and regulated, companies from energy and mining to food and beauty turn to CarboNet to reduce, recycle, and renew the water they need to compete.

Produced Water

CarboNet chemistry removes make-down: eliminating equipment, chemical, and water expenses while cutting OPEX, HS&E incidents, and emissions.

For frac sake.

Fracking, like much of O&G, operates in remote locations with little access to water and crews that are spread thin managing and monitoring make-down over dozens of sites.

Why it matters: Producers who rely on make-down rely on vast quantities of water to mix PAM, and the constant attention of crews who are forced to juggle wonky equipment, outmoded chemicals, and inconsistent dosing.

↳ **Water woes:** Despite producing enormous amounts of effluent water from fracking, producers rely on freshwater for make-down: a process that's time-consuming and, given water scarcity and remote oil fields, expensive to obtain and ship.

↳ **Make-down breakdown:** PAM is an outmoded chemical with weak bonds that requires constant babysitting to ensure semi-consistent flocs, a process that often runs foul and leads to overtime, gummed up equipment, malfunctions, and NPT.

CarboNet's SimpleFloc removes make-down and the associated costs and headaches:

↳ **Requires no make-down** and plugs directly into your lines, eliminating the need for make-down equipment and maintenance.



↳ **Offers a forgiving dosage window** so workers don't have to babysit the pumps or experiment with complex dosing regimes.

↳ **Cuts PAM/polymer by up to 80%**—a gain for the P&L and toxicity limits.

↳ **Acts quickly and produces consistent results**, leading to predictable costs and reliable KPIs.

↳ **Cost-competitive** with liquid emulsion flocculants, even at a 4:1 ratio.

↳ **Overall:** reduces CAPEX, OPEX, HS&E incidents, and emissions—while improving your margins.

The bottom line: O&G operators need simple, inexpensive solutions to manage dozens of remote sites without having to truck-in expensive freshwater for make-down or worry about crews bunking up the system with inconsistent flocs. Removing make-down entirely dramatically changes treatment time, performance, and margins.

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SimpleFloc

Anionic Flocculant

CarboNet SimpleFloc is a pre-activated flocculant that is dosed neat without dilution or make-down required—for a streamlined and simplified process.



TECHNICAL SPECIFICATIONS

PRODUCT	3010A-G3	3030A-G1
Charge density	-10	-30
Molecular weight	Very high	Very high
Specific gravity	1.01 - 1.04	1.01 - 1.04
Bulk viscosity *	6000 - 8000 cP	4000 - 6000 cP
pH	7.5 - 9.5	7.5 - 9.5
Storage Temperature	41 - 86°F (5 - 30°C)	41 - 86°F (5 - 30°C)
Shelf life **	6-12 months	6 months
Appearance	Opaque gel	Opaque gel
Color	Milky white	Milky white
Odor	Mild	Mild
Freezing point	32°F (0 °C)	32°F (0 °C)
Boiling point	212°F (100°C)	212°F (100°C)
Reactivity	Non-flammable, non-reactive, stable	

APPLICATIONS

Groundwater treatment

Influent water clarification

Produced water reuse

Phosphate removal

Wastewater

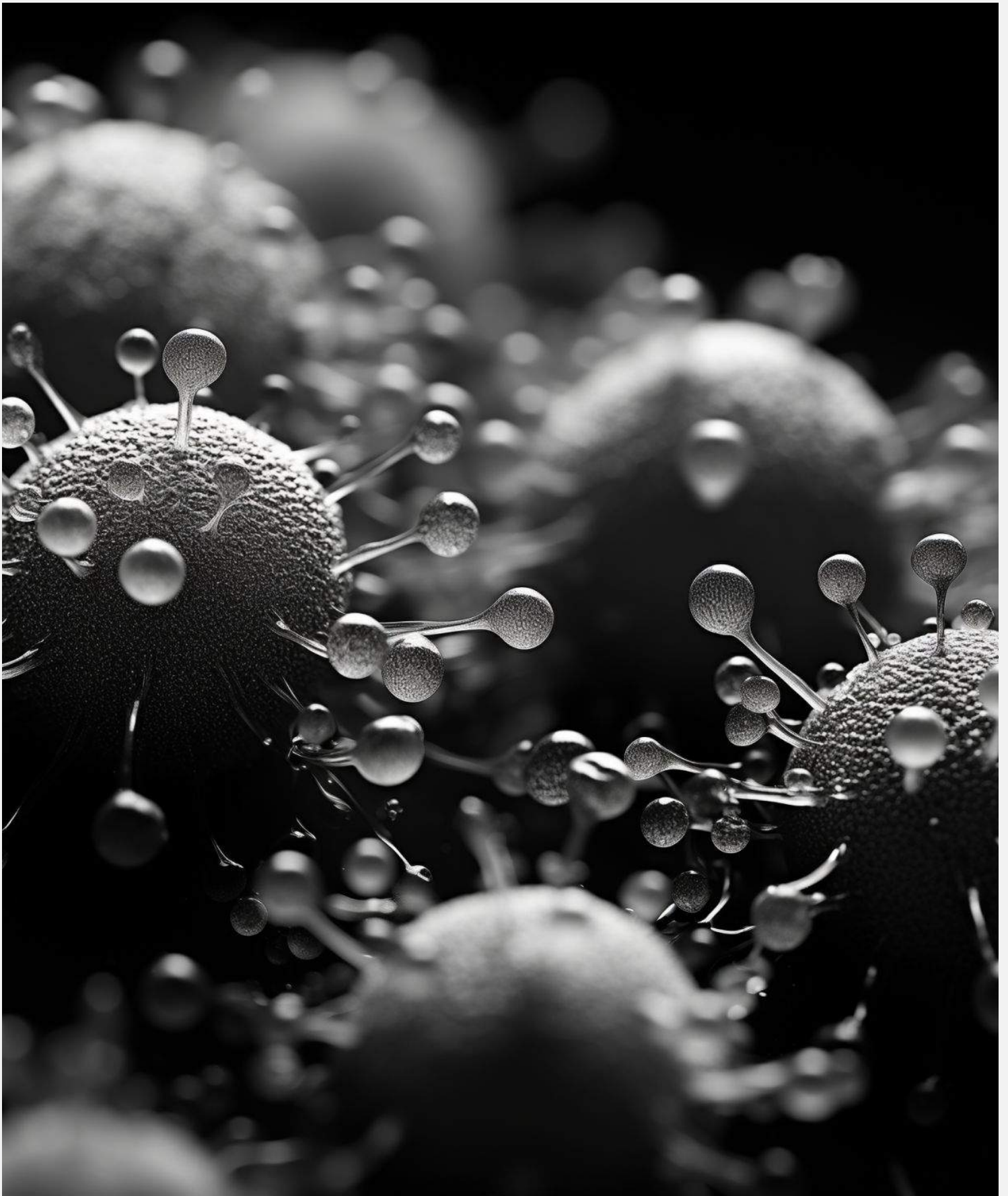
Note: Anionic SimpleFloc™ is best suited for waters containing cations [Ca²⁺, Fe²⁺/³⁺, Al³⁺, and Fe(OH)₃], positively charged particles, and oil. In many cases, the cationic load is provided by the upstream coagulant.



Certified to NSF/ANSI/CAN 60

* Average values measured at 60 rpm

**When stored inside at stable temperature of 72-86°F



NanoNets

The platform behind the products.

CarboNet ●●

A machine to make machines: NanoNets are a proprietary library of molecular agents that can sequester particles in water 10x more efficiently than industry norms at a fraction of the price.

How it works: NanoNets mix a targeting surfactant with a scaffolding polymer:

↳ **Surfactant:** The glue that helps the flocculant attach to particles or impurities in water. It's responsible for ensuring the flocculant can find and stick to the target particles.

↳ **Polymer:** This gives the flocculant its shape and stability. Just like the frame of a house provides support and structure, the polymer ensures the flocculant can hold together and effectively do its job.

A bit deeper: Together, and guided by AI, these components behave like a programming platform, capable of outputting an array of products to address any water treatment application.

Why it matters: Water insecurity is changing regulations and emission limits. Commodity chemicals like polyacrylamide (PAM)—created 70 years ago for a different era of water treatment and rapidly aging out—aren't up for the task at hand:

↳ **Chemically,** PAM has weak bonds that won't create strong flocs, often forcing wastewater teams to overdose and breach permit levels.

↳ **Technically,** crews have to constantly babysit make-down equipment to ensure PAM is properly dosed. When they miscalculate, they gum up bags, belts, presses, or centrifuges and the site or plant has to shut down for flushes or equipment swaps.

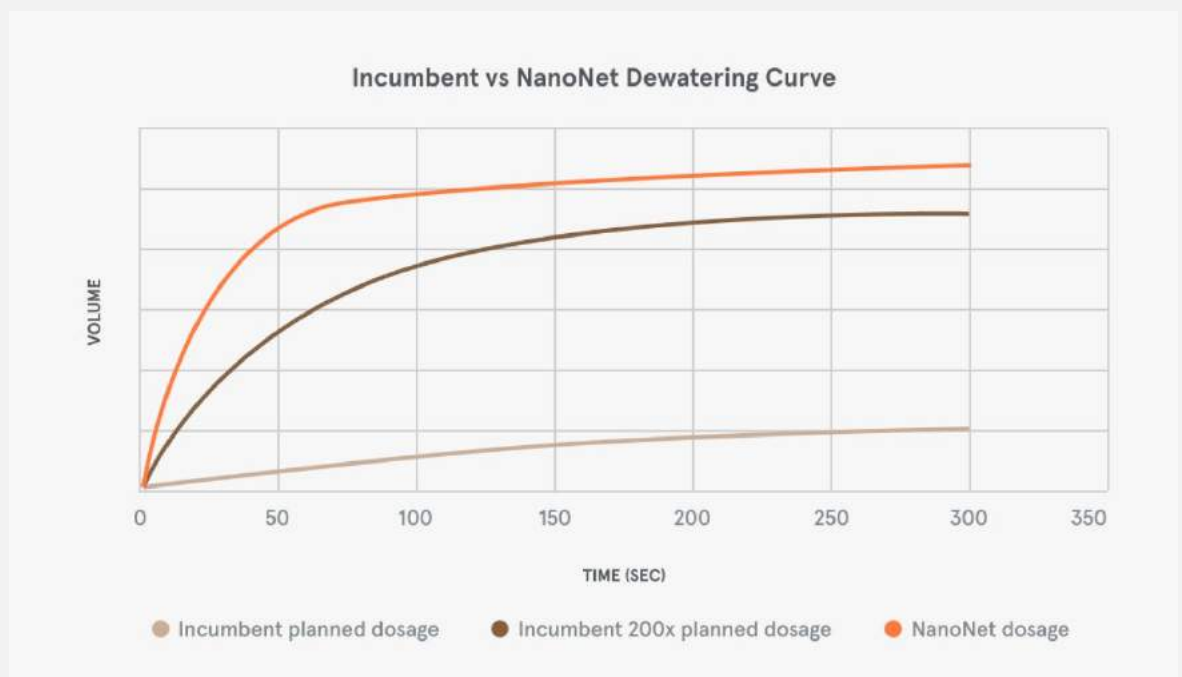
↳ **Practically,** PAM is dangerous: crews regularly suffer from inhalation burns (dry) and slips and breaks (emulsion slop).

↳ **Legally,** PAM heightens profile risk. A site overburdened with PAM will inevitably see seepage, spills, and dosing miscalculations push too much chemical into the environment and breach EC50/LC50 limits.

↳ **Financially,** PAM hits the bottom-line several times over, from the chemical costs to CAPEX purchases and maintenance to OPEX inefficiencies.

NanoNets in action:

SimpleFloc's pre-activated, made-down state faces no rate-limiting on speed of reaction compared with dry, emulsion, and solution polymers that must reckon with improper aging, variable water temperature, and dozens of other factors that impact performance.



In contrast: NanoNet chemistry resets the boundaries and can have a big impact on the P&L:

↳ **Chemical spend:** CarboNet flocculants alter the throughput of water treatment, reducing cost-to-treat by up to 50%.

↳ **OPEX:** CarboNet chemistry requires no make-down and dramatically reduces time spent on dosing calibration and monitoring. And, increasingly, NanoNet sites use automated pumps that send data back to a monitoring dashboard for aggregation and analysis.

↳ **CAPEX:** CarboNet flocculants don't require make-down equipment and often improve the performance of other tools in the pipeline, helping maintain existing CAPEX or avoid new investments entirely.

↳ **Toxicity:** NanoNets reduce PAM by up to 90%, helping hit increasingly stringent regulatory targets.

↳ **Emissions:** NanoNet chemistry reduces Scope 3 Emissions up to 70%. To date, the commodity chemicals we've displaced has cut 300 million tonnes of CO2 production.

↳ **Health & safety:** CarboNet products arrive pre-activated and plug-and-play, removing the need for makedown and crew exposure to toxic inhalants, spills, slips, and other machine interactions.

↳ **Regulatory exposure:** Broadly, CarboNet chemistry slashes emissions and improves performance KPIs related to zero discharge or permit targets

CarboNet: As freshwater becomes increasingly scarce and regulated, companies from energy and mining to food and beauty turn to CarboNet to reduce, recycle, and renew the water they need to compete.

Behind-the-scenes: CarboNet scientists and field technicians are focused on products for a new reality: a world with less water and more regulations—but persistent demands of customers and shareholders.

↳ This has led to the NanoNet platform and new chemistry, one which eliminates chemicals from water treatment entirely, another that isolates valuable particles for extraction.

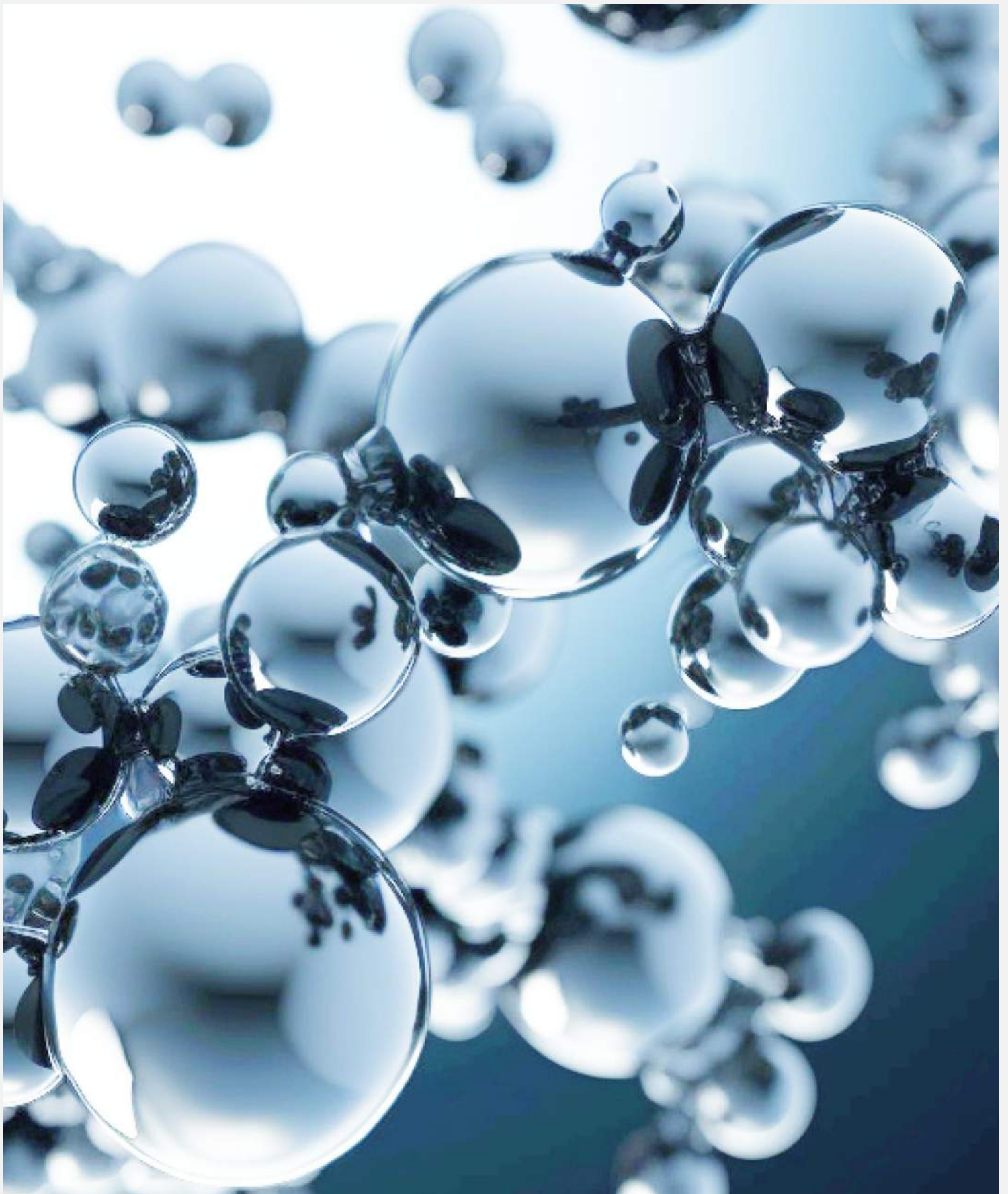
The bottom line: Water treatment has moved from a line item in the P&L to a key strategic advantage for companies looking to boost profits as they navigate regulatory hazards and the increasing costs of freshwater.

↳ **Smart chemistry** can reduce drawdown, recycle wastewater—even reclaim waterborne materials—while cutting costs and improving unit performance.

“It’s the most technologically innovative water treatment application I have laid eyes on this decade. It has been excellent in helping our project operate within spec, and in simplifying our overall process. It’s the difference between a system that just meets regulations and one that’s set up to accelerate and scale.”

Randy Khalil

Dewatering & Water Treatment SME



OVERVIEW

Chemistry to Compete

CarboNet ●●

As freshwater becomes scarce and increasingly regulated, companies from energy and mining to food and beauty turn to CarboNet to reduce, recycle, and renew the water they need to thrive.

Adaptive chemistry: a new competitive advantage.

CarboNet's NanoNet platform generates programmable flocculants, coagulants and targeting agents that adapt to any application and significantly impact your P&L and market position.

CHEMISTRY FOR THE P&L

Chemical spend

Reduce cost-to-treat by up to 50%

Toxicity & emissions

Reduce PAM by up to 90%

OPEX spend

Greater crew efficiency, reduced NPT, lower labour costs

CAPEX investments

Avoid new equipment, prolong existing infrastructure, increase throughput

Regulatory exposure

Reduced exposure to govt or collective action



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Randy Khalil

Dewatering & Water Treatment SME



Products

CarboNet chemistry is powered by NanoNets, novel molecules that sequester particles 10x more efficiently than industry norms at a fraction of the price.

- [SimpleFloc Anionic](#)
- [SimpleFloc Cationic](#)
- [NanoNet Select](#)



Applications

CarboNet chemistry is designed to adapt to most applications and water conditions.

- [Leachate](#)
- [Meat & dairy](#)
- [Groundwater](#)
- [Personal care wastewater](#)
- [Produced water](#)
- [Sludge dewatering](#)
- [Water clarification](#)



Industries

Products for industrial brands and operators across industries and applications:

- [Construction](#)
- [Food & beverage](#)
- [Mining](#)
- [Municipal](#)
- [Oil & gas](#)
- [Pharmaceutical](#)
- [Pulp & paper](#)



About Us

Five-years in, CarboNet has set the standard in modern water chemistry and set their sites on major North-American markets.

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