

Anionic

SimpleFloc Anionic reference projects and product details



Optimizing Wastewater Treatment in Food Manufacturing

A food manufacturer faced constant surcharges as unreliable chemical suppliers and understaffed makedown disrupted wastewater operations.

The problem: A food manufacturer in Northern California struggled to staff make-down operations which, when combined with an unreliable chemical supply chain, led to wastewater that regularly breached permissible levels of suspended solids.

The solution: While SimpleFloc was initially discussed to solve the issue of suspended solids in the waste stream, the conversation broadened to include make-down itself: the materials, the staffing, and the babysitting required to deal with FOG water's high variability.

- → Make-down is a relic of treatment from the 1970s that leads to CAPEX, OPEX, and emission overages. It's core ingredient—polyacrylamide—has weak bonds that create inconsistent flocs, forcing teams to overdose and, in turn, create flocs that are too wet or spongey—gumming up filters and presses that lead to work stops, swap outs, and shut downs.
- → **SimpleFloc**, in contrast, requires no makedown and plugs directly into the lines, cutting out make-own equipment, maintenance, dosing schedules, and adjustments.

The result: The switch to SimpleFloc had an immediate impact on the water and the P&L:

- → 89.6% less PAM
- → 18% less suspended solids
- → Wastewater surcharges greatly reduced

The bottom line: Just as with chemistry, water treatment decisions have primary and secondary consequences that aren't always factored into the big picture or the bottom line.

→ By adding SimpleFloc, the manufacturer was able to remove an entire process, along with the associated costs and inefficiencies that were slowing them down and hitting the P&L.

RESULTS

- · 89.6% less PAM
- · 18% less suspended solids
- Wastewater surcharges greatly reduced
- Boosted crew efficiency

Wastewater Treatment for Meat & Dairy

CarboNet chemistry simplifies water treatment for meat and diary producers while cutting chemicals, OPEX, CAPEX, HS&E incidents, and emissions.



Meat and dairy wastewater is a gnarly mix of fats, proteins, and detergent that are made even more complex with shift changes and clean-in-place, functions that create maximum variability in the effluent stream that even a skilled crew would find challenging to treat.

Why it matters: Meat and dairy operators don't employ specialized wastewater teams. Line workers are asked to guesstimate dosing schedules, and with aging equipment and outmoded chemicals like PAM, it's easy to gum up the system or overdose and breach permit levels.

CarboNet's chemistry resolves these issues:

- → **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 fixed-address toxicity limits.

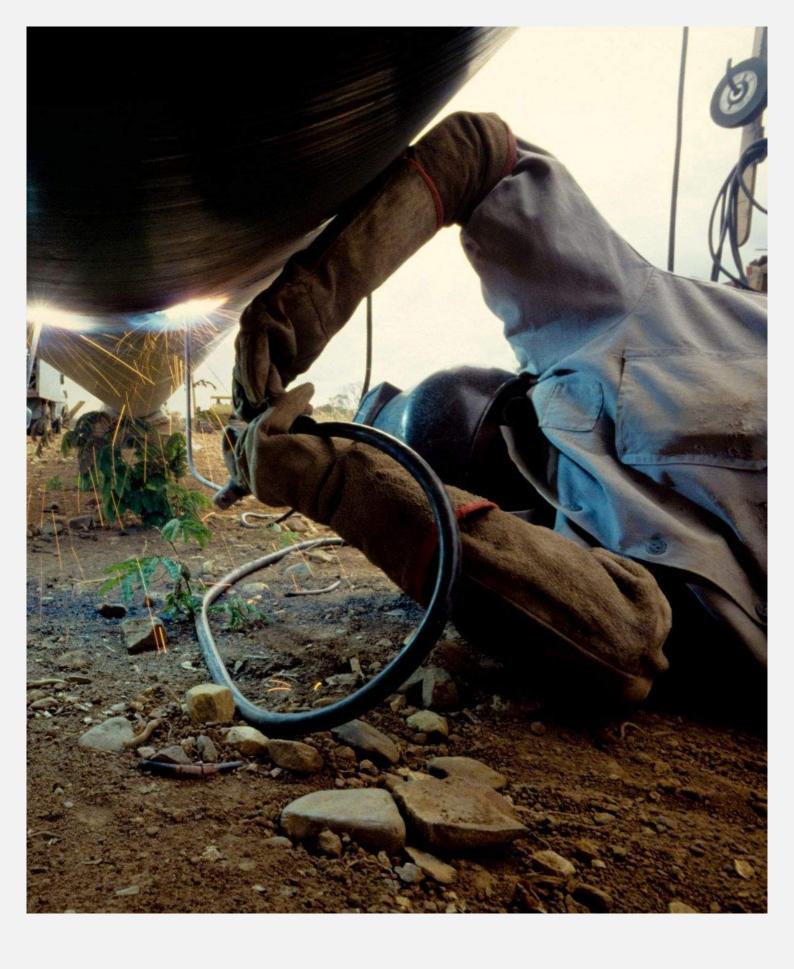


- → Acts quickly and produces consistent results, leading to predictable costs and reliable KPIs.
- → Cost-competitive with liquid emulsion flocculants, even at a 4:1 ratio.
- → **Overall**: reduces CAPEX, OPEX, HS&E incidents, and emissions—while improving your margins.

The bottom line: Water treatment isn't a core focus for meat and dairy producers. Solutions need to be cost-effective and not impact permit limits—but vitally they need to be safe, simple, and require little to no training for line workers who are focused on other tasks.

"We cut suspended solids by 18% and polymer by 90%, then cut out make-down, which also saved our crew hours a week not messing with dosing."

Plant Manager Food Operator, California



Groundwater Treatment for Trans Mountain Pipeline

Trans Mountain Corp. delivers some 300,000 barrels of petroleum daily to the West Coast. The Trans Mountain Expansion aims to increase capacity and expand access to global markets.

An ambitious expansion:

The installation of 900 km of new pipeline will greatly expand the existing pipeline that measures 1.261 km across Alberta and British Columbia.

Increased scrutiny and regulations:

As the largest project in TMP's history, the expansion requires dredging, dewatering, and discharge to waterways and irrigation channels. Groundwater treatment is crucial to ensure released water is within regulatory specifications.

The chosen chemistry:

SimpleFloc, an anionic flocculant backed by the NanoNet platform, emerged as the solution for clarification, demonstrating enhanced flocculation, reduced active chemistry, and much lower toxicity.

A simpler solution for complex operations:

SimpleFloc is delivered ready to use, eliminating make-down, cutting chemical consumption, and reducing polymer by 80%.

Benefits beyond cost:

Not just cost-effective, SimpleFloc tackled DAF carry-over issues, reducing stress on the system and improved operator conditions, particularly in cold weather.

"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

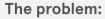
RESULTS		
KPI	TARGET	RESULT
Turbidity	<10 NTU	0.05 - 1.0 NTU
Iron	<1 ppm from DAF	0.01 - 0.2 ppm
IMPACT		
· 80% reduction in Polyacrylamide		
· 77% reduction in Scope 3 CO2 emissions		

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.

· 8.4 million litres of water conserved

Groundwater Chemistry

Carbonet's SimpleFloc is a preactivated flocculant designed to adapt to variable conditions and stringent environmental regulations.



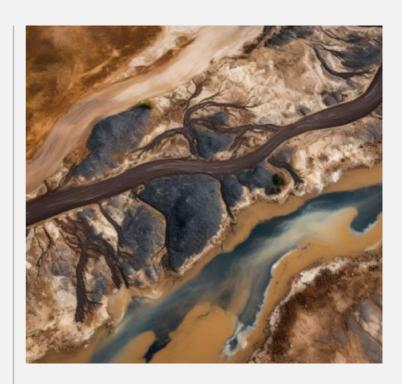
Groundwater jobs are unpredictable. Water can vary hour-to-hour, flocculants may underperform, and the chemicals you release can run contrary to local or federal laws. On top of that, sites are often remote or frustratingly small—making it hard for crews to work efficiently. For an operator, unpredictability eats into margins, crew morale and safety, and legal exposure.

SimpleFloc for groundwater:

- Requires no makedown, saving time, water, and space in remote or tight locations.
- Its forgiving dosage window means less pump adjustments and labor demand, leading to fewer delays and operational issues.
- Reduces operator variability and error, reducing safety hazards and environmental concerns.
- 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.

Between the lines:

Control matters when everything is unpredictable. SimpleFloc's plug-and-play simplicity, small footprint, and near-zero chemical output boost your ability to deliver results on-time and budget while avoiding environmental snafus.



APPLICATIONS

Groundwater / wellpointing

Construction dewatering

Mining

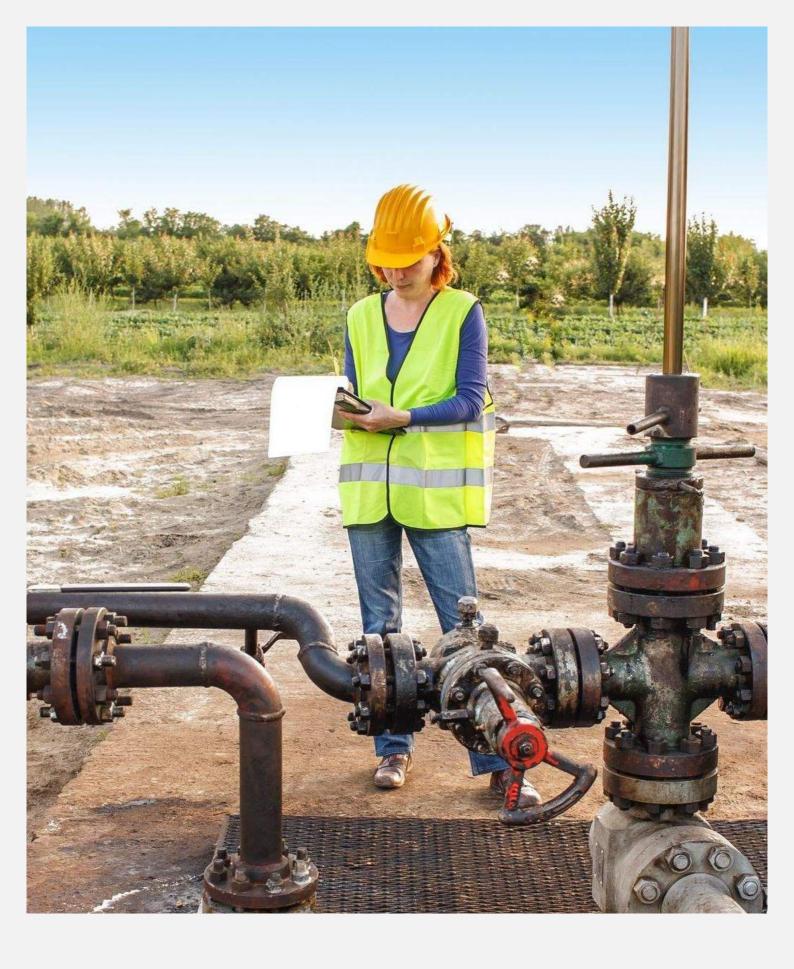
Dredging

Landfill leachate

Remediation

TOPLINE SPECS

Storage Temperature	41 - 86°F (5 - 30°C)
Shelf life	6 months
Appearance	Translucent gel
Freezing point	32°F (0 °C)
рН	3.0 - 4.5



Water Clarification of Landfill Leachate and Gas Condensate

An energy company faced stiff fines for breaching arsenic levels in their landfill leachate and gas condensate wastewater.

The problem: Sludge regularly gummed up filters intended for heavy metals and similar particulates during wastewater treatment. The source? Inconsistent flocs due to polyacrylamide (PAM).

- → PAM's weak bonds create flocs that are too watery, too spongy, or—frustratingly—both. This inconsistent behaviour makes it hard for crews to achieve consistent output and creates havoc for filters during dewatering.
- → Leachate can be particularly challenging to wastewater teams given the variability of fats, oil, and grease (FOG).

Behind the scenes: Looking to avoid regulatory exposure, the operator was spending \$25k/month on filter replacements as they sought a permanent fix for the problem.

The solution arrived in the form of SimpleFloc, CarboNet's no-make-down flocculant which, when combined with with ACH (aluminum chloride), and FeCl3 (ferric chloride), resulted in faster solid settlement, lower turbidity, and lower FOG measurements. The effect of this was:

- → A 67% reduction in filter damage, which shaved some \$200k off the P&L.
- \hookrightarrow The elimination of arsenic breaches and a cut in PAM usage by 80%

Furthermore: SimpleFloc not only improved dewatering, but delivered additional benefits:

- Crews were more efficient as they didn't have to babysit make-down
- 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

KPIs

- · 67% reduction in filter damage
- · 79% reduction in PAM
- · Elimination of arsenic breaches

"The speed and clarity that CarboNet helped us to achieve in our water was better than anything we ever expected—the results were astounding. Not only could this save tens of thousands in equipment costs, we are impressed with how seamless the experience was."

Plant Manager

Waste Disposal Unit

Landfill Leachate

CarboNet chemistry cuts PAM by 80% and cost-to-treat by 50%, ensuring landfills don't breach their permit—or balance sheet.

Dunking on dumps.

Leachate is a zero-sum game: breach your permits and your landfill shuts down and operations grinds to a halt. It's also a favourite of regulators who can easily track emissions from fixed address sites.

Why it matters: Landfill operators have historically relied on commodity chemicals, wonky makedown equipment, and untrained crew to handle leachate treatment. But that hand can easily fold when staff—hampered by having to babysit makedown rigs—overdose PAM or create accidental leaks that push emission levels over the top.

- → **Toxicity**: SimpleFloc reduces PAM by up to 80%, helping hit increasingly stringent regulatory targets, and insulating operations from breaches in the operating envelope.
- → **Chemical spend**: CarboNet flocculants alter the throughput of water treatment, reducing cost-to-treat by up to 50%.
- → **OPEX**: SimpleFloc requires no make-down and dramatically reduces time spent on dosing calibration and monitoring. And, increasingly, CarboNet sites use automated pumps that send data back to a monitoring dashboard for aggregation and analysis.
- → **CAPEX**: SimpleFloc doesn't require make-down equipment and often improves the performance of other tools in the pipeline, helping maintain existing CAPEX or avoid new investments entirely.



- → **Emissions**: CarboNet chemistry reduces Scope 3 Emissions up to 70%, a crucial feature for fixed-address sites.
- → **Health & safety**: CarboNet products arrive preactivated 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.

The bottom line: Water insecurity is changing regulations, permits, 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.

→ Smart chemistry can reduce risks, cut costs, and improve unit performance.



Produced Water Treatment Overhaul in the Permian Basin

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

Produced Water

CarboNet chemistry removes makedown: 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 makedown over dozens of sites.

Why it matters: Producers who rely on makedown 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.

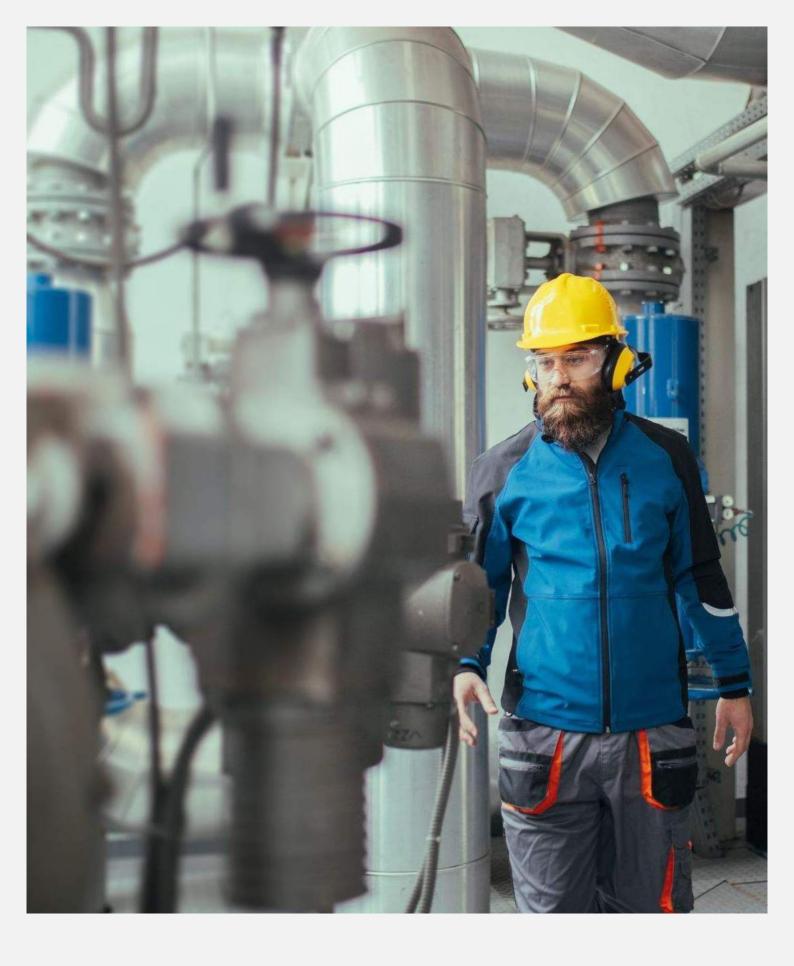
CarboNet's SimpleFloc removes make-down and the associated costs and headaches:

→ **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.



Clarifying Freshwater on the Sabine River

An operator looked for modern alternatives as a commodity chemical became less reliably available and economical.

Background: Companies that rely on freshwater clarification for reverse osmosis, ion exchange, process water, feedwater, or cooling towers are concerned about the shortages and increasing cost of polyDADMAC. It's becoming less reliably available and economical, driving interest in other options that allow operators to reach their KPIs.

The problem: On top of increasing supply challenges with polyDADMAC, a refinery on the Sabine River has been unable to maintain its turbidity KPI to <5 NTU making it necessary to constantly supervise the daily fluctuations.

→ Though they use a sludge blanket clarifier system, it's been difficult maintaining the sludge blanket itself to mitigate carry over.

The solution: We tested the performance of to help the refinery fully transition from relying on polyDADMAC.

The results: Tests consistently result in better clarity with lower NTUs over a wider range of dosing. We saw faster flocculation with lower dosing than commodity dry or emulsion polymers due to SimpleFloc's pre-made-down state.

The bottom line: The switch from polyDADMAC to SimpleFloc + ACH created better KPIs while reducing manpower, the chance of spills and HS&E incidents, and emissions.

Footnote: SimpleFloc not only improved clarification, but delivered additional benefits:

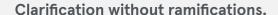
- Crews were more efficient as they didn't have to babysit make-down
- Significantly less chemicals were introduced into the operating envelope, ensuring no permits were breached
- Crews enjoyed safer working conditions not having to deal with dry make-down dust or slips from emulsion slop

RESULTS

- · Removed need for polyDADMAC
- Reduced chemical costs by 50%
- Boosted crew efficiency
- · Reduced HS&E incidents

Water Clarification

Low-emission clarification that's fast, efficient, and safe.



Water treatment operators, faced with capped emissions and fixed CAPEX/OPEX, live with a Catch-22:

- → To comply with emission caps, crews often under-dose PAM, leading to weak flocs and, in reaction, last-minute overdosing in an attempt to recalibrate.
- → **Inconsistent dosin**g gums up the filters and need to be swapped out or backwashed, leading to an increase in OPEX or CAPEX.

Why this matters: costs and caps only go up while budgets stay put or go down, leaving operators in no-win scenario.

CarboNet chemistry recalibrates the issues and provides operators with more affordances. SimpleFloc, our no-make-down solution for water treatment:

→ Cuts PAM by 80%, creating an expansive buffer that all-but-guarantees crews won't overdose and breach limits.



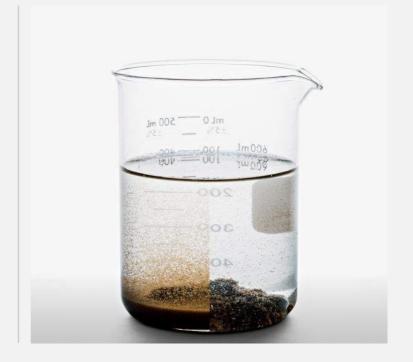
- → **Requires no make-down** and plugs directly into the system, eliminating the need for makedown equipment and maintenance.
- → Offers a forgiving dosage window so workers don't have to babysit the pumps or experiment with complex dosing regimes.
- → **Reduces NPT** due to backwashes and swapouts, and cuts HS&E incidents due to inhalation (dry polymers) or falls/breaks (emulsion slop).
- → Fundamentally lowers your cost-to-treat by nearly eliminating PAM and permit breaches; and reducing OPEX, CAPEX, and NPT.

The bottom line: Operators can re-write the plot by modernizing their chemistry to eliminate makedown, reduce OPEX and CAPEX, and live comfortably within emission caps.

SimpleFloc

Anionic Flocculant

CarboNet SimpleFloc is a preactivated 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
рН	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

Note: Anionic SimpleFlocTM 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.



Wastewater

^{*} Average values measured at 60 rpm

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



NanoNets

The platform behind the products.

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:

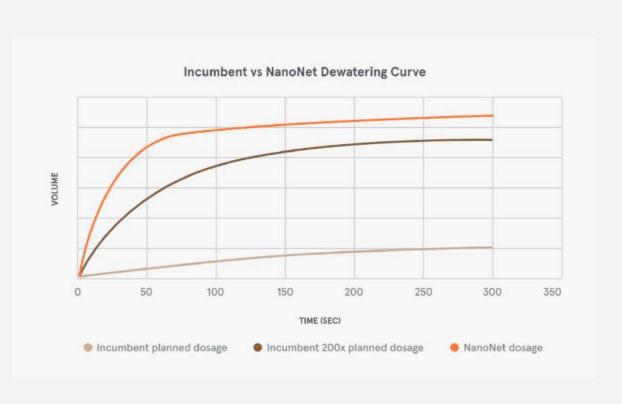
- → **Surfactant**: The glue that helps the flocculant attach to particles or impurities in water. It's responsible for ensuring the flocculant can find and stick to the target particles.
- → **Polymer**: This gives the flocculant its shape and stability. Just like the frame of a house provides support 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 preactivated, made-down
state faces no ratelimiting 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 makedown 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 preactivated 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.

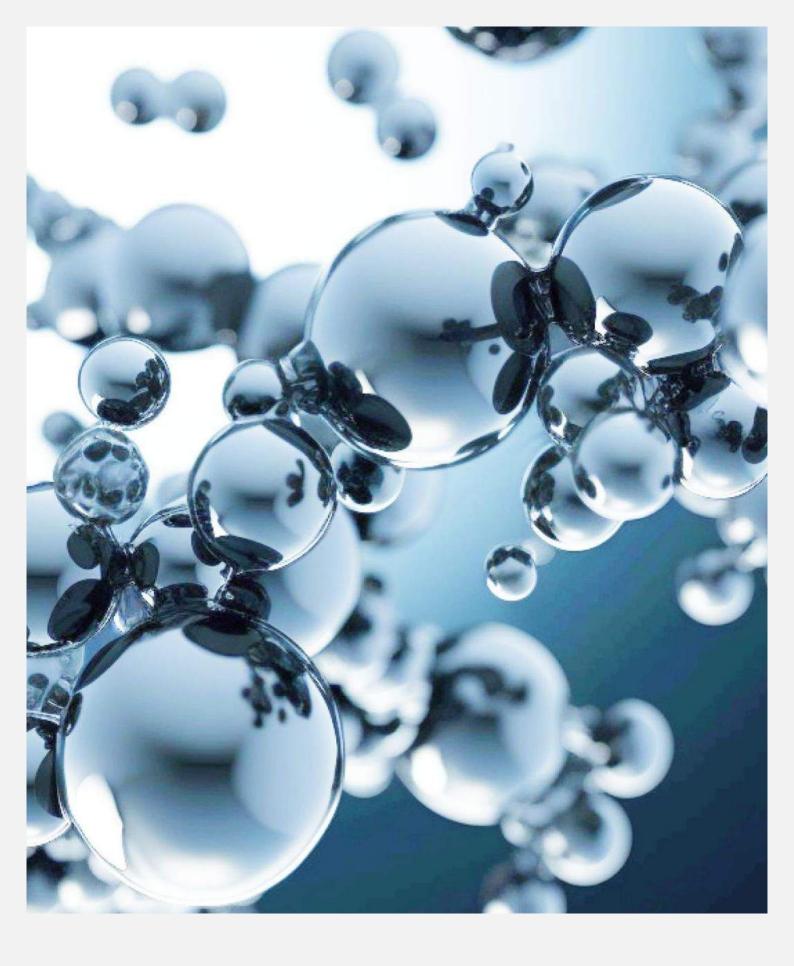
The bottom line: Water treatment has moved from a line item in the P&L to a key strategic advantage for companies looking to boost profits as they navigate regulatory hazards and the increasing costs of freshwater.

→ 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

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

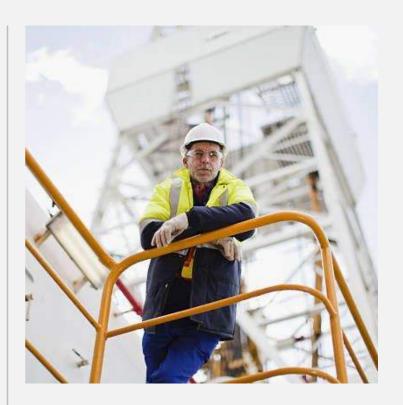
Greater crew efficiency, reduced NPT, lower labour costs

CAPEX investments

Avoid new equipment, prolong existing infrastructure, increase throughput

Regulatory exposure

Reduced exposure to govt or collective action



"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

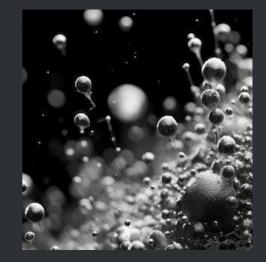
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Products

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	<u> 7</u>
· SimpleFloc Cationic	7
· NanoNet Select	7



Applications

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

· Leachate	7
· Meat & dairy	7
• Groundwater	7
· Personal care wastewater	<u> 7</u>
· Produced water	
· Sludge dewatering	7
· Water clarification	7



Industries

Products for industrial brands and operators across industries and applications:

· Construction	<u> </u>
· Food & beverage	7
· Mining	7
• Municipal	7
· Oil & gas	7
· Pharmaceutical	7
· Pulp & paper	7





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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CarboNet • •