

# An Introduction to ClarosTech™

Prepared in collaboration with Great American Insurance Group

#### Serving your PFAS analytical and destruction needs



Test your water, soil, or textiles for PFAS using our analytical services

Beryl@clarostech.com



Engage in a treatability study and pilot trial of the ClarosTech<sup>TM</sup> PFAS destruction system

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Invest or partner with us

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#### Claros Technologies: About Us



Greenhouse gasses are not the only ubiquitous, toxic pollutants in our environment

ClarosTech<sup>TM</sup> is a venture-backed deep tech start-up harnessing green chemistry and advanced material science to solve our global PFAS water contamination crisis





#### About ClarosTech™

Founded: 2019 (VC-backed spin-out of University of

Minnesota

HQ: Minneapolis. MN CEO: Michelle Bellanca

Employees: 30+ mission-driven

scientists, engineers, and

business leaders

Website:

www.clarostechnologies.com

Stage: Lab-validated scaling

into customer pilots

#### What We Do: We Solve Problems Without Creating New Ones™

## PFAS Destruction Technology

- Proprietary UV-photochemical system deployable for low and high throughput PFAS wastewater streams
- Destroys and defluorinates PFAS
- Works on ALL PFAS types: long, short, and ultrashort chain and the greatest # of compounds compared to any other technology
- Contact <u>Zachary@clarostech.com</u> to learn about setting up a treatability study

# PFAS Analytical Laboratory Services

- Offering industry-leading PFAS analytical standard and customized testing services for non-potable water, soil, textiles, and other materials
- Examples of services include EPA draft method 1633, specialized total organofluorine analysis, PFAS textile testing
- ISO/IEC 17025 certified
- Contact <u>Beryl@clarostech.com</u> for your testing needs

# Claros Technologies: PFAS Destruction Technology



## The ClarosTech<sup>TM</sup> Proprietary Destruction Technology

- Our PFAS destruction system destroys 99.99% of PFAS
- Effective across all PFAS types including ultrashort chain and longchain
- Third-party performance results validated by Fortune 500 customer
- Effective across multiple PFAS waste streams including firefighting foam, industrial effluent, and landfill leachates
- Agnostic to capture method (e.g., ion exchange resin, reverse osmosis, surface active foam fractionation)
- Winning energy and cost profile our technology is cost competitive PFAS Free Water with traditional methods of disposal (landfill, incineration, and deepwell injection)
- Empowers you to meet effluent and regulatory goals

PFAS Wastewater Concentrate





Low & High Throughput Reactor(s)



- · Carbon-fluorine bonds are broken
- PFAS reduced to safe, natural elements

#### Destruction and Defluorination Performance

Our process fully destroys and defluorinates >99.99% of long, short, and ultrashort chain PFAS, validated with in-house and third-party mass balance analyses

Customer	Water Type	Long Chain	Short Chain	Ultrashort Chain	Destruction (%)	Destruction Third-Party Validated*	Defluorinati on Third- Party Validated*
Department of Defense	Firefighting Foam	✓	✓	N/A	> 99.7%	✓	-
Polymer Manufacturer (PM)	Manufacturing Effluent (ME)	✓	<b>√</b>	<b>√</b>	> 99.9%	-	-
PM	ME	✓	✓	✓	> 99.9%	<b>√</b>	✓
PM	ME	✓	✓	✓	> 99.99%	✓	✓

# Claros Technologies: PFAS Overview



#### The Problem of PFAS Contamination

- Greenhouse gasses are not the only ubiquitous, toxic pollutants in our environment
- PFAS is found in water, air, and soil at locations across the nation and the globe
  - U.S. Geological Survey found "forever chemicals" present in about 45% of U.S. tap water
- The way we treat PFAS contamination today (using a PFAS capture technology then incinerating, landfilling, or deep-well injecting the remaining PFAS waste) does NOT permanently solve the problem. Instead, it merely perpetuates an infinite lifecycle by returning either the original PFAS or their degradation products back into the environment



#### **POLITICO**

CHSTAINABILITY

'Forever chemicals' are everywhere. The battle over who pays to clean them up is just getting started.

States are fighting manufacturers over cost of removing toxic substances tied to huma

Societal cost of 'forever chemicals' about \$17.5tn across global economy - report

US agency takes unprecedented action to tackle PFAS water pollution

EPA has ordered chemical company Chemours to stop discharging high levels of the toxic substance into the Ohio River

US food pesticides contaminated with toxic 'forever chemicals' testing finds

PFAS are present at 'potentially dangerous' levels in widely used chemicals sprayed on food crops destined for Americans' plates

EPA warns that even tiny amounts of chemicals found in drinking water pose risks

June 15, 2022 - 11:47 AM E

Chemicals yield profit of about \$4bn a year for the world's biggest PFAS manufacturers, Sweden-based NGO found

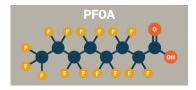
#### **PFAS Chemistry Overview**

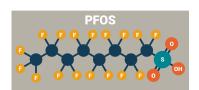
Per- and polyfluoroalkyl substances (PFAS) are a class of more than 15,000 man-made chemical compounds

PFAS are made of nearly unbreakable carbonfluorine bonds, making them extremely difficult to destroy and remediate ("forever chemicals")

Created in the 1940s, commonly used to add functionality and durability such as resistance to grease, oil, water, and heat

3 primary types of PFAS- long chain, short chain, and ultrashort chain





#### PFOA & PFOS

2 of the most well-known and studied compounds in the PFAS family, banned from manufacturing and use in the US

#### Performance Matters

- True destruction technologies, alternatives to landfill/incineration, are only now emerging
- It is important to note that most of these emerging technologies address only these 2 PFAS compounds or create shorter chain PFAS- Claros is the leading solution proven to destroy all PFAS types (long, short, and ultrashort chain)

# Claros Technologies: PFAS Overview



#### Where Does PFAS Waste Accumulate?

- Because of the nature of PFAS, these materials are present everywhere
- By focusing on the point sources of contamination to either eliminate the use of PFAS compounds or treat the waste stream properly while it is in its most concentrated form, we can significantly reduce our PFAS pollution problem

#### **Private Sector**

- Manufacturing companies
- Landfills that accept PFAS-laden materials
- Oil refineries
- Fire suppression systems
- Locations near incineration units that burn PFAS-laden materials
- Metal manufacturing and finishing
- Metal casting and smelting
- Laundry and dry cleaning
- Automobile manufacturing
- Waste processing centers Electronic/chip manufacturing

# **Public Sector**

- State or city sewer districts and drinking water facilities
- Schools
- Law enforcement sites
- Fire department sites, including training facilities and fire sites
- Airports
- Public landfills
- Public waste and energyproducing incinerators
- Miltary and DoD sites

#### Work With Us to Stop PFAS Pollution



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