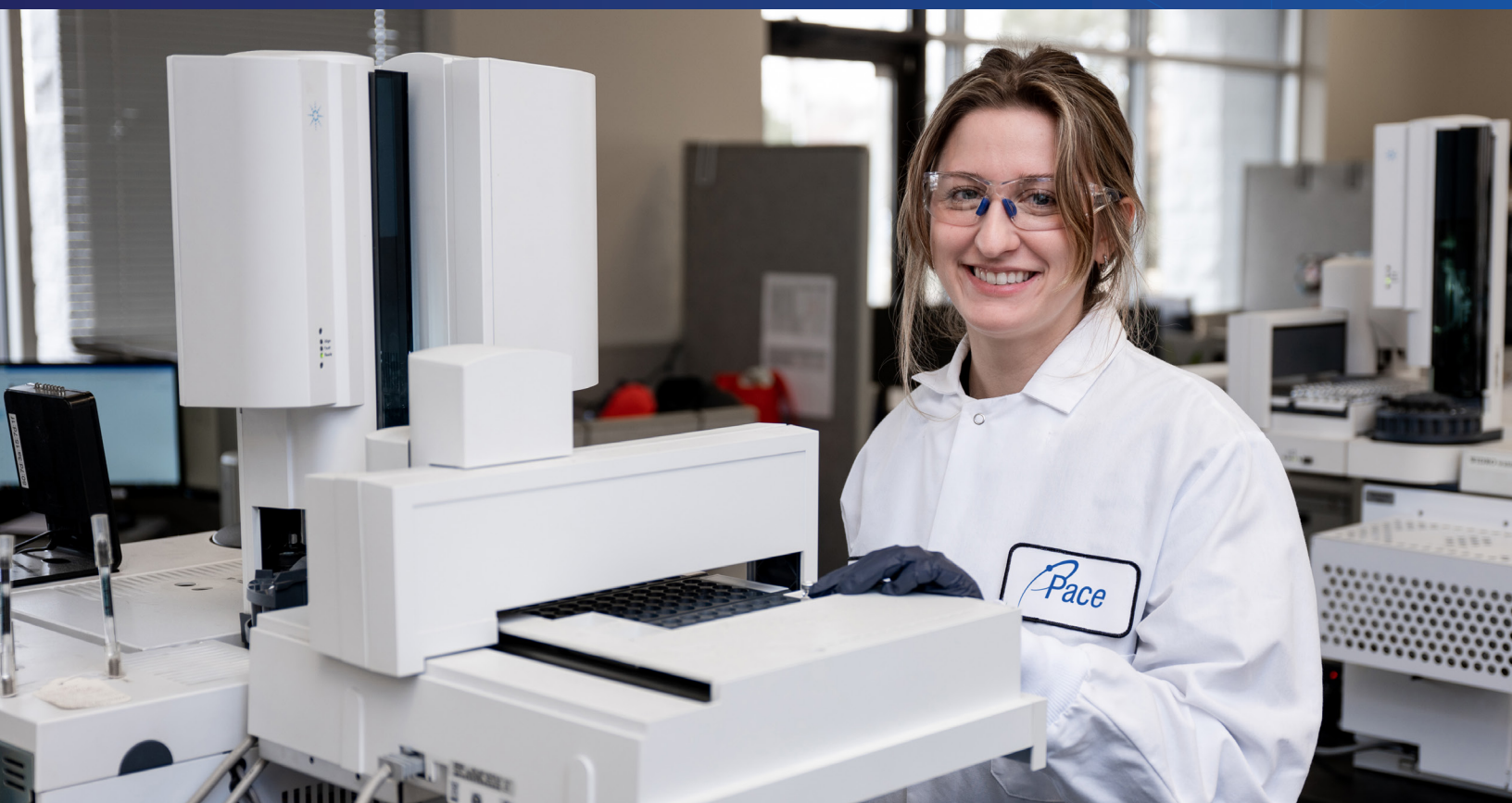


PACE® ANALYTICAL SERVICES

CASE STUDY

Pace® partners with Onvector as Testing Lab for PFAS Destruction Validation



SNAPSHOT

CLIENT

Onvector

INDUSTRY

Environmental



ABOUT

Onvector is a physics-based technology company solving one of the most difficult environmental problems facing our planet—destroying hard to treat hazardous chemicals in water and wastewater known as PFAS (per- and polyfluoroalkyl substances). Onvector is using its Plasma Vortex technology to destroy contaminants in water, providing a positive impact on human health and the future of clean water.

BACKGROUND

Onvector is poised to tackle the problem of PFAS contamination across a variety of applications, including AFFF (aqueous film-forming foam) remediation, industrial contamination (soil and groundwater), industrial wastewater, and landfill leachate. To address a diverse set of matrices, Onvector has designed its patented Plasma Vortex technology to combat PFAS on a commercial scale.

“The cyclone is a well-recognized device that’s fully scalable and used throughout the industrial wastewater treatment world to separate solids from water using centrifugal forces,” said Daniel Cho, Onvector CEO. “We added an electrode set, which injects and ionizes gas to create arc lightning at the cyclone’s center. This electric field strips electrons from the inflowing gas molecules, creating charged ions and releasing a plasma discharge. The ions are highly chemically reactive, allowing them to break down PFAS by destroying the carbon-fluorine bonds.”

CHALLENGES

To help demonstrate the efficacy of the Plasma Vortex approach, Onvector needed a lab partner with the expertise to analyze a variety of complex matrices, including waste streams exposed to AFFF and leachate. Their chosen lab partner also needed to provide the superior service level required in an emerging market.

"Both AFFF and leachate can be challenging to analyze due to the high levels of PFAS concentrations present and the potential background interference associated with these sample types," said Lindsay Boone, Pace® Technical Specialist. "There are multiple method options for these types of non-potable matrices. It is of the utmost importance for the lab to understand a client's data quality objectives when discussing method options."

Pace® works with clients to fully understand what they are looking to analyze and how they will use the results. Then the Pace® team helps them choose the most appropriate methods based on factors such as turnaround time and available sample volume.

"There are a lot of labs in the United States that provide PFAS testing," said Cho. "Lindsay Boone, our main contact at Pace®, has been an excellent technical and project management resource. In addition, the price was right, and the turn-around times are excellent. Pace® is a highly respected lab in the industry."



SOLUTION

Onvector partners with Pace® to validate the performance of the Plasma Vortex technology in commercial projects as well as ongoing research and development. One high-profile example is the work being done at Joint Base Cape Cod.

The pilot program involved a two-step approach in which PFAS was extracted from groundwater and then concentrated. Onvector's Plasma Vortex was then used to mineralize the PFAS in the spent ion exchange regenerant (concentrated still bottoms after solvent recovery), producing harmless by-products, such as fluoride ions, carbon dioxide, and water.



"The ubiquity of PFAS and the low concentration targets can make solving the PFAS problem an expensive proposition," said Cho. "In addition to providing an environmentally sustainable solution, we wanted to create something that was affordable, yet still capable of destroying PFAS to very low concentration levels. ASTM D8421 fit with our objectives as it allows us to validate results faster and at a lower cost than other test methods. Pace® clearly had the expertise we needed, and with ASTM D8421 in their hands, we knew we could get defensible results."

Although ASTM D8421 is already faster to implement than many other test methods, Onvector's project team was under constant pressure to deliver results. Pace® was able to accelerate delivery to less than five days to help Onvector meet its project commitments.

"Honoring our commitments so you can honor yours is a core Pace® value," said Boone. "With the largest American-owned lab network on the market, we're already able to provide some of the fastest turnaround times in the business, but sometimes clients need more. Accelerating delivery time of reliable PFAS results helps our customers make better informed decisions faster."

RESULTS

The pilot test at Joint Base Cape Cod demonstrated 97% PFAS destruction using Onvector's Plasma Vortex technology on the concentrated PFAS waste from the ion exchange regeneration process. With the regenerable ion exchange process, Joint Base Cape Cod successfully achieved PFAS concentration levels of single ng/L or "non-detect," meeting both state and federal drinking water limits. Additionally, with Plasma Vortex destruction of the PFAS waste, the "plasmate" (plasma-treated effluent) can be returned to the headworks of the ion exchange process, enabling zero liquid waste operation without high energy use or operating costs.

"Our partnership with Pace® allows us to build confidence in our customers that the Plasma Vortex works," said Cho. "Pace® understands the long-term, vital importance of PFAS destruction technologies, and their PFAS experts are extremely helpful in answering client questions about PFAS testing and analysis and what the results mean. We're looking forward to a long and fruitful partnership as we work together to help solve one of our planet's most pressing challenges."

