NOAA’s Breakthrough Discovery in the Fight Against Forever Chemicals

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MT. PLEASANT, SOUTH CAROLINA, USA, March 1, 2024 /EINPresswire.com/ -- Per- and polyfluoroalkyl substances (PFAS), often known as “forever chemicals,” present a profound and growing threat to public health and the environment. These synthetic chemicals, found in hundreds of everyday products such as nonstick cookware, firefighting foam, clothing, cleaning products, makeup and shampoo are notorious for their ability to never break down in the environment and accumulate in the human body.

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> *Dr. Peter Moeller*

NBOT Labs, in partnership with the National Oceanic and Atmospheric Administration (NOAA), has developed and validated what is considered to be the first scalable, versatile, and cost-effective solution for removing these harmful forever chemicals from the world’s water supply.

Dr. Peter Moeller, Program Lead for Emerging Toxins at NOAA, led this groundbreaking round of research and stated: "Utilizing NBOT as a catalyst to destroy over 99.999% of PFAS in our recent tests has proven to be a remarkable advancement in the field of environmental chemistry. The ability of this technology to play a key role in efficiently breaking down PFAS compounds and removing fluorine from the carbon-fluorine bond, where traditional methods have failed, marks a significant milestone towards sustainable water treatment solutions. This success not only showcases the incredibly scalable potential of NBOT but also sets a new benchmark for addressing one of the most pressing environmental challenges of our time. It is an extraordinarily exciting discovery."

For decades, chemical companies covered up evidence of forever chemicals’ health hazards. PFAS were found in the blood of 97% of Americans tested according to a study published in the International Journal of Environmental and Public Health, and a study by scientists at the Environmental Water Group estimated that more than 200 million people may be drinking PFAS-tainted water on a regular basis. The health implications are dire, with PFAS exposure linked to severe conditions, including cancer, liver and thyroid disease, lung damage, and compromised

immune systems. The resiliency of these chemicals, coupled with their widespread use, has developed into a crisis, contaminating water supplies worldwide and posing a ticking time bomb for ecological and human health.

The challenge of remediating forever chemicals lies in their chemical structure, particularly the carbon-fluorine (C-F) bonds, the strongest in organic chemistry. This is particularly due to the high electronegativity of fluorine, meaning it has an extremely high tendency to attract electrons towards itself. When bonded with carbon, this incredibly strong and stable bond is almost impossible to break down. While some methods can break down the carbon chains in PFAS, the difficulty of severing the fluorine bonds has left scientists searching for an effective, scalable, and cost-effective solution to tackle the full spectrum of contamination.

The severity of forever chemicals contamination has not gone unnoticed by regulatory agencies. The hazards of exposure to forever chemicals became widely known in a 1998 study released by 3M, yet many critics suggest the health hazards were kept hidden for more than fifty years. In 2019, the EPA issued guidelines for acceptable levels of PFAS in drinking water at 70 parts per trillion (ppt). In March 2023, the EPA proposed regulations for allowable levels at 4 ppt, but these new measures have yet to be implemented or enforced. These proposed regulations underscore the pressing need for innovative and effective remediation technologies, setting the stage for an imminent and coordinated action.

Scientists and researchers are actively seeking new methods to destroy PFAS, as existing remediation technologies and processes are largely ineffective at mass scale. Some of the most prominent solutions on the market today are granular activated carbon, ion exchange resins, high-pressure membrane systems, and electron beam technology.

Granular Activated Carbon removes a wide range of compounds and is cost-effective for large scale applications, however may require frequent replacement or reactivation, is less effective for short-chain PFAS compounds and can generate waste needing further treatment.

Ion Exchange Resins are highly effective but limited to specific types of forever chemicals and can be expensive due to resin costs.

High-Pressure Membrane Systems efficiently remove a broad spectrum of PFAS compounds and are not reliant on chemical properties for removal. There can be high operational and maintenance costs and is only suitable for small amounts of water.

Electron Beam technology is capable of treating large volumes of water quickly and is effective against a wide range of compounds. The challenges lie in the fact that it is an energy-intensive, expensive operation.

NBOT Labs, a trailblazer in the fight against forever chemicals with its Nano-Bubble Oxidation Technology (NBOT), has developed a groundbreaking technology that provides hope for a

scalable, effective solution. By harnessing the power of oxygen and ozone gas injected into nano-bubbles, NBOT creates hydroxyl radicals, which are implemented as the key part of a patent pending process capable of breaking down PFAS compounds. In a series of tests by NOAA, PFAS concentrations were reduced by over 99.999%, from 3 million parts per trillion down to non-detect levels.

Through the implementation of NBOT, this process is versatile, scalable, and environmentally friendly. All bacteria, algae and viruses are destroyed (can address both known and emerging PFAS), vast quantities of contaminated water can be treated, and no chemical additives are required.

Steve Gareleck, CEO of NBOT Labs stated: “At NBOT Labs, our mission is to ensure the availability of clean water globally. We're thrilled with Dr. Moeller and his team's success at NOAA, demonstrating our technology's crucial role in eradicating harmful forever chemicals. This marks a significant milestone, and we look forward to rolling this incredible solution out as soon as possible."

As the world grapples with the forever chemicals challenge, NOAA’s innovation utilizing NBOT’s proprietary technology as a catalyst for the elimination of PFAS represents one of the most significant advancements in water treatment technology of our time. With tens of thousands of known locations throughout the US over the legal limit of forever chemicals contamination and over 300 million Americans with PFAS in their bloodstreams, the introduction of NBOT Labs' technology promises to transform the landscape of environmental protection and public health.

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