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Perma-Fix Successfully Completes Pilot Plant Testing and Unveils New Process for Destruction of PFAS “Forever Chemicals”

ATLANTA, April 03, 2024 (GLOBE NEWSWIRE) -- Perma-Fix Environmental Services, Inc. (NASDAQ: PESI) (the “Company”) today announced it has successfully completed pilot plant testing on its new, patent-pending process for the destruction of Per- and Polyfluorinated Substances (PFAS), commonly known as “forever chemicals.” PFAS compounds do not degrade over time through any natural process or environmental conditions, bioaccumulate, and are harmful to humans and the environment. The tests were designed to demonstrate the destruction of commercial quantities of PFAS-contaminated liquids and better define the parameters needed to construct the first commercial unit.

The Company’s prior bench-scale testing of PFAS compounds demonstrated that the process is effective and can be applied to a variety of potential markets, including liquids, solids, soils, biosolids, and sludges. The new pilot plant operates in a closed system under mild conditions.

Present disposal options for PFAS liquids include deep wells, incineration and landfills, all of which have serious environmental liability issues. We expect that the Perma-Fix’s process will virtually eliminate PFAS compounds (minimum of 99.9999% destruction) and reduces the environmental liability associated with these materials. Additionally, the process is designed to operate at a highly competitive price compared to traditional disposal options.

According to a recent article in Barron’s the estimated cleanup cost for PFAS compounds could exceed $200 billion. A recent study from the U.S. Geological Survey found that “forever chemicals” were present in about 45% of U.S. tap water. Scientific studies have linked PFAS exposure to reproductive effects such as decreased fertility or increased high blood pressure in pregnant women; developmental effects or delays in children, including low birth weight, accelerated puberty, bone variations, or behavioral changes; increased risk of prostate, kidney, and testicular cancers; reduced ability of the body’s immune system to fight infections, including reduced vaccine response; interference with the body’s natural hormones; and increased cholesterol levels and/or risk of obesity. Last year, manufacturer 3M agreed to a $10.3 billion settlement over water pollution claims involving their use of PFAS.

Mark Duff, President and CEO of the Company, commented, “I am pleased to announce that the pilot plant testing of our breakthrough process for treating PFAS compounds was not only successful, but exceeded our expectations. In fact, our process achieved PFAS destruction levels exceeding anticipated regulatory requirements. These tests reaffirmed our prior bench scale testing which indicated our process should effectively destroy these

harmful chemicals at high levels of efficiency."

Dr. Louis F. Centofanti, founder of the Company and Executive Vice President of Strategic Initiatives, as well as inventor of the technology, noted, "This successful demonstration marks potentially the single largest achievement in the history of the Company, and is the culmination of years of R&D. We initially focused our tests on contaminated liquids, which are stored in abundance around the country and worldwide. There are limited current treatment options for these materials and we expect that our process will exceed any of these methods. Some of the sizable markets for PFAS include AFFF firefighting foams, both expired concentrate and flushing liquids, contaminated liquids from PFAS systems, and other water-based separation products from a variety of industrial systems."

Centofanti continued, "While there are inherent risks and potential delays with any new technology, especially as we continue to scale the process, with the pilot plant test now complete we have confidence moving forward. We are now in the process of constructing our initial commercial unit, which will be comprised of a sealed vessel operating under mild conditions. We believe that this process is highly scalable with minimal capex or labor costs required since we are employing a non-incineration, chemical-based process. Our proprietary process is expected to destroy the fluorocarbon chain, mineralizes the fluoride, and creates calcium fluoride as the primary byproduct, which is a completely non-hazardous material far exceeding even the strictest disposal requirements set by the U.S. Environmental Protection Agency. Other byproducts include simple non-hazardous organic materials that can also be easily and safely disposed of."

Centofanti further noted: "PFAS chemicals have been designated as "forever chemicals," but we know from basic chemistry they are fundamentally unstable. This is because of an activation barrier that exists with carbon-fluorine materials. After several years of research, Perma-Fix has developed a process that has bypassed that barrier and readily destroys PFAS materials under mild conditions. This process has been screened against a large variety of PFAS materials in bench tests, and we were able to destroy all materials screened. The process is fundamentally new, and patents have been filed, including 3 patents pending, a fourth patent in process, and several more underway to cover the various potential applications that we see in the various PFAS markets."

Duff concluded: "We are now in the process of final design and fabrication for installation of the first operational unit and plan to be operational, accepting commercial waste for destruction by the end of the year. Perma-Fix has established goals for additional units to be installed at each existing treatment plant to follow in 2025. The initial feedback from potential customers has been positive given the increasing pressure to treat and dispose of these waste streams. In addition to the costs associated with storing these materials, there are significant growing legal and regulatory requirements to treat these wastes, not to mention the potential liabilities associated with these harmful and dangerous waste streams that have permeated landfills. Initial estimates associated with impact to soils include more than 200 million acres of contaminated farmland in the U.S. alone. We intend to tackle this global environmental catastrophe and look forward to providing further updates on our progress."

Commercial and government entities interested in speaking to a Perma-Fix representative about the new PFAS destruction process may contact the Company at (770) 587-9898.

About Perma-Fix Environmental Services
Perma-Fix Environmental Services, Inc. is a nuclear services company and leading provider of nuclear and mixed waste management services. The Company's nuclear waste services include management and treatment of radioactive and mixed waste for hospitals, research labs and institutions, federal agencies, including the DOE, the DOD, and the commercial nuclear industry. The Company's nuclear services group provides project management, waste management, environmental restoration, decontamination and decommissioning, new build construction, and radiological protection, safety and industrial hygiene capability to our clients. The Company operates four nuclear waste treatment facilities and provides nuclear services at DOE, DOD, and commercial facilities, nationwide.

Please visit us at http://www.perma-fix.com.

This press release contains "forward-looking statements" which are based largely on the Company's expectations and are subject to various business risks and uncertainties, certain of which are beyond the Company's control. Forward-looking statements generally are identifiable by use of the words such as "believe", "expects", "intends", "anticipate", "plans to", "estimates", "projects", and similar expressions. Forward-looking statements include, but are not limited to: testing results of the new process to treat PFAS; benefits of our new process; patent applications; construction and installation of first operational unit by year end; installing of additional units in 2025; and receipt of commercial waste for destruction. These forward-looking statements are intended to qualify for the safe harbors from liability established by the Private Securities Litigation Reform Act of 1995. While the Company believes the expectations reflected in this news release are reasonable, it can give no assurance such expectations will prove to be correct. There are a variety of factors which could cause future outcomes to differ materially from those described in this release, including, without limitation, future economic conditions; acceptance of our new process by the public; granting of the patents which are subject to review by the appropriate governmental authorities; industry conditions; competitive pressures; our ability to apply and market our new technology; acceptance of our new technology; and the "Risk Factors" discussed in, and the additional factors referred to under "Special Note Regarding Forward-Looking Statements" of, our 2023 Form 10-K. The Company makes no commitment to disclose any revisions to forward-looking statements, or any facts, events or circumstances after the date hereof that bear upon forward-looking statements.

Contacts:
David K. Waldman-US Investor Relations
Crescendo Communications, LLC
(212) 671-1021

Herbert Strauss-European Investor Relations
herbert@eu-ir.com
+43 316 296 316



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