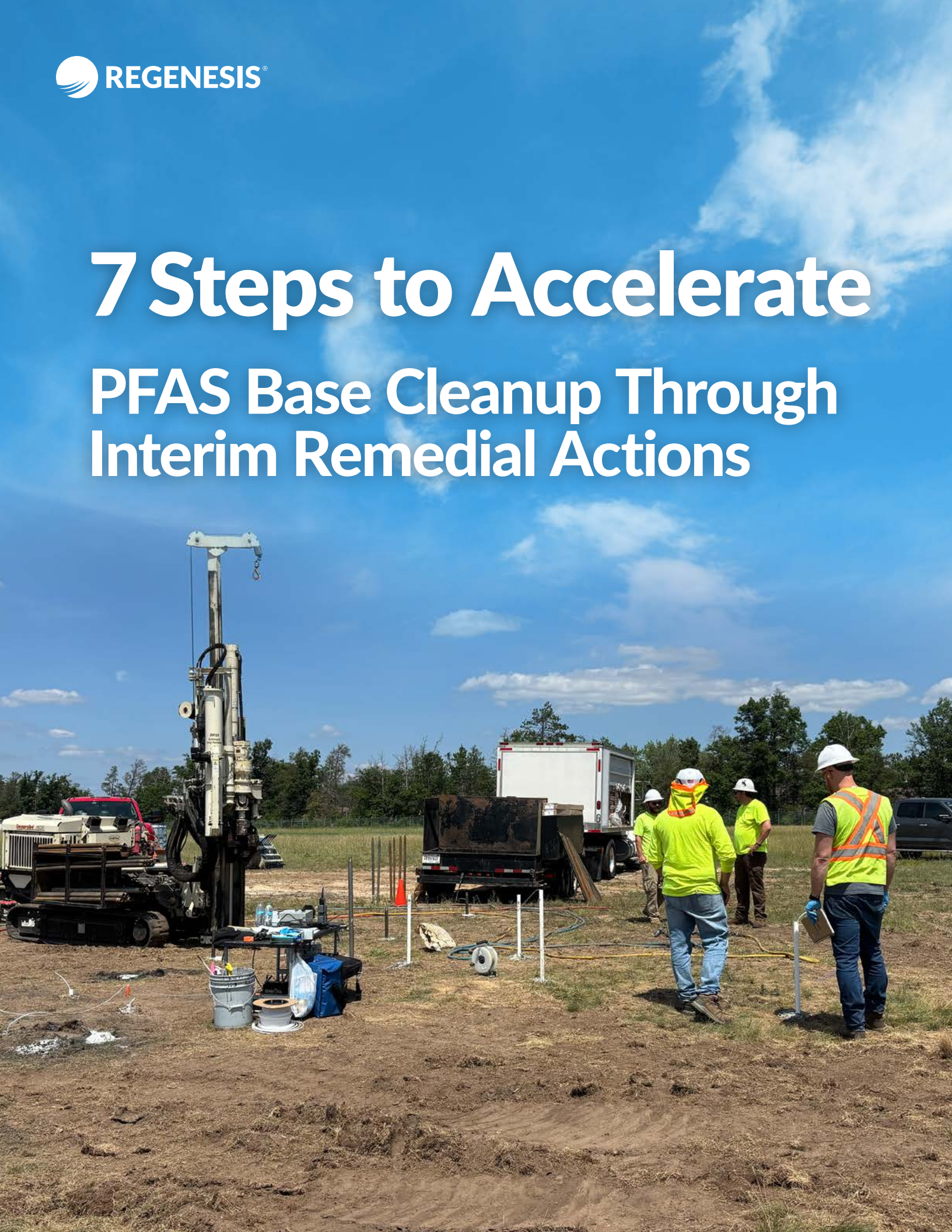
REGENESIS®

7 Steps to Accelerate

PFAS Base Cleanup Through Interim Remedial Actions



7 Steps to Accelerate PFAS Base Cleanup Through Interim Remedial Actions

Executive Summary

Congress is calling on the Department of Defense (DOD) to act swiftly to address PFAS contamination at hundreds of military sites across the country. With bipartisan support behind new provisions in the FY26 National Defense Authorization Act (NDAA), both the Senate and House are demanding measurable progress—starting now.

At all military bases the CERCLA process is followed to fully investigate a chemical release and determine the appropriate cleanup action. If it is discovered that current conditions pose a risk to human health or the environment, Interim Remedial Actions may be implemented to address the site risk. The Department of Defense (DOD) needs field-ready solutions that are scientifically sound, to deploy as Interim Remedial Actions capable of delivering real-world performance aligned with Congressional expectations.

PlumeStop® and SourceStop®— *in situ* remedial technologies developed by REGENESIS – that are engineered specifically for this challenge. These field-ready technologies provide highly effective, resilient solutions which can be deployed as interim remedial actions to immediately stabilize PFAS in groundwater, protect receptors, and generate performance data to support full-scale remediation.

These patented colloidal activated carbon (CAC) technologies also enable a strategy called PFAS Enhanced Retention (PER) – an advancement over traditional monitored natural attenuation—that is both scientifically defensible and scalable.

This e-book outlines seven key steps that support accelerated DOD PFAS cleanup, demonstrating how Interim Actions such as those completed at Former Naval Air Station Alameda and Camp Grayling Joint Maneuver Training Center can reduce risk, satisfy congressional mandates, and build public trust.

#1 Confront the Urgency Head-On: Congress Demands Immediate PFAS Action

Pressure is building in Washington D.C. With PFAS contamination impacting hundreds of military installations and many communities affected. Congress is pressing the DOD to deliver faster, more transparent PFAS cleanup efforts—especially when drinking water and ecological receptors are threatened.

The FY26 NDAA shows a bipartisan urgency, with both the House and Senate advancing provisions that prioritize:

- Immediate interim remedies, including bottled water and filtration systems for impacted residents/communities
- Accelerated PFAS cleanups to prevent further PFAS migration and exposure
- Faster site assessments and cleanup planning
- Public transparency through online dashboards and congressional reporting

Congressional Consensus - Speed, Protection, Accountability

Both chambers of Congress are aligned on three core goals—faster cleanup, public protection, and visible accountability.

House NDAA (H.R. 3838)

Directs the DOD to accelerate PFAS cleanup at military sites by prioritizing locations, improving timelines, increasing lab capacity, and establishing a public progress dashboard.

Senate NDAA (S. 2296)

Repeals the PFAS incineration ban, mandates interim protections like bottled water, and accelerates site investigations with public-facing reporting requirements.

#2 Use Interim Actions for Immediate Results Under CERCLA

Waiting for final remedy determination and implementation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) cleanup process can prolong health risks and erode public trust. That's why interim actions are a necessary tool—not as temporary fixes, but as strategic tools that address PFAS impacts quickly, reduce risk, and inform the full-scale cleanup design.

In situ barriers using CAC—can be deployed quickly and cost-effectively to:

- Reduce exposure risks to drinking water supplies and sensitive ecosystems
- Contain PFAS migration, especially in high-flux areas or near receptors
- Support regulatory momentum by demonstrating visible progress
- Build public trust through early action and communication
- Serve as the first phase of an adaptive remediation strategy, addressing critical exposure pathways while generating site-specific data to inform final remedy selection.

These actions directly satisfy emerging Congressional mandates for faster cleanup, public transparency, and receptor protection.

They also help DOD installations stay ahead of compliance timelines while avoiding unnecessary delays tied to long-term remedy selection.

Planning Forward: Leveraging Data from Early Action

Data collected during implementation—including hydraulic response to injection and post-application performance—can reveal important insights that may be missed during the investigation stage. With the right approach and technologies, interim actions serve a dual role: protecting receptors now while informing full-scale design.

Tools like FluxTracer®, an *in situ* passive flux monitoring device, can be deployed during interim actions to collect critical site- and zone-specific data—such as PFAS mass flux—that are essential for optimizing full-scale CAC remediation.

#3 Deploy What Works: Science-Backed, Field-Proven Solutions for PFAS Control

As sites are identified and designated for interim actions, the DOD must act quickly to effectively contain PFAS, protect drinking water supplies, and communicate progress to the public. This directive demands the use of ready-to-deploy, scientifically validated technologies that can immediately contain PFAS.

PlumeStop and SourceStop are advanced colloidal carbon solutions designed for this role. Both are easily deployable, scientifically validated, and widely accepted for use worldwide.

Applied directly to the subsurface, these patented materials permeate and coat soil grains with high-surface-area activated carbon—creating an *in situ* filter that immediately reduces PFAS mobility and mass flux. This buys time, reduces risk, and generates real-world performance data, which helps to guide full-scale deployment.

These tools support interim action objectives by:

- Stabilizing PFAS and mixed contaminant plumes *in situ*
- Protecting drinking water wells and ecological receptors
- Preventing plume migration offsite
- Supporting compliance with EPA maximum contaminant levels (MCLs) and state-specific cleanup targets

Already installed at numerous DOD and federal installations, these technologies are supported by robust field data and independent validation through the Department of Defense's Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP).

Backed by this research, REGENESIS has established a track record of success —including the world's first *in situ* PFAS remedy, completed in 2016, which remains highly effective today. Independent modeling projects it will remain effective for decades (McGregor 2018, Carey 2020).

Whether applied in source zones to stop PFAS leaching into groundwater or as barriers to control PFAS plume migration, SourceStop and PlumeStop provide DOD with a proven path to interim risk reduction.

Active SERDP/ESTCP Research: *In Situ* Colloidal Activated Carbon for PFAS Remediation

ESTCP Project ER20-5182

Title: Validation of Colloidal Activated Carbon for Preventing the Migration of PFAS in Groundwater

Goal: Demonstrate and validate the *in situ* application of colloidal activated carbon (CAC) to sequester PFAS in source-zone groundwater.

ESTCP Project ER21-3959

Title: An Investigation of Factors Affecting *In Situ* PFAS Immobilization by Activated Carbon

Goal: Advance the understanding of how powdered and colloidal activated carbon (PAC and CAC) immobilize PFAS *in situ* and evaluate their long-term effectiveness under real-world conditions.

Additional SERDP/ESTCP projects are continuing to evaluate CAC's performance across diverse hydrogeologic settings and contaminant profiles, reinforcing its role in DOD's evolving PFAS response toolkit.

No other PFAS remediation technology offers equivalent, independently validated *in situ* field performance under such scrutiny— backed by long-term monitoring, modeling, and multiple DOD-funded evaluations—like PlumeStop and SourceStop.

#4 Prioritize Cost-Effective, Resilient Solutions

Congress emphasizes using technologies that are not only effective but also fiscally and environmentally responsible. In the explanatory language accompanying the FY2024 Defense Appropriations Act (House Report 118-121), lawmakers direct the Pentagon:

> "to prioritize the utilization of proven PFAS groundwater and soil remediation and mitigation technologies that eliminate the PFAS risk to human health and the environment in the most cost-effective and energy-efficient manner."

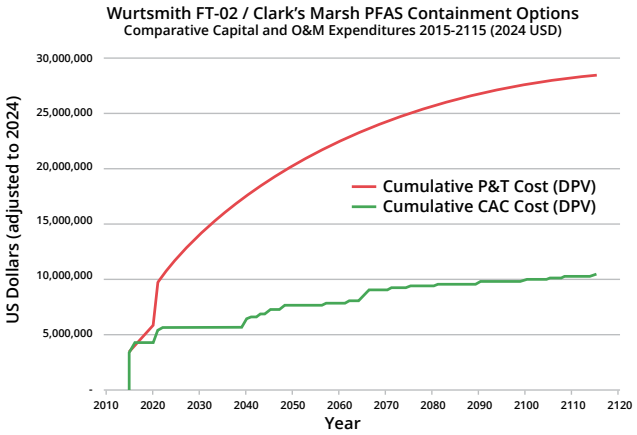
The Committee further states:

> "The Committee understands that existing technologies, such as *in situ* treatment, have been evaluated and proven effective by [EPA]," but adds that it is "disappointed that the Department has not begun to employ these technologies in lieu of costly and inefficient techniques."

This language reinforces the growing federal preference for *in situ* technologies—like PlumeStop and SourceStop—over traditional pump-and-treat systems, which are slower to deploy, more energy intensive, and more expensive to operate. These Congressional directives strengthen the case for deployable, field-ready solutions that deliver tangible performance and offer economically and environmentally sound remediation pathways.

PlumeStop and SourceStop: Resilient by Design

Unlike pump-and-treat systems, PlumeStop and SourceStop operate passively, without the need for external power, making them inherently more resilient to blackouts and climate-related disruptions.



Graph represents comparative technology costs (2015–2115). Comparative annual and cumulative costs for the WAFB FT-02/ Clark's Marsh P&T system and hypothetical *in situ* CAC barrier meeting the same design objectives.

#5 Implement PFAS Enhanced Retention (PER): A Practical, Scalable Strategy

PlumeStop and SourceStop expand the applicability of a modernized containment strategy known as PFAS Enhanced Retention (PER). PER is a practical adaptation of the Monitored Natural Attenuation (MNA) framework tailored for PFAS, which are resistant to biodegradation.

Introduced by Adamson et al. (2025), PFAS Monitored Retention (PMR) focuses on retaining PFAS in place through mechanisms such as:

- Sorption (hydrophobic, electrostatic, and interfacial)
- Diffusion into low-permeability layers
- Retention of precursors
- Reduced mass discharge and increased contaminant travel time

Where natural retention is insufficient, PFAS Enhanced Retention (PER) becomes necessary. As Adamson et al. (2025) note, "Current PER options include injecting particulate sorbents to enhance retention."

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>
> — Adamson et al., 2025

This is where PlumeStop and SourceStop come in—providing a direct path from the conceptual PER framework to field results.

- PlumeStop is a liquid Colloidal Activated Carbon (CAC) material injected into the subsurface to form an *in situ* permeable adsorptive barrier. It binds PFAS, stabilizes plumes, and rapidly mitigates risk.
- SourceStop is a concentrated CAC formula designed to target shallow, high-loading zones, preventing PFAS leaching and ongoing plume formation. It is available in both liquid and solid formats.

Together, these tools greatly expand PER's applicability and may unlock a permanent, low-cost containment strategy at eligible DOD and federal sites.

PMR Implementation Roadmap

1. Assess Natural Retention

Evaluate site-specific mass flux, travel time, and hydrology to determine natural PFAS retention capacity.

2. Determine If Enhancement (PER) is Needed

If plume migration threatens receptors or stability cannot be assured, implement a PFAS Enhanced Retention or PER strategy.

3. Apply PlumeStop or SourceStop

Deploy CAC-based sorptive barriers in critical flux zones or source areas to enhance retention and reduce mass discharge.

4. Monitor Mass Flux and Stability

Use tools like FluxTracer® to validate retention performance and refine the full-scale remediation design.

5. Demonstrate Compliance

Link interim performance to long-term goals under PMR—providing a defensible, measurable path to site closure or long-term stewardship.

#6 Seek Proof of Results: Successful Interim Actions at DOD Sites

Former NAS Alameda, California

At former Naval Air Station Alameda, California, PlumeStop was deployed as part of a 720-foot Permeable Adsorptive Barrier (PAB) to intercept PFAS-contaminated groundwater migrating toward the Oakland Inner Harbor. This full-scale *in situ* solution was designed using passive flux meter data and site-specific modeling to target high-flux zones and account for back-diffusion from low-permeability units—a challenge common at legacy firefighting sites.

Within one year of installation, PFOS and PFOA concentrations were reduced by over 99% in most monitoring wells—demonstrating how *in situ* barriers can rapidly meet protective performance metrics while avoiding the long-term energy demands of pump-and-treat.

PFAS Reductions

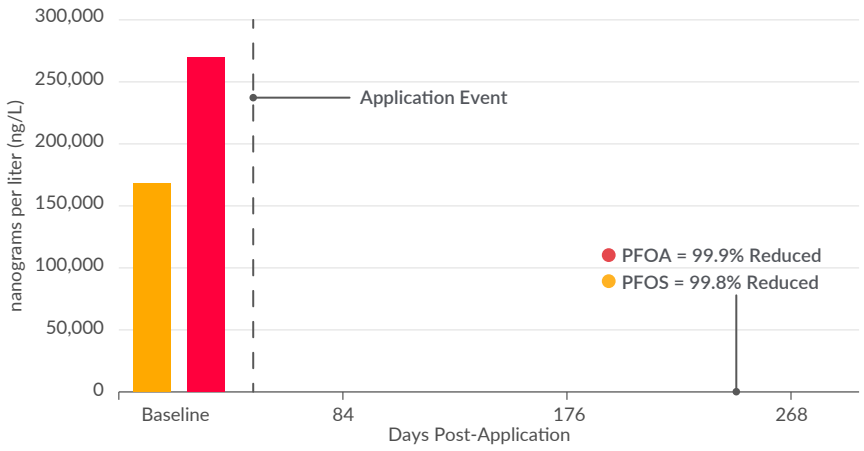
PFOS and PFOA concentration changes in barrier performance wells following PlumeStop barrier installation, showing 99.8% or greater reduction in these two primary PFAS of concern

99.8%

PFOA concentrations reduced by 99.8%

99.9%

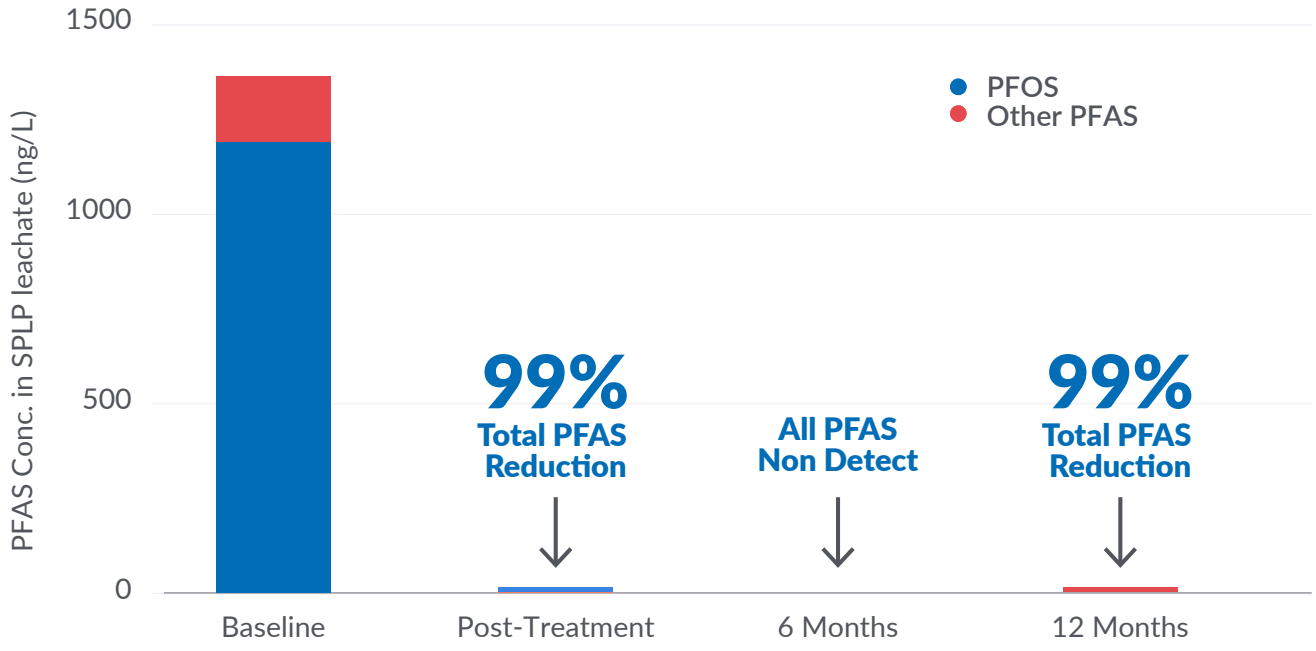
PFOS concentrations reduced by 99.9%



Camp Grayling Joint Maneuver Training Center, Michigan

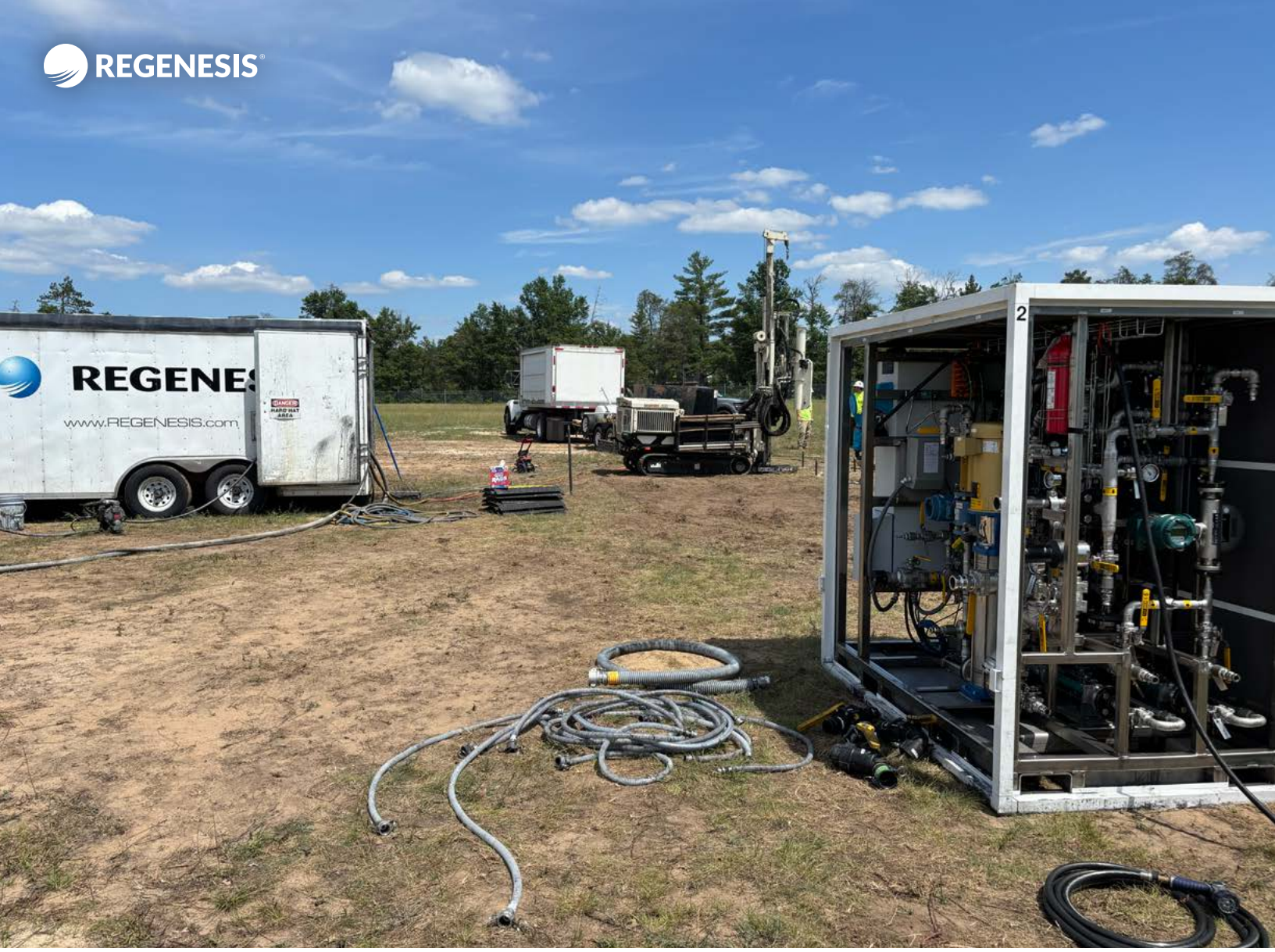
PlumeStop and SourceStop have been deployed through state-led Interim Remedial Actions to demonstrate their field effectiveness in addressing real-world PFAS contamination at Camp Grayling in Michigan.

The initial PlumeStop application, targeting a plume migrating from a bulk tank storage area, has remained effective for over five years—consistently reducing concentrations below Michigan's drinking water standards. More recently, SourceStop was pilot-tested near an AFFF source zone at the same site, delivering immediate and sustained PFAS reductions. Building on these outcomes, PlumeStop was later applied along the plume centerline as part of an Interim Remedial Action to contain further PFAS migration.



PFOS (red) and remaining PFAS concentrations (blue) in soil leachate at baseline and post-treatment following SourceStop source zone treatment at Camp Grayling Joint Maneuver Training Center, Grayling, Michigan.

Together, these projects highlight practical, cost-effective solutions that can be implemented quickly as interim actions under the PMR framework to contain PFAS migration.



#7 Act Now, Show Results: Translating Policy Mandates into Measurable Action

The DOD doesn't need to wait for final remedy selection to begin addressing PFAS contamination. With PlumeStop and SourceStop, the DOD can move now–demonstrating real progress while charting a path toward lasting compliance.

By enabling PER, these tools support a forward-looking strategy that aligns with Congressional mandates for timely action and the use of proven, cost-effective, energy-efficient and resilient remediation technologies.

REGENESIS works alongside DOD, environmental consultants, and regulatory agencies to deploy these solutions quickly, validate their performance, and maintain transparency throughout the process. By translating Congressional mandates into immediate, on-the-ground progress, this approach accelerates cleanup timelines, protects public health, and builds stakeholder and public trust.

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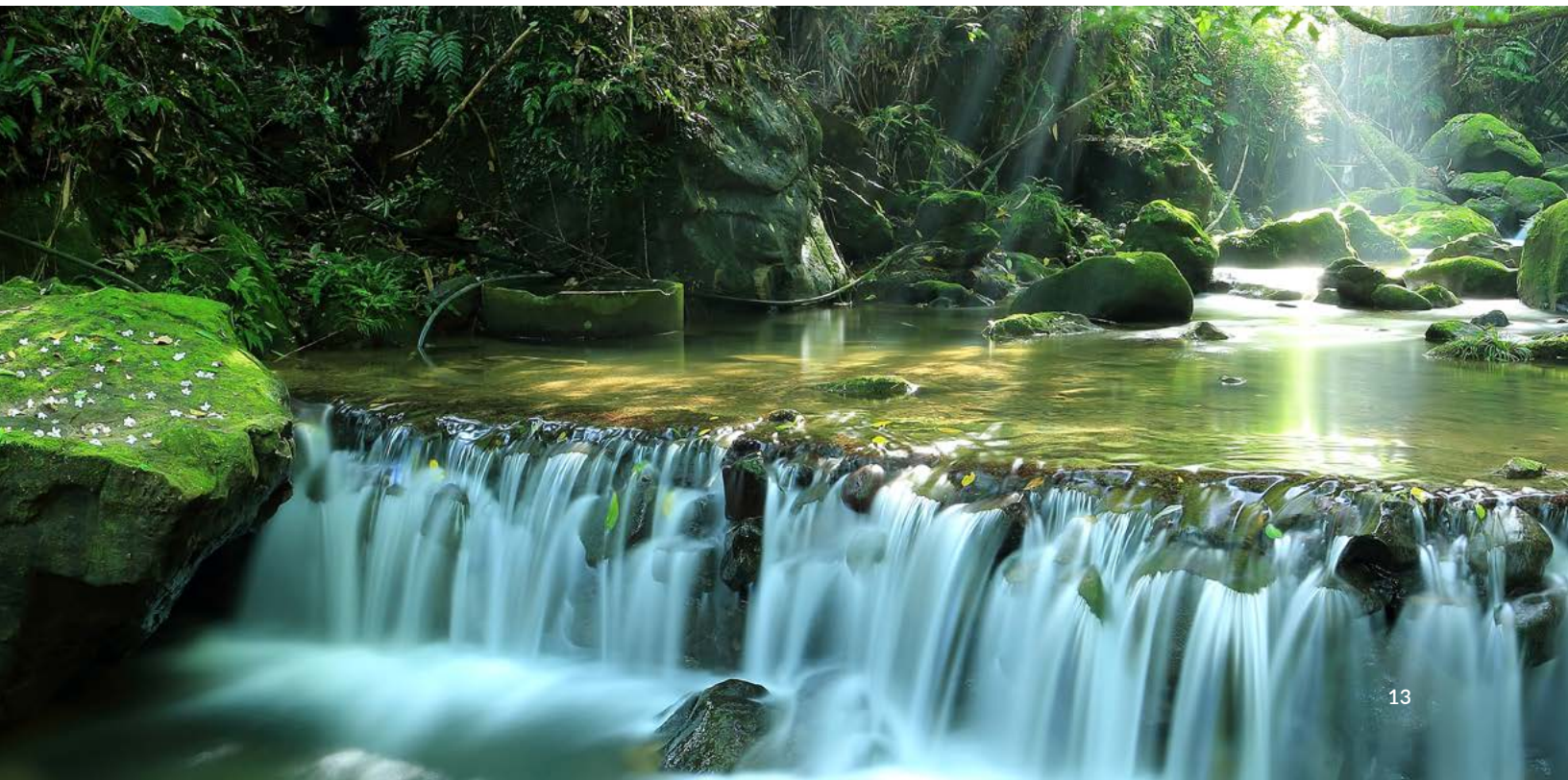
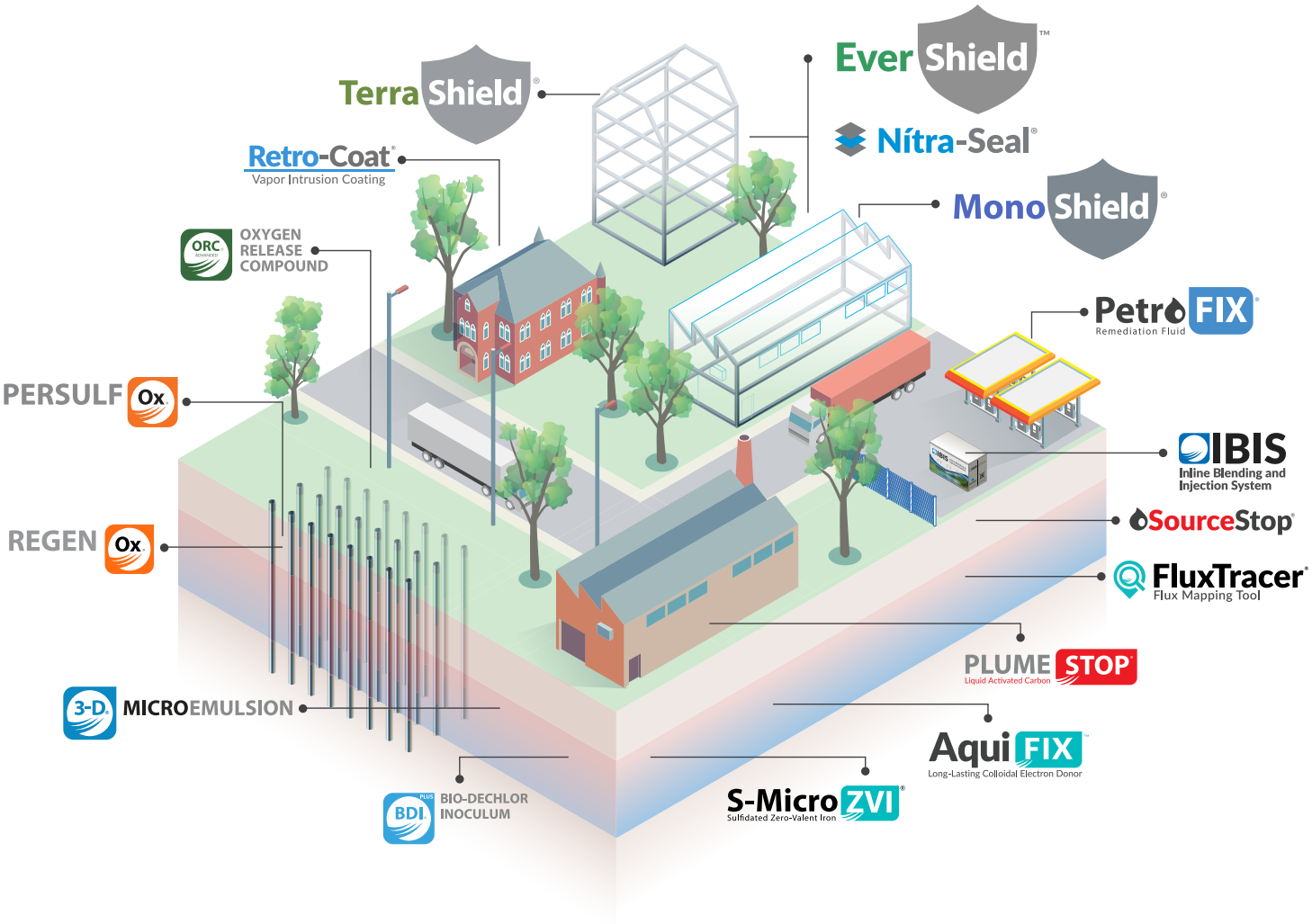




About REGENESIS

At REGENESIS we value innovation, technology, expertise and people which together form the unique framework we operate in as an organization. We see innovation and technology as inseparably linked with one being born out of the other.

Inherently, innovation imparts new and better ways of thinking and doing. For us, this means delivering expert environmental solutions in the form of the most advanced and effective technologies and services available today.

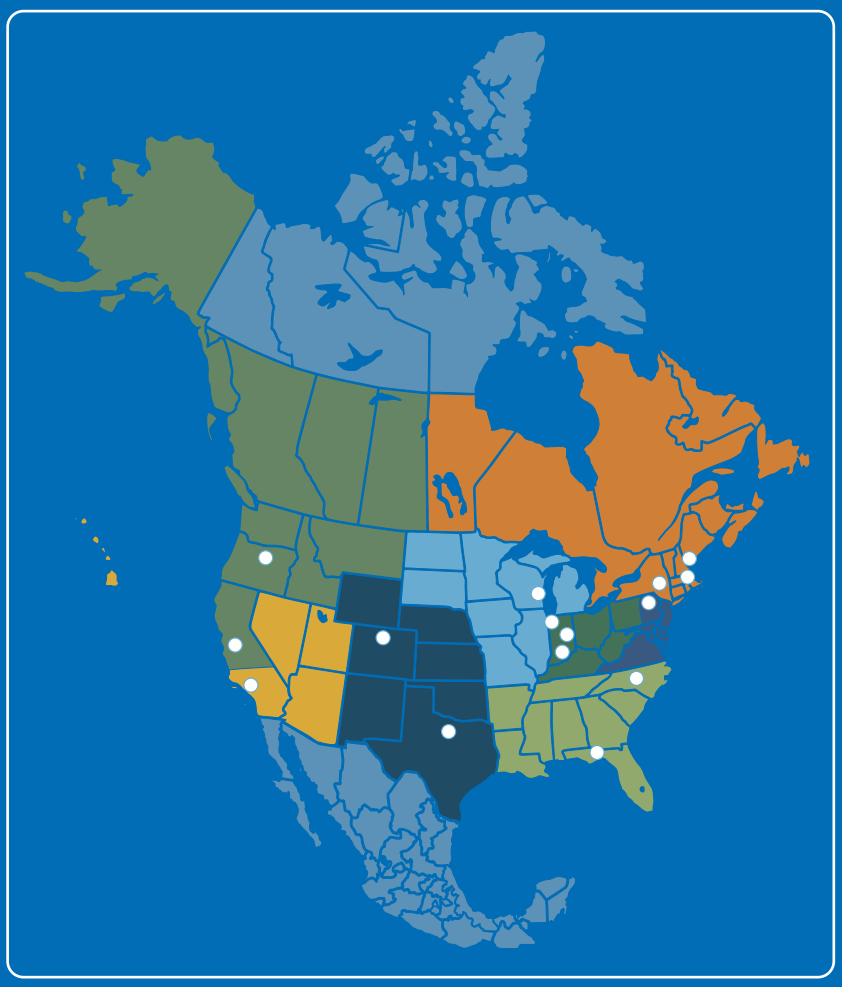
We value expertise, both our customers' and our own. We find that when our experienced staff collaborates directly with customers on complex problems, there is a high potential for success including savings in time, resources and cost.

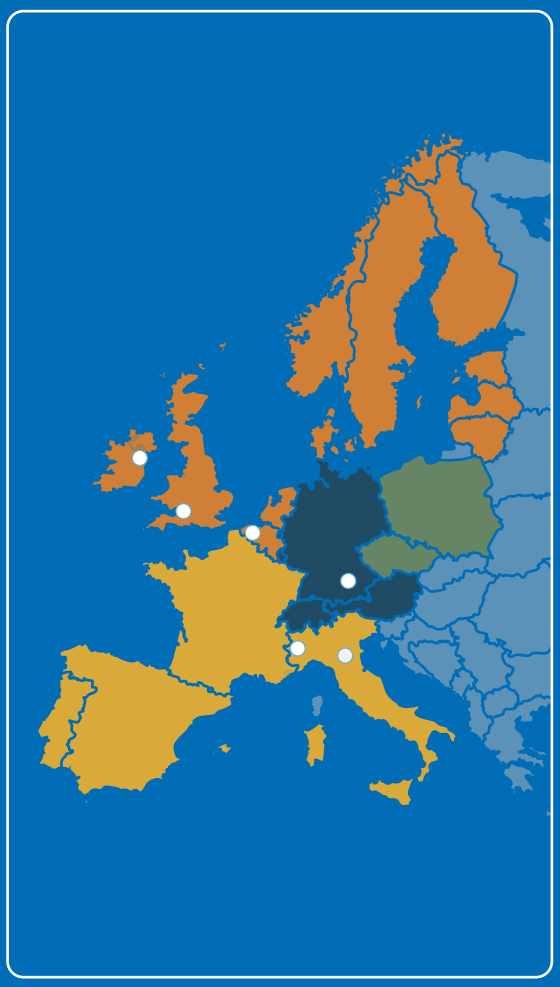
At REGENESIS we are driven by a strong sense of responsibility to the people charged with managing the complex environmental problems we encounter and to the people involved in developing and implementing our technology-based solutions. We are committed to investing in lasting relationships by taking time to understand the people we work with and their circumstances. We believe this is a key factor in achieving successful project outcomes.

We believe that by acting under this set of values, we can work with our customers to achieve a cleaner, healthier, and more prosperous world.

REGENESIS®

We're Ready to Help You Find the Right Solution for Your Site





Global Headquarters

1011 Calle Sombra
San Clemente, CA 92673 USA

Ph: (949) 366-8000
Fax: (949) 366-8090

Europe

Bath, United Kingdom
Ph: +44 (0) 1225 61 81 61

Dublin, Ireland
Ph: +353 (0) 1 853 7384

Torino, Italia
Ph: +39 338 8717925

Ieper, België
Ph: +32 (0)498 57 26 90

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