

Inline Blending And Injection System (IBIS)

Enhancing Efficiency, Accuracy, and Safety
for *In Situ* Remediation

Offered through REGENESIS Remediation Services



A New and Innovative Solution to In Situ Remediation Treatment

Over the years, numerous injectable remediation amendments have been developed to enhance *in situ* remediation efficacy for treating an array of contaminants in soil and groundwater. In contrast, the common method for mixing and applying liquid remedial amendments, has remained unchanged until now.

Traditional Mixing Approach

The most common and simplistic approach to mixing a single or multiple remedial amendments with water is batch mixing. Historically, onsite remediation specialists have manually measured liquid volumes of product and water into large mixing tanks based on prescribed design ratios. This is followed by mechanical mixing in the tanks to produce a homogeneous product mixture. If multiple products are used, this process must be repeated for each product taking time and resources away from the project and extending time onsite.

A Time-Consuming Process with Several Inherent Challenges

Batch mixing presents several inherent challenges to efficient and accurate mixing and injection. It is a time-consuming, labor-intensive, redundant multi-step process that diverts hours in the field that could be better spent managing the overall injection program, planning the next steps, confirming the distribution and placement of remedial amendments, and troubleshooting. Additionally, batch mixing is inherently messy, increasing the risk of spills and human exposure to the remediation reagents during product transfer.

Once mixed, the amendment solution is injected into a delivery point or well. During injection, remediation personnel manually record injection pressures and flow rates for each injection line at a regular frequency, typically at multiple injection lines operating concurrently. These data are tabulated and included in an injection report, usually within a week or two after project completion.

Finally, the injection data obtained during batch mixing are not instantly available. It takes time to enter, process, and deliver this information to project stakeholders, potentially causing delays in responding to new information during an injection project, slowing its progress.

"We worked closely with our field scientists and technical engineers to develop the IBIS. Applying our decades of application experience, we engineered features and benefits that deliver on improved efficiencies, a higher degree of accuracy and of course our team's safety."

Steve Barnes, MBA

Director of Remediation Operations and Services

Inline Blending Offers a New Approach to Streamline *In Situ* Remediation Projects

Inline blending, a process used by numerous industries to safely and efficiently blend mixtures of chemical and food products and maintain quality control, eliminates the need for batch mixing. This method of inline blending is now available for *in situ* remediation.

IBIS Streamlines Remediation and Improves Accuracy, Efficiency and Safety



The IBIS streamlines a remediation project by markedly improving its accuracy, efficiency, and safety. Available through REGENESIS Remediation Services, IBIS contains automated, self-adjusting, electronic controls to ensure an accurate product blend is delivered to each injection point per the design while continually logging injection information for real-time data acquisition. This frees up the onsite remediation scientists from performing rote manual labor, allowing them to focus on scientific observation of the application instead. IBIS contains numerous safety features and controls, making it the safest amendment injection system available, while its small footprint is easily moved between project work areas.

Using IBIS leads to a highly optimized remedial application, improving performance and ultimately saving time and money on your project.



Welcome to the Future of *In Situ* Remediation



IBIS elevates your remediation project to new levels of efficiency, accuracy, and safety. Groundbreaking in its design and capabilities, IBIS represents the peak of technological advancement for *in situ* remediation.

What is IBIS?

IBIS is a self-contained, compact remediation amendment delivery system that enhances the efficiency, accuracy and safety of *in situ* remediation injection applications.





How Does IBIS Work?

IBIS mixes water with liquid remediation amendments and mechanically blends them through an inline static mixer to produce a solution for direct application into a treatment zone.

IBIS contains several positive displacement pumps that connect directly to bulk reagent storage containers and a water supply. Onboard electronic automation controls align the operation of these pumps and provide an accurate ratio control for each based on a user-defined flow rate. Using mass flow measurements in formulated ratios, IBIS ensures accurate amendment dosing and blending while eliminating the need for batch tank mixing.

The accurate dosing and blending process is based on the final remedial design dose ratios, which, as part of the initial setup, is programmed into the system by the REGENESIS field scientist through an interactive and fully viewable touch screen.



What Are IBIS's Capabilities?

IBIS can process up to four remediation amendments to deliver a final blended solution for injection at up to six separate delivery discharge lines simultaneously. IBIS's electronic control features auto-adjust to regulate and maintain safe operating injection flow rates and pressures throughout the delivery system.

Injection flow rates, pressures and volume totals at each line are logged by IBIS continuously during operation. These and other pertinent injection data can be accessed in real-time to keep project stakeholders informed and guide remedial decision-making in the field without communication delays.



How Does IBIS Improve Safety During Injection?

Numerous inline safety mechanisms limit pressure exceedances by automatically adjusting pump speed as well as bypassing fluids in the case of accidental mechanical valve closure. Backflow prevention devices at each reagent pump prevent undesirable cross-contamination.



How Much Space Does IBIS Require?

IBIS has the flexibility to be configured with a footprint as little as 15 feet by 15 feet, including a designated area for connecting to bulk reagent containers and a dedicated power supply. The system can easily be moved between injection areas using a forklift.

What are the Benefits of Using IBIS?



Accelerating Efficiency

By streamlining processes, IBIS picks up the tempo of remediation applications and reduces time in the field. With an inline blending technology capable of mixing up to four products simultaneously, IBIS eliminates the labor-intensive task of one-at-a-time ingredient mixing, ensuring swift and efficient deployment of remediation amendments. By mixing inline, IBIS eliminates batch tank mixing, further accelerating the process. The result? Faster amendment changeovers, quicker setup and teardown, and unparalleled production efficiency saving time and money on your remediation project.



Improving Accuracy

IBIS improves remediation application accuracy. By automating dosing control and mixing of amendments, IBIS minimizes variability, ensuring precise matching to remediation design specifications. By providing real-time data, IBIS supplies accurate application information, eliminating human error and enhancing data reliability. IBIS can be programmed to deliver depth-discrete dosing based on contaminant mass-flux, setting a new benchmark of automated capability for *in situ* remediation.





Enhancing Safety

IBIS enhances onsite safety through automation, mitigating amendment handling and spill risks. With reduced material handling and elimination of large-volume batching, IBIS minimizes spill and containment measures, safeguarding both personnel and the environment. Automated safety controls maintain programmed operating pressures, while quieter operations reduce noise abatement requirements, creating a safer and more conducive work environment.



Compact and Efficient

IBIS eliminates the need for space consuming batch tanks, using a compact design that connects directly to bulk reagent containers and a water supply. By reducing the footprint of remediation setups, IBIS optimizes space utilization without compromising performance. It is easily moved between onsite treatment areas, reducing operational downtime.



Empowering Onsite Personnel

IBIS liberates application personnel from rote manual labor, allowing our remediation scientist greater focus on amendment delivery and placement validation. With automated batching capabilities, IBIS maximizes efficiency and productivity, driving superior outcomes in the field.



Unparalleled Data Access

IBIS empowers with real-time data acquisition. With higher frequency data collection and instantly downloadable data files, IBIS delivers unparalleled insights for improved analysis. IBIS eliminates manual entry while ensuring data integrity and reliability at every step during an injection project.

Summary of Key Benefits



Speed - Enhances Efficiency, Reduces Time in the Field

- Dedicated amendments delivery pumps, mass flow meters, and an inline static mixer eliminates one-at-a-time ingredient transferring and mixing
- Faster amendment changeover
- Quicker setup and teardown



Accuracy - Improved Matching to Design Specifications and Amendment Targeting

- Automated amendment dosing, mixing, and volume controls reduce variability
- Surety of requisite reagent emplacement
- Provides immediate modification to reagent dose design based on field optimization observations
- User interface provides real-time data for cross-checking
- Programmable for depth-discrete dosing based on mass-flux



Safety - Automation Reduces Amendment Handling and Spill Risks

- Reduced material handling
- Elimination of batch mixing reduces spill risks
- Mechanical and automated safety controls maintains safe operating pressures
- Quieter, reduced noise abatement requirements



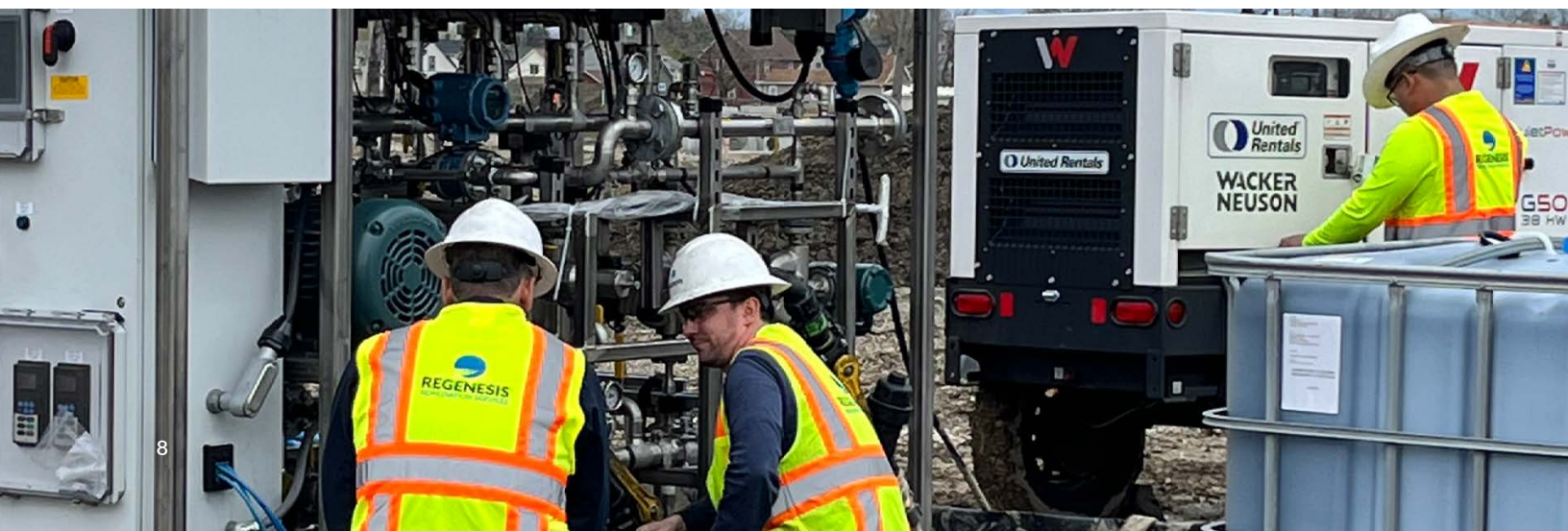
Compact and Mobile - Freeing up space, improving mobility onsite

- No space consuming batch tanks needed
- Directly connects to reagent bulk containers and water supply
- Can be moved easily between treatment areas
- Limits the impact to active site operations



Real-Time Data Collection

- Automated data collection provides the information needed to track projects in real time and make quick decisions or adjustments
- Instantly downloadable and reviewable automated data
- Elimination of human error due to manual entry

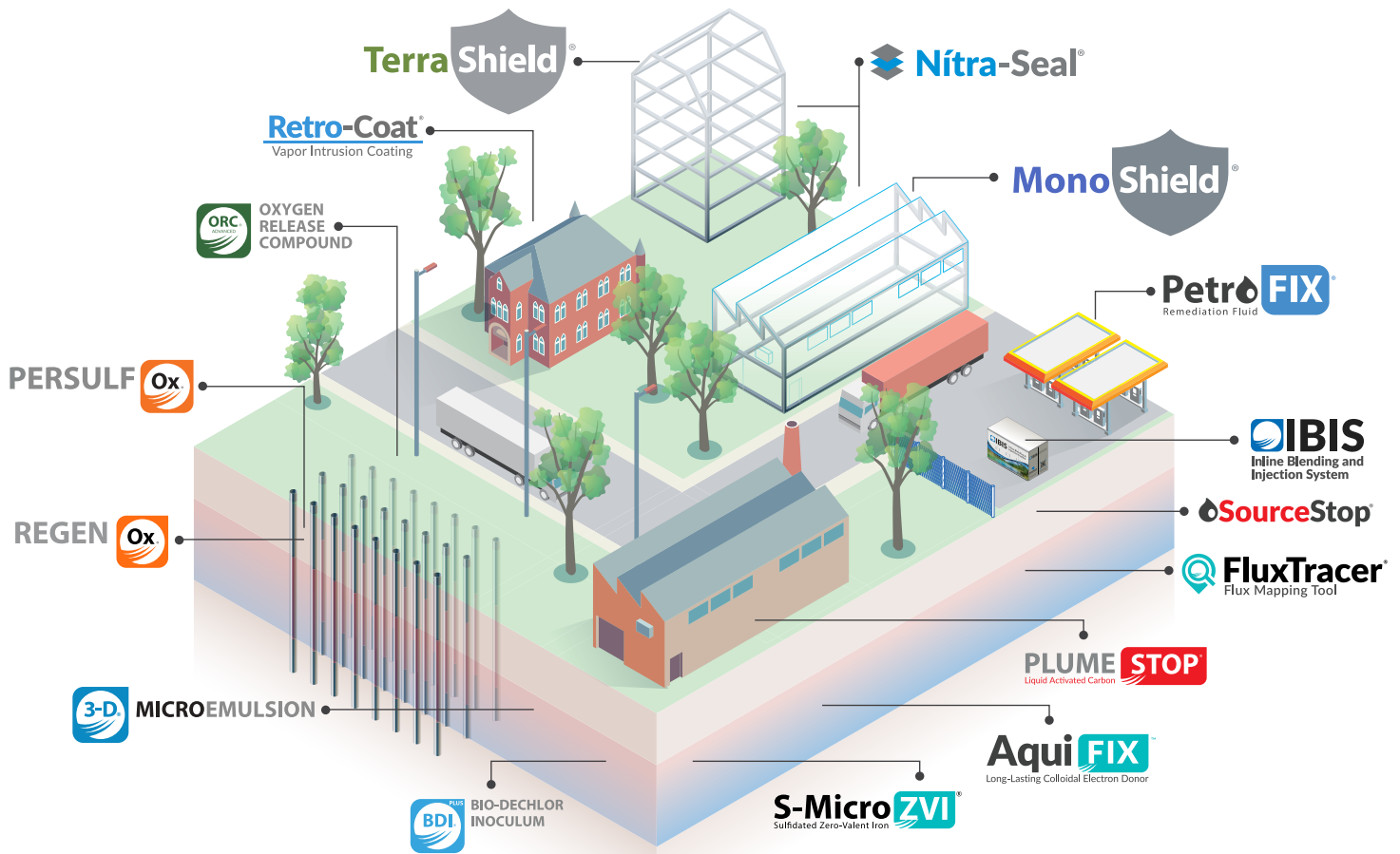


Leading with Innovation

Guide the future of *in situ* remediation with REGENESIS Remediation Services and our industry-leading IBIS technology—the latest innovation in our continuing mission to streamline and improve your injection project.

For more information, contact REGENESIS Remediation Services at <https://regenesisc.com/en/about-our-services/> or call (949) 366-8000





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.

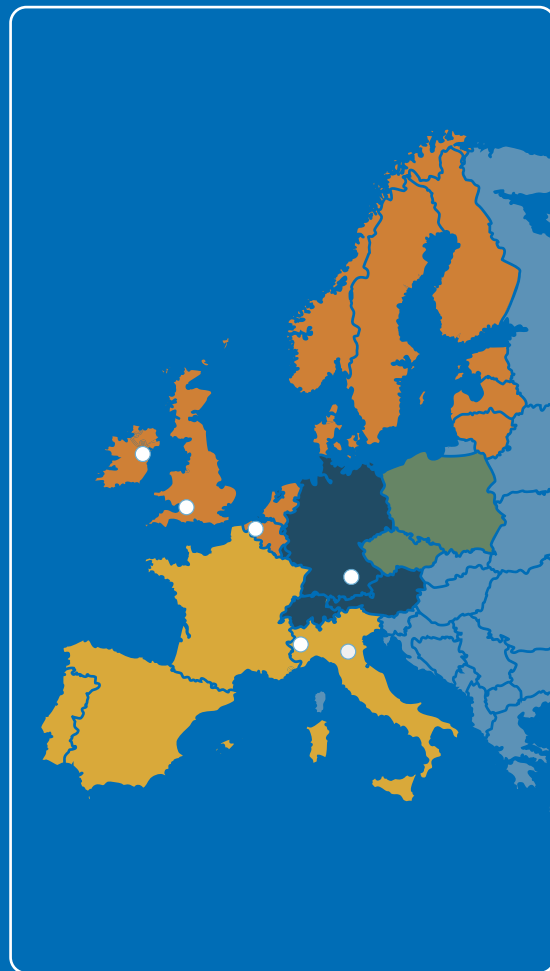
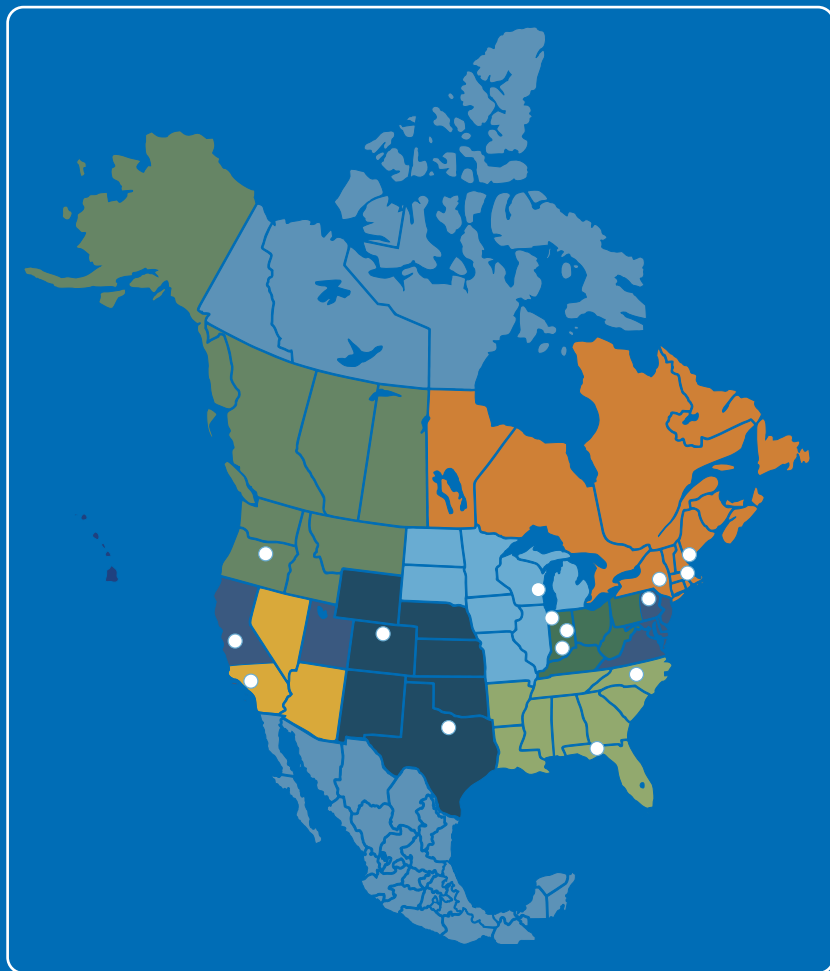
Inherently, innovation imparts new and better ways of thinking and doing. For us, this means delivering expert environmental solutions in the form of the most advanced and effective technologies and services available today.

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.

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



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