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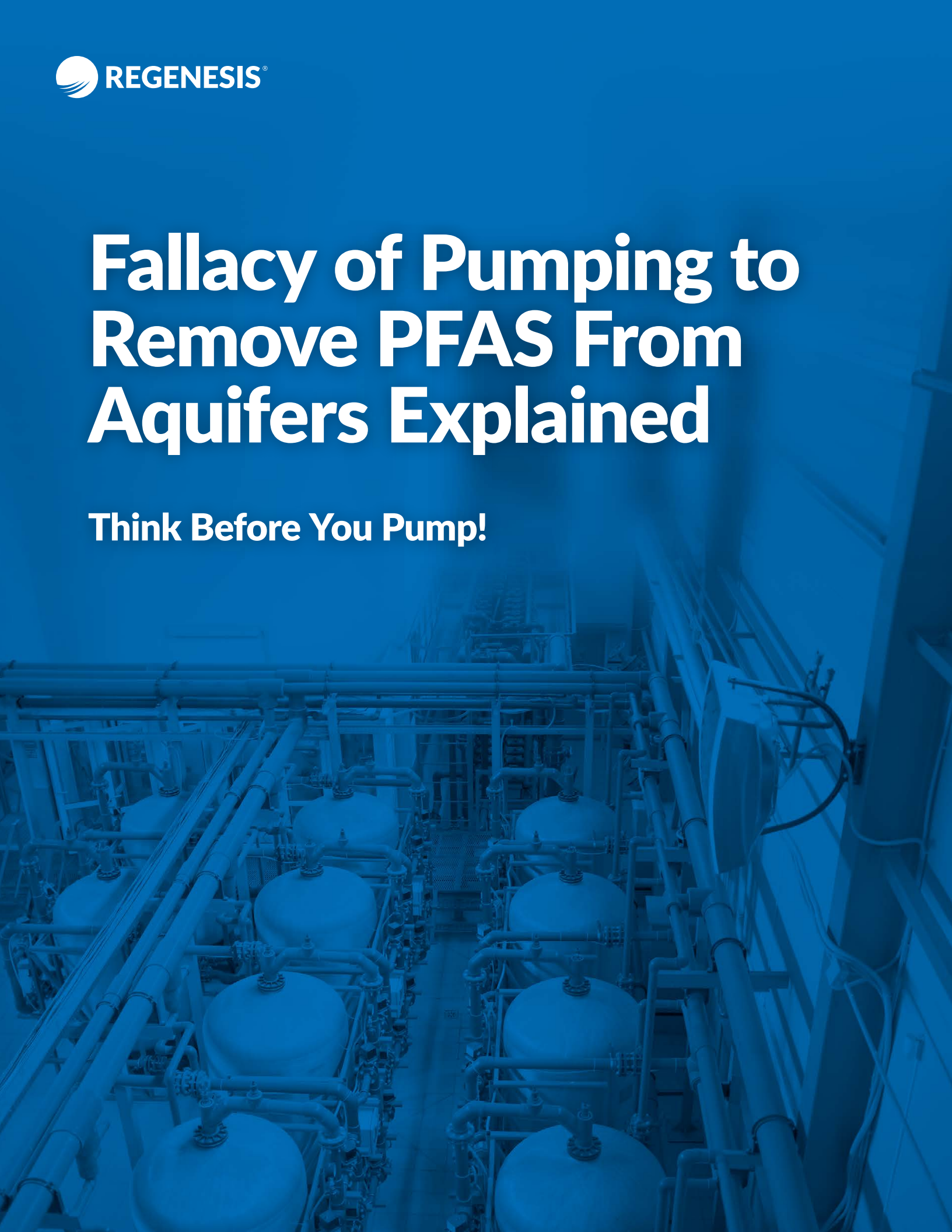
Fallacy of Pumping to Remove PFAS From Aquifers Explained

Think Before You Pump!



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Fallacy of Pumping to Remove PFAS from Aquifers Explained

Think Before You Pump!

With the USEPA recently imposing regulatory changes that will require reporting and cleanup of per- and polyfluoroalkyl substances (PFAS) contaminated groundwater, it is all the more important that site owners, responsible parties, and consulting engineering firms understand the current remedial options available to address PFAS risk. Here are three important points discussing *ex situ* (pump and treat) and *in situ* (colloidal activated carbon) remedial options, with third-party resources supporting each point.

1

Pumping Groundwater Will Not Flush the PFAS Hazard From an Aquifer.

It is well understood that pumping groundwater is not an efficient or effective practice to remediate a polluted aquifer. Over the past 40-plus years, pump-and-treat has failed as a stand-alone technique to remove chlorinated solvents (e.g., TCE) and other contaminants below regulatory levels. Key PFAS compounds are 5 to 25 times more sorptive to aquifer materials than TCE and have regulatory cleanup goals >1,000X lower (MCL of 4 ppt).

> ***It will likely require hundreds of years of pumping and treating before the PFAS hazard is flushed out of a groundwater-bearing zone, if it is possible at all.***

Pumping is simply a containment strategy, but one that also generates PFAS waste above ground.

Key Leading Academics Explain Why:

Rethinking Pump-and-Treat Remediation as Maximizing Contaminated Groundwater (Carrol, et al., 2024). summarizes pump-and-treat's ineffectiveness in removing contaminants from groundwater. This article also explains how surrounding clean groundwater is captured by pump-and-treat systems, thus maximizing the volume of water requiring above-ground treatment.

> Scan QR code to read the article.

2

Pumping & Treating Groundwater Increases PFAS Exposure Risk and Spreads CERCLA Liability.

Any use of pumping to extract PFAS-containing groundwater will result in the generation of a PFAS-containing waste every day the system is operating. This waste must be separated from the groundwater and concentrated on-site. The waste must then be transported to a disposal facility or to a destruction facility. Every step of the way, there is ample opportunity for accidental spills and releases to the environment. By implementing this form of groundwater treatment, the operator is increasing the potential risk of PFAS exposure to the public and the environment. A small amount of spilled PFAS can impact a huge volume of soil, water or air to above regulatory standards. Any waste spilled or released carries with it CERCLA liability. CERCLA liability is both Strict and Joint & Several. Avoid CERCLA liability by NOT pumping PFAS impacted groundwater.

Key Resource Outlines Potential PFAS Risks and Liability:

A recent article by three very respected leaders in the field of PFAS risk and groundwater remediation (Hall, et al., 2024) clearly spells out the routes of exposure attendant to pumping and treating groundwater, and thus the associated CERCLA liability.

See back cover for an abstract of this article.

Scan here to read the USEPA description of CERCLA liability that includes the generation, transportation, and disposal of waste or substances.

3

In Situ Filtration with PlumeStop – Proven, Low Cost, PFAS Remediation With no Waste or CERCLA Liability.

PlumeStop® colloidal activated carbon is a liquid that is injected directly into the PFAS impacted aquifer. It permanently coats the aquifer materials, converting the polluted aquifer itself into an *in situ* purifying filter. PFAS compounds are naturally removed from the groundwater as they pass through the area.

PlumeStop *in situ* filtration has enormous advantages over any form of pumping and treating PFAS impacted groundwater:

- Eliminates all risk from PFAS groundwater
- Full cost to implement is <1/3 the cost of any pump and treat
- No waste generated
- No CERCLA liability
- 98% reduction in greenhouse gas emissions
- Proven on >50 successful PFAS remediation sites world wide, including military bases, airports, industrial facilities, US EPA Superfund Sites, etc.

Key: A = Stabilization B = Stabilization/Containment C = Containment D = Containment

PFAS Remediation Using Colloidal Activated Carbon Technologies Proven to Treat Soil and Groundwater on Over 50 Sites Globally

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Pandora's PFAS Box: Life Cycle Exposure Considerations of Treatment Options for PFAS in Groundwater

Abstract

As ongoing nationwide drinking water investigations document the extent of US aquifer contamination with per- and polyfluoroalkyl substances (PFAS), the remediation of PFAS-contaminated groundwater is expected to increase in frequency and scale. Many remediation technologies for PFAS in groundwater produce waste containing PFAS. Unintended releases of PFAS to the environment arising directly or indirectly from the handling, transport, disposal, regeneration, or destruction of these wastes may lead to the redistribution of PFAS into additional environmental compartments and to potential human exposure. The risks of environmental redistribution and human exposure are exacerbated by the persistent nature of many PFAS species.

This commentary explores demonstrated and potential PFAS release, transport, and human exposure pathways for four contemporary remediation technologies for PFAS in groundwater. Three technologies – granular activated carbon, ion-exchange resins, and foam fractionation – are based on pump-and-treat. Lifecycle PFAS exposure potential for these is principally related to that of the *ex situ* wastes generated. The fourth technology involves direct *in situ* injection of colloidal activated carbon into PFAS-impacted groundwater. This generates no waste. The potential for PFAS redistribution and human exposure is therefore significantly reduced.

Webinar Recording

The Fallacy of Pumping to Remove PFAS from Aquifers & Proven Advantages of *In Situ* Remediation

In this recent webinar recording, Scott Wilson, President and CEO of REGENESIS shares information and industry-wide research on the misconceptions surrounding the use of pumping groundwater to flush PFAS from aquifers. *In situ* PFAS remediation is then explained and an overview is presented of performance expectations of this widely adopted remediation approach.

Key Advantages of *In Situ* PFAS Remediation

The US EPA's recently imposed regulatory changes will require the cleanup of PFAS-contaminated groundwater. The persistent nature of these contaminants limits the options to mechanical pump-and-treat systems or *in situ* remediation. Both approaches contain PFAS to prevent exposure risk, however, *in situ* remediation has several important advantages, including the following:

- **Zero Waste**
- **Low Cost**
- **No Ongoing O&M**
- **Proven Efficacy**
- **Sustainability**

Considering these benefits, *in situ* PFAS remediation with PlumeStop and SourceStop® will emerge as the only logical solution to prevent PFAS exposure risk at many impacted facilities and is poised to quickly become the go-to option for site owners, responsible parties, and consulting engineering firms charged with addressing historical PFAS releases. Its widespread adoption for remediating PFAS contamination in soil and groundwater ensures the greatest protection and benefits to the environment, economy, and communities worldwide.

Schedule a call to speak with one of our PFAS technical experts at www.REGENESIS.com

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