



PFAS
Perfluoroalkyl Substances



Perspective // Vision // Solution

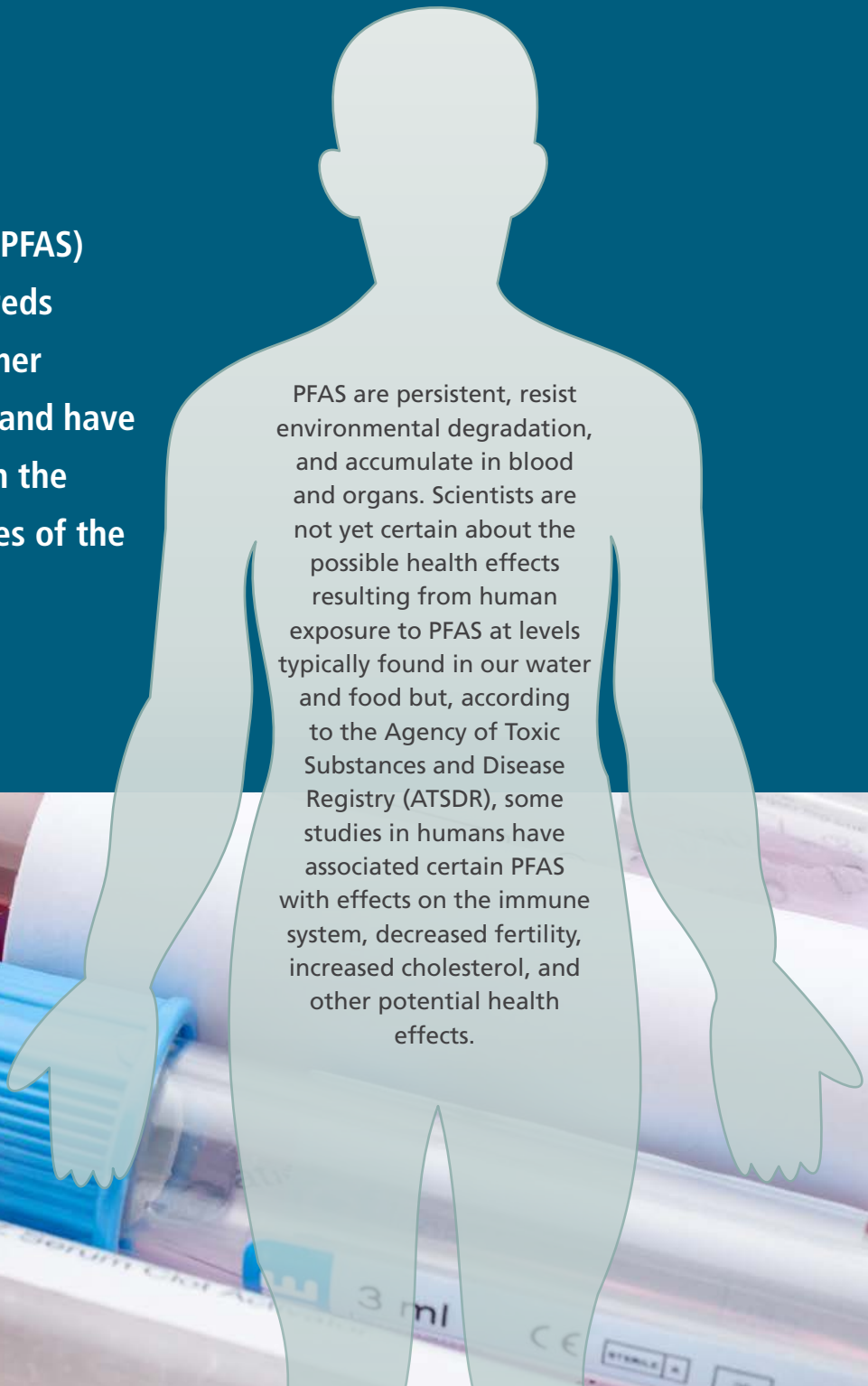
 **NewFields**





OVERVIEW

Poly- and perfluoroalkyl substances (PFAS) have been used for decades in hundreds of industrial applications and consumer products. They are chemically stable and have been found at very low levels both in the environment and in the blood samples of the general U.S. population.



PFAS are persistent, resist environmental degradation, and accumulate in blood and organs. Scientists are not yet certain about the possible health effects resulting from human exposure to PFAS at levels typically found in our water and food but, according to the Agency of Toxic Substances and Disease Registry (ATSDR), some studies in humans have associated certain PFAS with effects on the immune system, decreased fertility, increased cholesterol, and other potential health effects.

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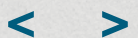
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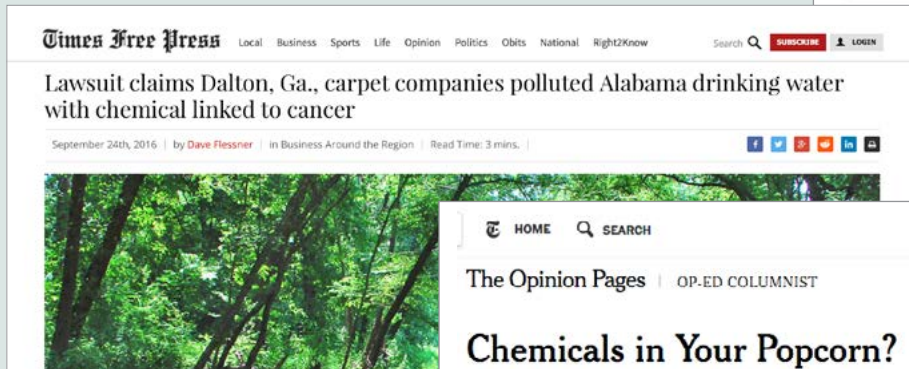
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While most of the attention has been focused on the presence of PFAS in drinking water, these compounds have also been detected in natural waters, soil, as well as mammals, fish and birds. PFAS have also been detected in a number of materials to which humans are regularly exposed, such as indoor dust and food packaging materials. PFAS have become such a concern that a major petrochemical manufacturer now requires PFAS-related training prior to granting site access for environmental investigations.



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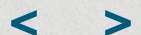
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RESEARCH

New research* from EPA, Harvard scientists, and other universities and regulatory agencies shows PFAS have been identified in tap water systems that serve 15 million Americans in 27 states as well as in more than four-dozen industrial and military sites. EPA testing found that PFAS were detected in 162 U.S. drinking water systems.

* Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water – Environmental Science & Technology

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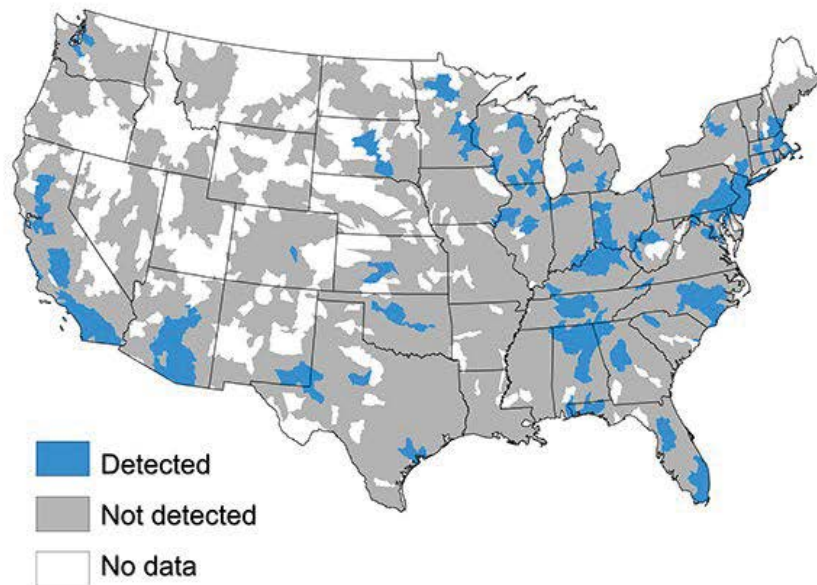
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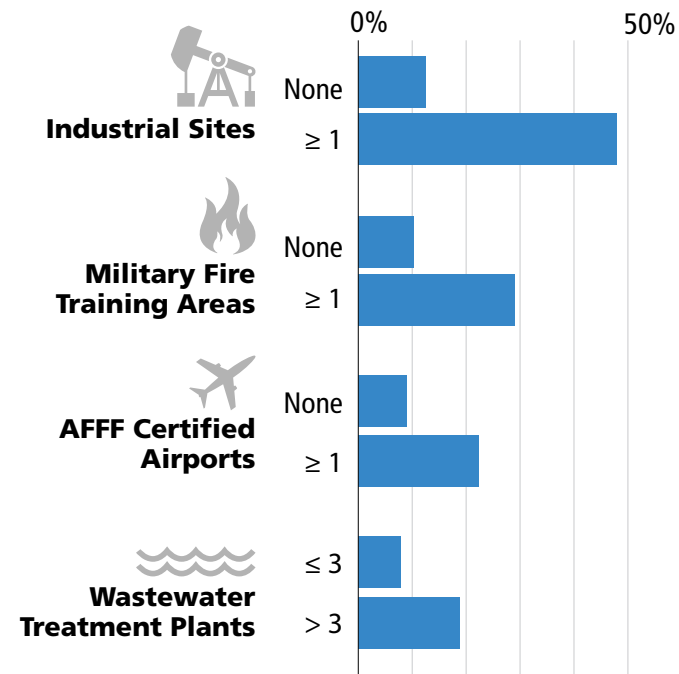
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Hydrological units with detectable PFASs



Credit: Hu et al, Environmental Science & Technology Letters

Percentage with dedetectable PFASs





REGULATORY STATUS

Though the EPA has issued health advisories, no enforceable groundwater criterion has been adopted.

On May 19, 2016, EPA established a health advisory level of 70 parts per trillion (ppt) for selected PFAS (PFOA and PFOS). The regulatory criteria for other chemicals most often encountered in water supplies are typically in the parts per billion range. The extremely low level of the PFAS health advisory poses a unique challenge to those trying to quantify and address PFAS concerns.

Over a dozen large lawsuits have been filed alleging exposure to PFAS and contamination of public water supplies. State agencies are currently deciding whether PFAS-containing materials should be designated as a hazardous waste.



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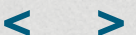
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Proper field sampling and laboratory procedures are particularly important when dealing with suspected PFAS contamination.

PFAS-containing materials/equipment (fluoropolymer plastics such as Teflon) can inadvertently introduce PFAS into the samples. This is especially critical given the low concentrations in water that are considered to be a concern (70 ppt).

NewFields works closely with analytical laboratories to direct laboratory analyses, review raw data, and generate sensitive and defensible measurements. In addition to the information available in standard methods, such as EPA Method 537, NewFields is currently collaborating with laboratories to develop modifications to existing methods to obtain forensic information that can be utilized to determine the concentration and sources of PFAS compounds through chemical fingerprinting.

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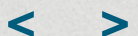
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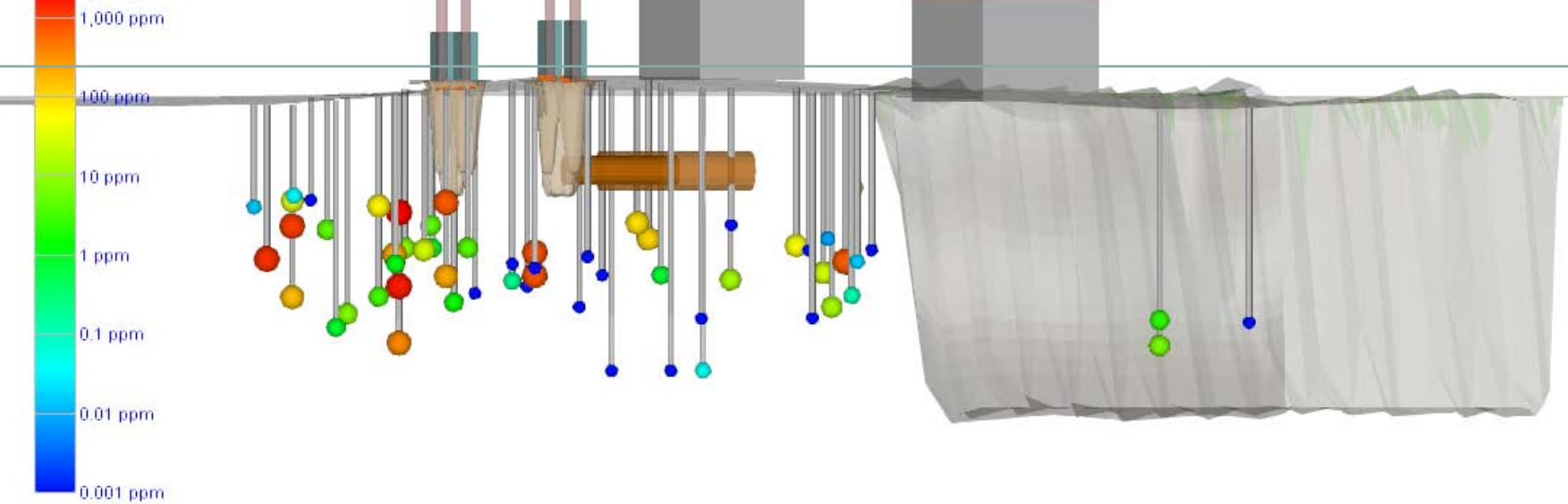
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CONCEPTUAL SITE MODELS

Forensic PFAS analysis uses chemical fingerprinting, geological and hydrogeological modeling, and GIS to develop conceptual site models and evaluate all potential sources of PFAS.

Because the use of PFAS is so widespread, companies that find themselves named as a potential source of PFAS in the environment should not assume they are the only source. Through the use of conceptual site models and statistical/geostatistical techniques, NewFields experts may be able to identify other potential sources.



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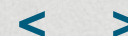
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DUE DILIGENCE

NewFields has a long history of providing due diligence assessments for refinery and chemical plants around the world. While investigating actual and potential environmental liabilities associated with these sites, it has become more and more apparent that PFAS-related issues are a very real and yet often overlooked concern. Some companies are now requiring the identification of the presence, storage and use of firefighting foam in due diligence documents.

Due to NewFields experience with PFAS-related plumes and remedial projects, we can provide much more accurate and holistic cost estimates when evaluating clients' site-specific environmental liabilities.

Considerations for due diligence include:

- The location of historical site fires or fire-training areas have unearthed potential issues that have a very real impact on the ability to sell and/or acquire facilities.
- Potential sites with fire-training areas or high potential for fires:
 1. Refineries/Terminals
 2. Chemical complexes
 3. Harbor facilities
 4. Department of Defense (DOD) facilities
 5. Airports

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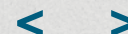
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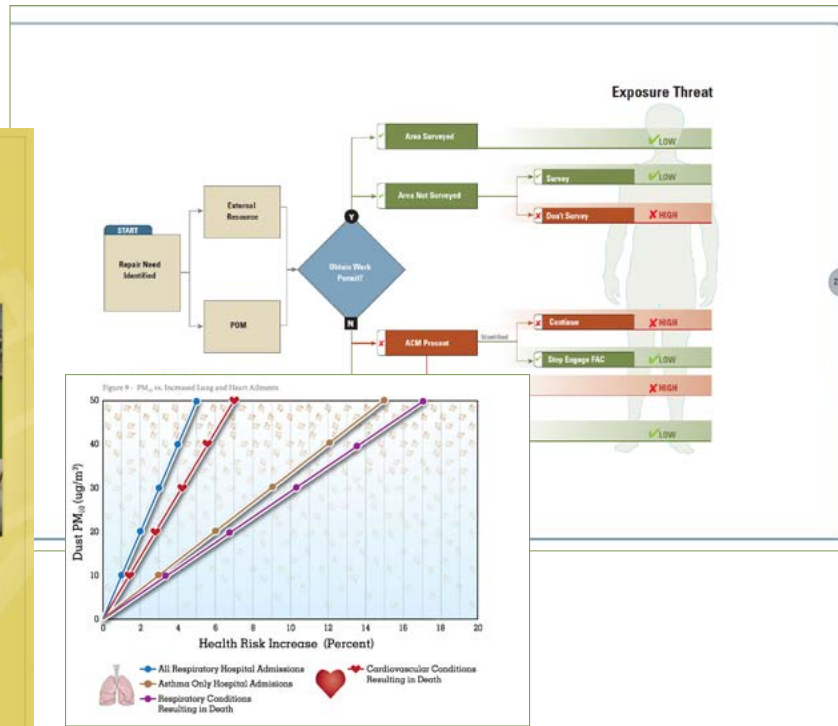
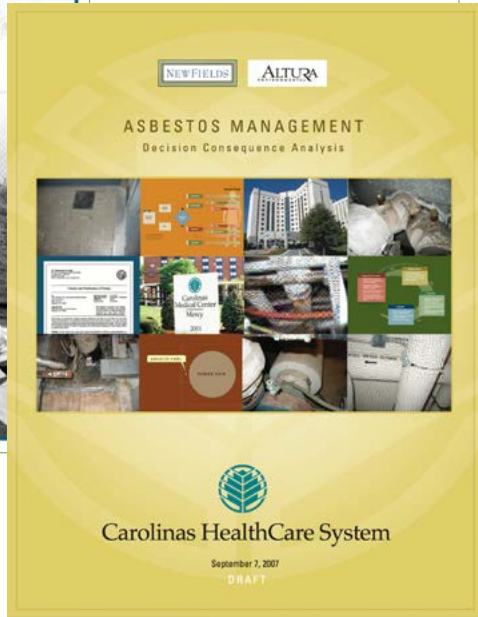
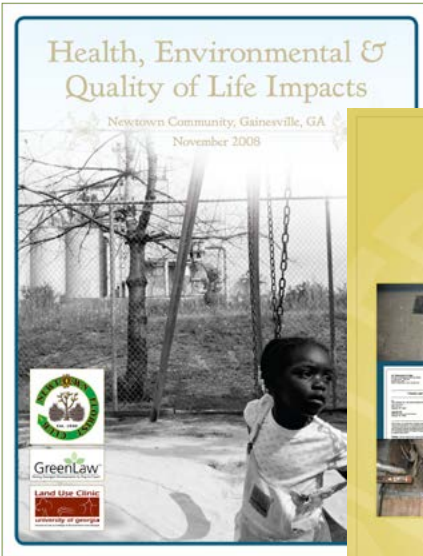
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NewFields has extensive experience with forensic fingerprinting, laboratory oversight, and conceptual site model development, all of which are critical to understanding PFAS contamination.

This experience, in conjunction with our assistance in obtaining and analyzing the appropriate data, provides scientifically based assessment to limit potential liability associated with PFAS. NewFields expertise is well-suited for providing litigation support and expert testimony related to PFAS.

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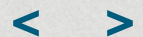
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