

# PFAS THE FOREVER CHEMICAL

## Did you know 98% of Americans have measurable levels of PFAS in their blood?

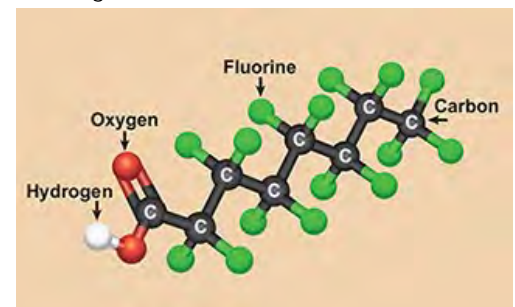
Found in plastic and metal manufacturing processes, soil and water, food wrappers, cosmetics, fire retardants, pharmaceuticals, paper manufacturing, your cooking pots and pans, filtered water, and even your body, these “forever chemicals” have rightfully earned their name. They tend to persistently stick around the environment and contaminate things they come in contact with. In this month’s edition of **The Rain Events** we are going to learn about PFAS, the detriments they have on the environment and people, and newly proposed legislation regarding these stealthy and toxic chemicals which seem to be everywhere.

**What are PFAS?** In 1938, a chemist discovered a new chemical substance called tetrafluoroethylene while working on a new refrigerant chemical. This substance had amazing non-stick, thermal and chemical resistant properties. Non-stick... *sound familiar?* You probably have a frying pan in your kitchen covered in this said material. That’s right... the discovery of this new and magical chemical produced what we now know as Teflon. However, as years have passed, it’s been discovered that this non-stick chemical and its friends are actually pretty great about sticking around and never going away. This group of lab-created chemicals which include Teflon (tetrafluoroethylene), PFOAs (perfluorooctanoic acid) and PFOS (perfluorooctanesulfonic acid) (and their salts and structural isomers) fall under the list of hazardous substances known as PFAS. According to the American Cancer Society, “PFAS have the potential to be a health concern because they don’t break down easily and can stay in the environment and in the human body for a long time. Studies have found them worldwide at very low levels in just about everyone’s blood. Higher blood levels have been found in communities where local water supplies have been contaminated

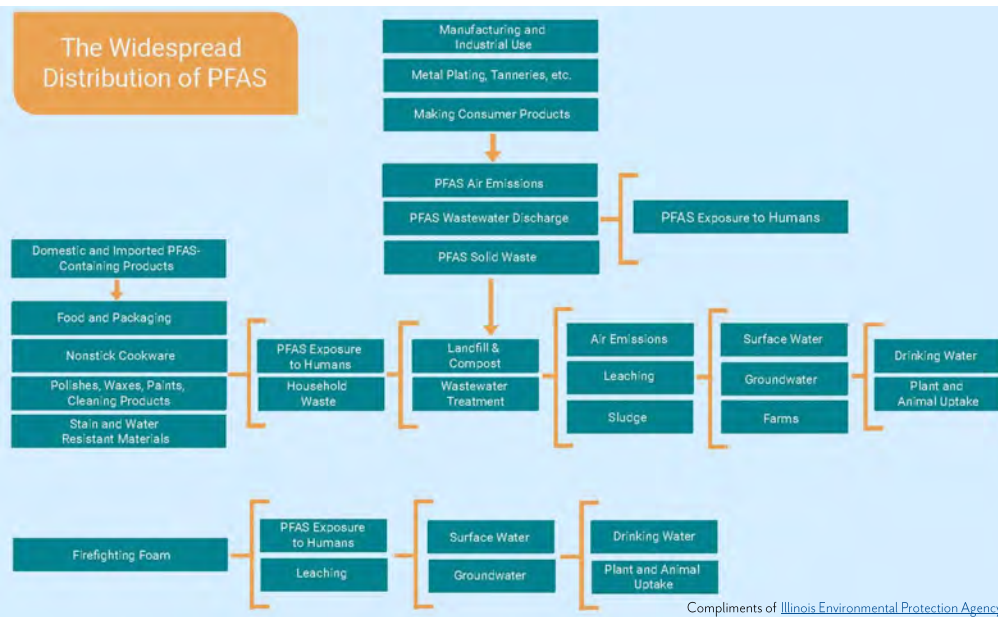
by PFAS. People exposed to PFAS in the workplace can have levels many times higher. Some PFAS, such as PFOA, can be found at low levels in some foods, drinking water, and in household dust. Although the levels in drinking water are usually low, they can be higher in certain areas, such as near industrial plants that have used these chemicals.”<sup>2</sup> According to scientific studies conducted by the U.S. EPA, it is shown that some exposure to *PFAS may be linked to harmful health effects on humans and animals—health effects including cancer, thyroid disease, decreased fertility, low birth weights, high cholesterol, and decreased immunity.*<sup>3</sup> If you’re wondering if you’ve been exposed to these chemicals, the answer is most likely “yes,” because, unfortunately, 98% of people have measurable levels of PFAS in their blood<sup>4</sup>. And while PFOS and PFOA are no longer made in the United States, they may still be used in manufacturing or be a historical contaminant. Thereby allowing bioaccumulation of these chemicals to still occur due to their longevity and widespread use and contamination.

**What is being done about PFAS?** In the past several weeks, the U.S. EPA has moved to add PFOA and PFOS to the list of

hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The proposed rulemaking regarding regulation of PFAS is intended to address per- and poly-fluoroalkyl (PFAS) contamination. This categorization of PFOA and PFOS as hazardous substances will hold private and public entities as liable for either contributing or having contributed to PFAS contamination of the environment. “The carbon-fluorine bond comprising PFAS is one of the strongest in synthetic chemistry. This feature, handy for many industrial applications, makes them exceedingly resistant to breakdown. Unlike most organic chemicals, PFAS are not known to degrade over a typical human lifespan, earning their ‘forever chemicals’ nickname.”<sup>5</sup>



Hotspots of PFAS contamination are found globally and currently remediation methods are being tested and implemented to control



the spread of this contamination to waterways and groundwater.

### Remediation Challenges and Success:

Because of the forever quality of these chemicals, the challenge is knowing how to successfully remediate contaminated areas. An approach which incorporates pumping and treating ground water through carbon, resins, and filtration media, not only is expensive and space and time consuming, but it also generates hazardous solid waste which has to be disposed of in a landfill. However, that raises another issue. Since PFAS don't break down, they tend to leach out of landfills – even ones that are fully lined and contained – and re-contaminate the environment. Burning PFAS hazardous waste, instead of diverting to a landfill, hasn't been studied enough to know if contaminants can be incinerated safely without generating air pollution. Currently, the most successful remediation technique being used in PFAS cleanups is an injection of colloidal activated carbon which immobilizes PFAS on contact and holds it in place to stop the spread. The leading product in remediation success stories is **PlumeStop** – activated carbon from milled coconut fiber wrapped in organic polymer used to filter out the PFAS. This liquid activated carbon is injected in the ground near or in an aquifer where it coats the soil surfaces and immobilizes the PFAS contamination plume, purifying groundwater in affected areas. Studies have shown that these treatments are successful in treating and reducing contamination for a projected 60+ years, and current projects have received encouraging lab results indicating containment of these forever chemicals.<sup>6</sup>

**How does this affect me?** According to

a recent publication by Downey Brand who practices Environmental Law, "Assuming U.S. EPA adopts the [proposed rulemaking](#), the rule will require facilities to immediately report "releases" of PFOA and PFOS that meet or exceed the reportable quantity provided for those substances (one pound or more of PFOA or PFOS within a 24-hour period). Such a release may not necessarily lead to a clean-up action or the listing of a release site under the National Priorities List (NPL), but U.S. EPA believes such actions will lead to better waste management and treatment practices, as well as the promotion of privately financed cleanups."<sup>7</sup> So the best way to move forward is first of all awareness of why PFAS are a concern (check out this [2022 Storm Water Awareness Week workshop](#) which will be talking all about PFAS). Second, awareness of what products or manufacturing practices include these forever chemicals. And lastly, an evaluation of your facility to see whether or not you are a possible source of contamination. According to the U.S. EPA, PFAS can be found in the following industrial avenues:

**Drinking water** – in public drinking water systems and private drinking water wells.

**Soil and water at or near waste sites** - at landfills, disposal sites, and hazardous waste sites such as those that fall under the federal Superfund and Resource Conservation and Recovery Act programs.

**Fire extinguishing foam** - in aqueous film-forming foams (or AFFFs) used to extinguish flammable liquid-based fires. Such foams are used in training and emergency response events at airports,

shipyards, military bases, firefighting training facilities, chemical plants, and refineries.

**Manufacturing or chemical production facilities that produce or use PFAS** – for example at chrome plating, electronics, and certain textile and paper manufacturers.

**Food** – for example in fish caught from water contaminated by PFAS and dairy products from livestock exposed to PFAS.

**Food packaging** – for example in grease-resistant paper, fast food containers/wrappers, microwave popcorn bags, pizza boxes, and candy wrappers.

**Household products and dust** – for example in stain and water-repellent used on carpets, upholstery, clothing, and other fabrics; cleaning products; non-stick cookware; paints, varnishes, and sealants.<sup>8</sup>

So what does this mean for NPDES permit holders? While case studies<sup>9</sup> show that storm water PFAS concentrations are well within the acceptable limits, and that ground water concentrations are the primary concern, it raises the question... will PFAS limits come to storm water permits? At this point, only time will tell. New regulations and sampling requirements may be added down the road, but as of right now, we're not there yet. However, as a way of practically applying this knowledge and starting to take preventative measures for your facility, it's a good idea to start looking at your industrial sources and consider non-PFAS alternatives.

<sup>1</sup><https://ehp.niehs.nih.gov/doi/10.1289/ehp.10598>

<sup>2</sup><https://www.cancer.org/healthy/cancer-causes/chemicals/teflon-and-perfluorooctanoic-acid-pfoa.html>

<sup>3</sup><https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>

<sup>4</sup><https://ehp.niehs.nih.gov/doi/10.1289/ehp.10598>

<sup>5</sup><https://earth911.com/business-policy/pfas-contaminant-explainer/>

<sup>6</sup>[https://regeneration.com/en/remediation-products/plumestop-liquid-activated-carbon/?gclid=CjwKCAjw1ICZBhAzEiwAFvFhJ-SA4hE3TxaWu2mYltp9eVnJSBsXld5O7IVUGabCJgNgRety5RlhoCRcsQAvD\\_BwE](https://regeneration.com/en/remediation-products/plumestop-liquid-activated-carbon/?gclid=CjwKCAjw1ICZBhAzEiwAFvFhJ-SA4hE3TxaWu2mYltp9eVnJSBsXld5O7IVUGabCJgNgRety5RlhoCRcsQAvD_BwE)

<sup>7</sup><https://www.downeybrand.com/legal-alerts/u-s-epa-pushing-ahead-to-designate-pfoa-and-pfos-as-superfund-hazardous-substances/>

<sup>8</sup><https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>

<sup>9</sup><https://www.casqa.org/asca/pfas-stormwater-what-we-know>

## The Rain Events

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- Interview with Brandon Roosenboom. Writer of the New Construction General Permit
- Municipal Good Housekeeping & Pollution Prevention
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- IGP Basics Part 1: What is the IGP?
- IGP Basics Part 2: What am I expected to do?
- Mishaps in a Misshaped World
- IGP Basics Part 3: "How to" tips of Sampling
- Navigating IGP TMDL Compliance & Treatment Options
- How Compost-based BMPs Help California Cities Meet Their Organics Diversion Requirements
- Active Treatment Systems: "Ask the Professionals"
- **NEW** Permeable Surfaces: Providing Stormwater Solutions in an Urban Setting
- Reinventing Stormwater Management for the 21st Century
- Caltrans Water Pollution Control Winterization Planning and WPC Manager Training
- Jobsite Safety for Storm Water Professionals
- Construction Sandbox - Sediment Control
- Construction Sandbox - Erosion Control
- Construction Sandbox - Good Housekeeping / Spill Prevention
- Stormwater Treatment Systems
- **NEW** The 2021 Urban Green Infrastructure Designer Survey - Results and Lessons Learned
- Construction Sandbox - Sediment Control (Online)
- Construction Sandbox - Erosion Control (Online)
- Construction Sandbox - Good Housekeeping / Spill Prevention (Online)
- Working in Water: The Forgotten BMP
- Initiate Water Reuse & Cease Pool Filtration Cleaning Contamination
- How to Winterize Construction Sites
- Municipal Construction Inspections - Lessons Learned from 2021/22
- Salmon in the Classroom Program Hooks Students to River Stewardship

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# *Storm Water Contest...*

Each month, we invite our readers to participate in a contest to test their knowledge of the Industrial General Permit and show their storm water compliance program. We enter all submittals to our monthly newsletter question into a drawing and one person is selected at random to receive a \$25 gift card. Last month's contest question was:

*What is the best way to remove nutrients from storm water?*

Congratulations to Temple who replied "*To not let them come into contact with stormwater in the first place*" to our contest question from last month! Temple, we hope you enjoy a delicious treat from Starbucks!

## *...This Month's Contest*

*What are PFAS found in?*

We need industrial storm water sleuths to help us with this month's question. Submit your answers by Friday, October 7th. Email your answer to [jteravskis@wgr-sw.com](mailto:jteravskis@wgr-sw.com). One winner will be selected by a random drawing to receive a \$25 gift card to Panera Bread.

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