

PFAS IN YOUR WELL

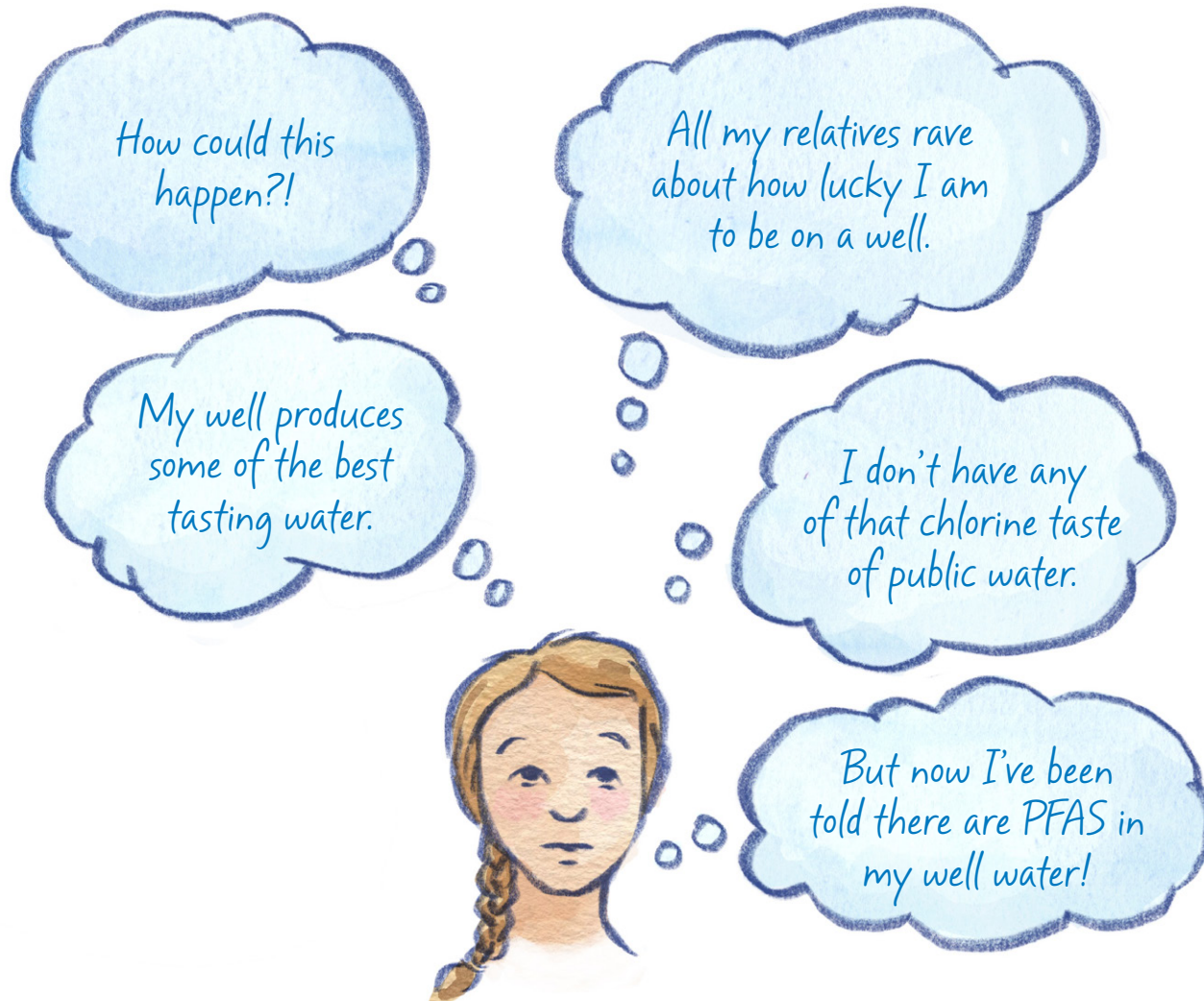
How they got there.
What you can do about them.

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Overview



If these are some of the thoughts running through your head, you're not alone.

Thousands of well owners are finding out that they have PFAS in their wells, and they are not happy. They are frustrated that they don't know what PFAS are, how they got there, or what they need to do about it.

So take a deep breath and read on. Hopefully by the end of this eBook you'll understand a bit more about PFAS, what happened, and more importantly, you'll learn what your options are and feel empowered to take action to protect your family's health.

Chapter 1

What Are PFAS?

Many of you may have sat through hours of presentations or done your own research about PFAS. But for those who are unsure about what PFAS are, here is a basic overview:

PFAS (PerFluoroAlkyl Substances) are man-made chemicals that have been manufactured since the 1940s. They have been used extensively in common household products such as nonstick pans, food packaging (pizza boxes, microwave popcorn bags, etc.), clothing and upholstery protectors (GoreTex, Scotchgard, etc.), and some personal care products and cosmetics. PFAS were also an ingredient in fire-fighting foam.

PFAS do not break down in water or soil They may be carried over great distances by wind, rain or groundwater.

PFAS are nearly indestructible They have an extremely strong, stable chemical bond of carbon and fluorine atoms, which makes them heat-resistant and water- and oil-repellent. This is why they've been used in such a wide variety of industrial and commercial products.

Much of the contamination that is being discovered today may have originated years ago, before suspicion of the damaging environmental and health effects was raised.

There are over 4,700 different PFAS chemicals Within this really big family of chemicals, we have quite a bit of information about two in particular: **PFOS** and **PFOA**.

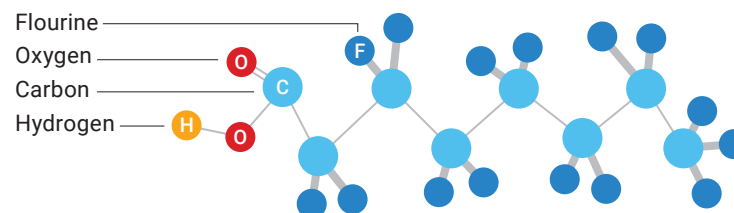
PFOS and PFOA are no longer produced in the U.S., in part because we've learned quite a bit about the negative health effects of exposure to them. But Americans continue to be exposed to these chemicals today:

- They are still produced in other countries
- They can still be found in domestic and imported products
- PFOS and PFOA produced decades ago linger in our soil and water.

While we don't know as much about other PFAS chemicals, they all have this feature in common: The chemical bonds that hold them together don't break down under normal circumstances. Because of that, we refer to this family of substances as "forever chemicals."

What is a "Forever Chemical"?

Forever chemicals have extremely strong bonds of carbon and fluorine that don't break down over time, allowing them to build up in water, soil, and our bodies.



Chapter 2

How Did PFAS Get Into My Well?

The main sources of exposure to PFAS, particularly PFOA and PFOS, are by consuming food and drinking water that is contaminated with these chemicals.

PFAS may have entered groundwater from:

- Industrial facilities where PFAS were produced or used in manufacturing
- Firefighting foam used for training or car accidents
- Leachate from landfills and informal dumping sites
- Agricultural, commercial, and residential application of PFAS-contaminated fertilizers

Ultimately, the PFAS end up in the groundwater that directly feeds into private wells.

The frustrating part is that, even with all the current analytical tools, it is very hard to identify exactly where the source of PFAS originated.



Sources of PFAS in groundwater

Unregulated PFAS releases from industrial operations enter the environment through air emissions and discharges to surface water and ground water.

Many “natural” residential and commercial fertilizers, processed from nutrient-rich waste-water treatment residue, contain PFAS.

Firefighting foams which may contain PFAS are used at airports, military bases and training sites. Runoff containing PFAS migrates through soil into surface and groundwater.

Wastewater from PFAS-contaminated waste may leach from landfills into groundwater or enter surface water; PFAS may remain even after landfill leachate treatment.

New technologies have enabled recent detection of PFAS in drinking water supplies. Water treatment facilities that hadn't previously known of PFAS in their water supplies are determining the most effective treatments for removal.

PFAS continue to be used in common household products such as stain repellents and non-stick cookware. Their use contributes to PFAS exposure in humans and drinking water, source water and ground water.

Source: American Water Works Association

Chapter 3

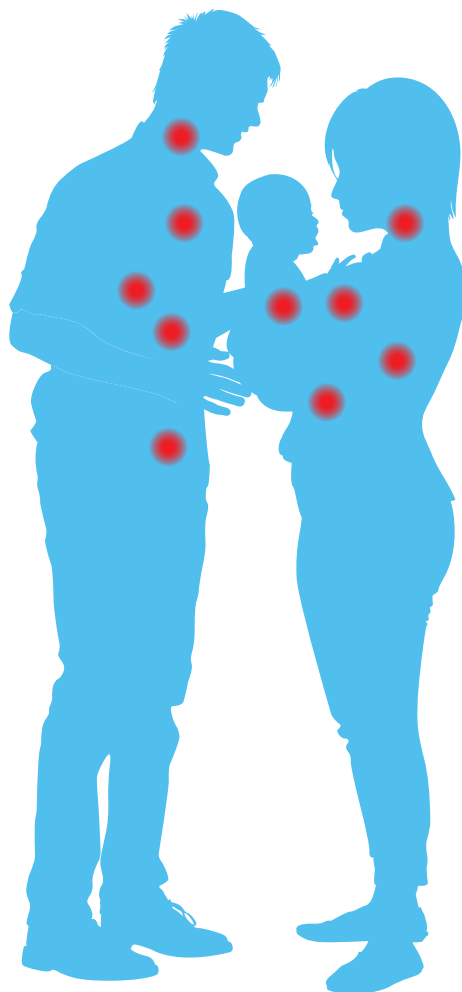
Health Effects of PFAS

PFAS either are, or degrade to, persistent chemicals that accumulate in humans, animals and the environment. This adds to the total burden of chemicals to which people are exposed and increases the risk of health impacts. Of the relatively few well-studied PFAS, most are considered moderately to highly toxic, particularly for children's development.

People most at risk include:

- Those exposed to high levels of PFAS
- Children
- The elderly
- Other vulnerable populations
- Those exposed to low levels of PFAS over a long period of time

PFAS Cause health issues throughout the body.



Cancer

- Breast cancer
- Kidney cancer
- Testicular cancer

Pre- and Post-Natal

- Low birth weight
- Longer time to conceive
- Increased risk of high blood pressure and preeclampsia in pregnant women

Chronic Damage

- Immune system response
- Reduced vaccine response
- Liver damage
- Thyroid disease
- Increased cholesterol levels
- Increased systemic inflammation

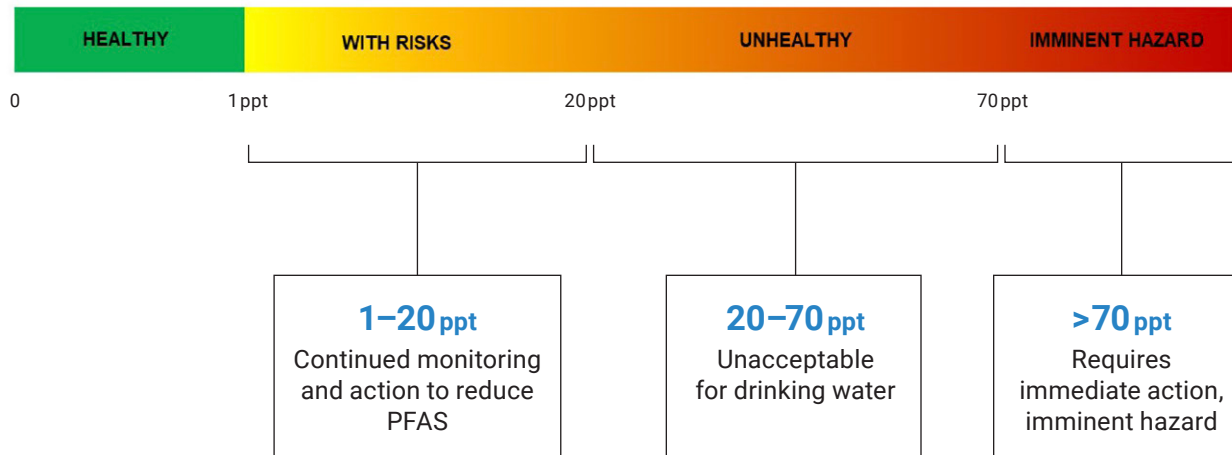
Sources: US National Toxicology Program, (2016); C8 Health Project Reports, (2012); WHO IARC, (2017); Barry et al., (2013); Fenton et al., (2009); and White et al., (2011).

Health Risk Scale for PFAS

When it comes to establishing standards to protect people from the adverse health effects of PFAS in drinking water, New Hampshire and Massachusetts are leading the way in the U.S. by setting Maximum Contaminant Levels for PFAS in water.

The scale below can help you evaluate the impact of PFAS in your well or town.

Health Risk Scale



More and more homeowners are discovering PFAS in their water supplies.

Any amount of PFAS that accumulates in the body isn't good.

These "forever chemicals" are not going away anytime soon.

Chapter 4

Private Wells: The Good and the Not-So-Good

There are many benefits of owning a private well, but with these benefits comes the responsibility for managing all aspects of your drinking water source — your well. You, alone, are responsible for testing, maintenance and ensuring the overall health of your drinking water. This is an important responsibility because the quality of your drinking water directly impacts your family's health.

The good:

- You're not dependent on a public utility service
- No water bills
- No chlorine or fluoride additives
- No interruptions from water main breaks

The not-so-good:

- You're responsible for maintaining your water system and managing repairs and repair costs
- You're responsible for being aware of current groundwater quality issues and their potential impact on your family's health
- Your home value can be affected by not maintaining your water system



Chapter 5

Protecting Your Family

Until you have a permanent solution in place, you and your family will continue to be exposed to the harmful effects of PFAS.

The good news is that there are steps you can take now:

- 1 Stop drinking water from your faucets.**
- 2 Don't use ice from your freezer's ice maker.**
- 3 Don't use the water for cooking.**

These three actions will stop the “forever chemicals” from entering and accumulating in your body. **However, you will need a more permanent solution—and you have options!**

Permanent PFAS solutions

Option A Rely on bottled water indefinitely.

Option B Install a home water filtration system to protect your family now.

The comparison chart below provides an overview of bottled water vs. home water filtration. We dive into the details of each of these options on the following pages.

Bottled vs. Home Filtration	Bottled Water	Home Filtration
PFAS-free water	Not always	Yes
Convenient	No	Yes
Unlimited healthy water	No	Yes
Environmental impact	Plastic waste, manufacturing waste and pollution, transportation pollution	No
Installation cost	No	\$750 – \$3,000
Cost/year (approx.)	\$1,113*	\$100 – \$200
Removes other contaminants	No	Yes
Removes all contaminants year after year	No	Yes

*See “The Cost of Bottled Water” on .page 10

Option A: Bottled Water

Not all brands are PFAS-free Most bottled water companies do a good job of producing a consistent, quality product. A few have voluntarily tested their source water for PFAS and have not found any issues. However, there are brands that have been identified as containing PFAS. If you decide to use bottled water, do your research to find a brand that has been confirmed to be PFAS-free.

It's a lot to carry If you decide to purchase bottled water from a store, you will still need to load it in your car and lug it into your home, week-after-week.

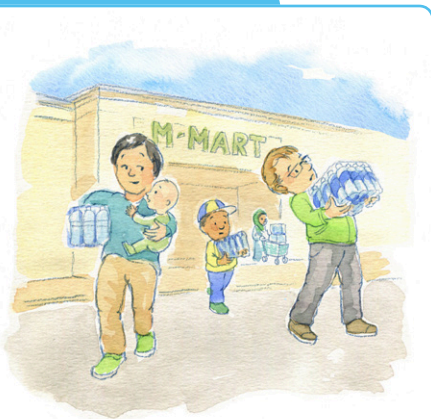
The Cost of Bottled Water

The average cost of bottled water is \$1.22 per gallon.

A family of four typically consumes about 2 1/2 gallons a day, or just over 912 gallons per year.

That adds up to about \$1,113 per year.

Over the course of 3 to 5 years, **you could end up spending as much as \$5,500 dollars or more on bottled water.**



Bottled Water vs. The Environment*



The entire life cycle of bottled water uses fossil fuels, contributes to global warming, and causes pollution.



More than 17 million barrels of oil are required to produce enough plastic water bottles to meet America's annual demand for bottled water.



According to the Container Recycling Institute, 86% of plastic water bottles used in the U.S. become garbage or litter.

Option B: Home Filtration

Going beyond PFAS removal When we think about home filtration we first need to step back and think about the link between the water we use to drink and bathe, and our family's health. We like to refer to this as the "**Water-Health Connection.**"

Water is responsible for moving nutrients and oxygen to and from every cell in our body. It enables our organs and endocrine system to function properly. Low levels of PFAS and other contaminants in the water can have long-term health effects.

Unfortunately, many of these contaminants are colorless, odorless and tasteless, which means that we can be exposed to them over long periods of time without ever knowing it until a serious health issue arises.

Home filtration systems can remove PFAS and many more contaminants that you may not yet be aware of in your well water.



A home water filtration system provides many benefits in addition to removing PFAS!



*Source: Harvard University Office of Sustainability

Chapter 6

Home Filtration Systems

There are two categories of home water filtration systems:

Point-of-Entry (POE)

Also known as a “whole house system,” POE filtration is installed in the basement where the water enters your home and filters all the water used in your house.

Point-of-Use (POU)

Usually installed under your kitchen sink and only filters at one location in the home. Options include Reverse Osmosis (RO) and Carbon Block Under Sink Filtration.

This comparison chart outlines the features of POE and POU systems. We break down each of these systems in detail on the following pages.

Point-of-Entry vs. Point-of-Use	POE	POU	
		Reverse Osmosis	Carbon Block
Removes PFAS	Yes	Yes	Yes
Remove other harmful contaminants	Yes	Yes	Yes
Removes foul odor	Yes	Yes	Yes
Unlimited healthy water	Yes	Yes	Yes
Convenient	Yes	Yes	Yes
Size of system	13" x 54"	Compact	Compact
Installation location	Basement/utility/laundry room	Kitchen sink/separate faucet	Kitchen sink/separate faucet
Installation cost	\$1,500–3,000	\$900–\$1,100	\$750
Maintenance cost	\$200	\$100	\$100
Maintenance frequency	Periodic media replacement	Change filters annually	Change filters every 6 months
Environmental concerns	Dispose of spent media properly	Dispose of used filters properly	Dispose of used filters properly
Treats all water/whole house?	Yes	Kitchen faucet only	Kitchen faucet only

Point-of-Entry (POE)

POE systems are typically installed in the laundry room or utility room in the basement, where the water enters the home.

Highly effective Activated carbon filtration technology has been in use for many years and has proven to be highly effective. It removes PFAS as well as other harmful contaminants and foul odor.



POE options Depending upon the concentration levels of PFAS in your well and other contaminants coming from your groundwater, there are two basic PFAS configurations to consider:

- **Single Tank System**
- **Redundant Tank System for added health protection**

System maintenance Every few years, depending on the PFAS concentration coming into your home, the carbon becomes exhausted (saturated) and will need to be replaced to continue to protect your family's health over the life course.

Cost vs. benefit The average cost of a POE system, fully installed in your home, ranges between \$1,500–\$3,000, depending on PFAS concentrations. Not inexpensive, but **it is the best solution for protecting your family by delivering the healthiest water throughout your home.**

Single Tank	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Treats the water for the whole house • Most cost-effective solution for whole house PFAS treatment • Recommended for lower levels of PFAS 	<ul style="list-style-type: none"> • Minor PFAS breakthrough can occur • Annual PFAS testing is recommended



Redundant Tank System	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Treats the water for the whole house • Best protection against any level of PFAS • Full redundant protection of PFAS contamination 	<ul style="list-style-type: none"> • More expensive than single tank solution • Annual PFAS testing is recommended



POE systems provide the maximum protection for your family because they filter all of the water throughout your home.



Point-of-Use (POU)

POU systems are usually installed under the kitchen sink. They have a separate faucet that is mounted next to your kitchen faucet. They may also deliver water to your refrigerator for ice, if that option is available.

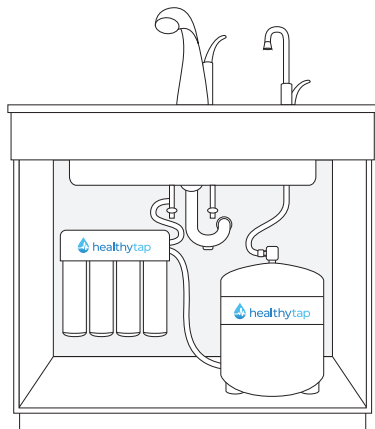
There are two types of POU systems to consider:

- **Reverse Osmosis (RO)**
- **Carbon Block Under Sink Filtration**

Reverse Osmosis Systems (RO)

A comprehensive filtration system Reverse osmosis (RO) systems remove any molecule larger than water (H₂O), including PFAS, lead, sodium and a litany of other harmful contaminants. This is the same technology that bottled water companies like Aquafina and Dasani use in their bottling plants.

A unique technology RO systems leverage your home's water pressure to push water through a membrane which captures contaminants while allowing the water molecules to pass through. Carbon and sediment filters screen out particles prior to the water entering the membrane to maximize efficiency and effectiveness. Once the water has passed through the RO's membrane, a final carbon filter removes any foul odors and improves the water's overall taste.



System maintenance Annual maintenance and filter changes are required to keep the system performing efficiently and effectively to protect your family's health.

RO systems backwash the filters, creating a waste stream that can have concentrated contaminants. It's important to appropriately manage the discharge into a public sewer system.

The filters must also be properly disposed of as they can also contain a build-up of contaminants.

Advantages of RO systems

- Affordable, compact and easy to maintain
- Filter a wide variety of contaminants
- Remove odors and improve the taste of the water

Disadvantages

- Waste stream and filters must be properly disposed of
- Filtered water is only available at the kitchen sink (and refrigerator water dispenser and ice maker, if that option is available)

RO systems are affordable, compact and easy to maintain. They offer a really good "bang for the buck."

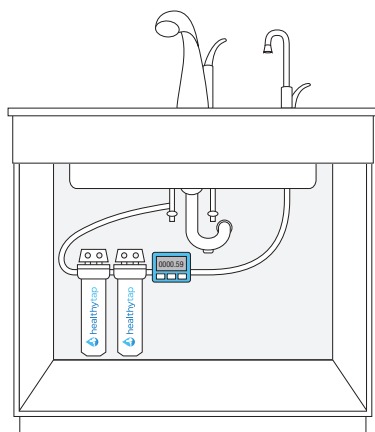


Carbon Block Under Sink Filtration

Cost-effective A dual-stage carbon block filtration system is a cost-effective solution for removing PFAS in your drinking water. Carbon block cartridges consist of granular activated carbon which has been compressed under high heat and pressure to form a carbon block. This block will remove any molecule larger than 0.2 microns, including PFAS and other harmful contaminants. It also improves taste and removes foul odors.

System maintenance

Semi-annual. Unlike RO systems, the carbon block system does not backwash the filters, so regular maintenance is key to the performance of the system.



These filtration systems should be installed with a volume meter to notify you when the filters should be changed.

Advantages of carbon block systems

- Cost effective
- Remove PFAS and other contaminants
- Remove odors and improve the taste of the water
- No environmental waste stream to discharge

Disadvantages

- Require maintenance (usually every 6 months)
- Filtered water is only available at the kitchen sink.



Carbon block under sink systems are a low cost solution for protecting your family from PFAS.



Taking Action

Let's review what you can do about PFAS in your drinking water. Essentially, you have three options:

Use bottled water

Provides protection from PFAS.

- **Not all brands of bottled water are PFAS-free**
- Ongoing inconvenience of lugging bottled water into your home
- Environmental impact of plastic waste and fossil fuel use in the production of water bottles
- Cost, depending on where your bottled water may be sourced

Install POE water filtration

Provides maximum protection for your family.

- **Healthy water throughout your home**
- Complete protection from PFAS and other harmful contaminants
- Healthy, odorless, tasteless water
- Located out of sight in your basement

Install POU water filtration

Reverse Osmosis (RO) and Carbon Block options both provide PFAS-free water.

- **Healthy water from a single faucet**
- Continuous protection from PFAS and other harmful contaminants
- Healthy, odorless, tasteless water
- Located under your kitchen sink

You have options. Health doesn't wait. Are you ready for healthy water?

So here's the good news!

You have the power to protect your family's health.

You've already taken the first step by reading this resource to become informed about PFAS and the potential harmful effects they have on your health.

Based on our knowledge and experience from our PFAS Initiative and working with many residents and towns, **POE and POU filtration are your best options for dealing with PFAS** at the end point—in your home.

We can help.

We are experts in the removal of PFAS and other harmful contaminants from drinking water, with years of experience to back it up. We offer filtration solutions to remove PFAS from your water, so you and your family can have peace of mind.

To learn more about PFAS and filtration options, please contact a member of the SafeWell team today.

► Learn how we can help:

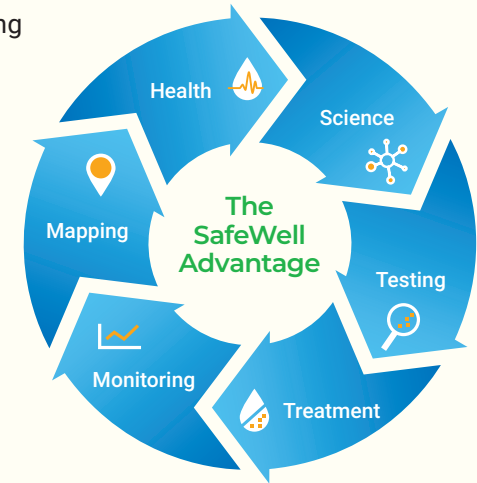
Call **888-450-9355**,
Email **support@safewell.us**,
Visit **safewell.us/pfas-contamination/**
or click this button:

Contact Us

SafeWell's PFAS Initiative

SafeWell is a drinking water protection company with expertise in PFAS removal.

- ✓ We are one of the leading PFAS testing and treatment companies
- ✓ We provide solutions.
- ✓ We understand the health risks and the science.
- ✓ We are local.



About the Author



Dan Gaffney is the President of SafeWell Corporation and a leading expert in the science, testing and remediation of PFAS from drinking water. He assists town administrators, well owners, public water users, and companies struggling with the removal of PFAS from their drinking water. His approach is always the same: inform to empower so homeowners have options to protect their family's health. SafeWell's mission is to make sure every tap in America has healthy water. He's not going to let PFAS stand in the way of the mission! Dan can be reached at dgaffney@safewell.us

Why SafeWell?

SafeWell is a drinking water protection company with expertise in PFAS removal.

We're passionate about clean water. Our company grew out of the realization that most people don't typically think much about the quality of their drinking water even though it has a huge impact on their family's health.

SafeWell is the first to offer a continuous active management program, "TotalCare," based on the highest standards in the world for healthy water. Working with standards from the EPA and the Environmental Working Group (EWG) based out of Washington, D.C., we've developed a Residential Water Score system for continuously tracking the quality of your water.

We monitor your water for life and we're there for you with a fleet of water quality specialists 365 days/year.

We love keeping harmful contaminants out of your water!

To learn more about PFAS removal or to talk to a PFAS expert, contact SafeWell today.

Call **888-450-9355**,
Email support@safewell.us,
or visit safewell.us/pfas-contamination/
Or click this button:

Contact Us

**Our Promise:
Not just safe water.
Healthy water.**

