

# PFA Contamination in Horsham and Warminster, PA: Are 'Forever Chemicals' Here To Stay?

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## Introduction



This is an investigation into the high levels of PFAs found in drinking water in Horsham, and Warminster, PA in 2015. PFAs, commonly known as forever chemicals, are a widely used chemical group that have resistance to grease, oil, water, and heat. They are found in non-stick cookware, paints, firefighting foam, and almost all other products where resistance is desired. A 2015 US water quality survey found PFA levels thousands of times higher than EPA health advisory levels. The US Navy has extensively used PFAs in fire fighting foam on the neighboring Willow Grove Air Reserve. PFAs are not regulated by the EPA under the Safe Drinking Water Act which has led to unregulated use of the chemicals. PFA contamination has been linked to higher rates of health complications, but the studies have not yet found conclusive evidence. Both Horsham and Warminster, PA have higher rates of potentially linked cancers than national averages. Many residents of the area are making the case that the US Navy is responsible for the high PFA levels because of their use of firefighting foam. The use of firefighting foam on the site has since been banned. The production of these chemicals has an expanding market because of their unique resistance to deterioration, but it is this same resistant quality that makes them very long lasting contaminants to local, and global ecosystems.

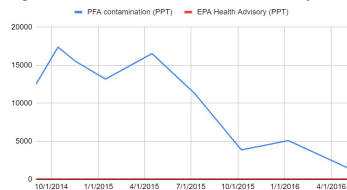


Photo Courtesy of EarthJustice.org

Children playing in fire fighting foam at Warminster Kite festival.

## Details, Data, and Analysis

Figure 1: Contamination Levels of wells on the Military Base



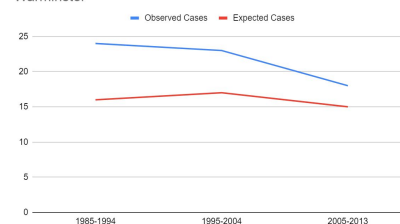
Data are from US Department of Health and Human Services

The red bar at the bottom of the graph above sits at the EPA health advisory maximum of 70 parts per trillion (PPT). After stopping the use of the firefighting foam on the base in 2015 PFA levels in drinking water decreased but, remain far above the EPA health advisory maximum.

Removal Method	Description	Upside	Downside
1 Activated Carbon	Activated carbon sticks to PFAs through nonpolar reactions and can be removed.	The cheapest option. Activated Carbon is readily available and is widely used for purification.	The highest concentrations of PFAs remain after treatment.
2 Ion Exchange	Resin molecules bind to PFAs through ionic bonds and can be continually replaced.	Economically competitive with activated carbon. PFA focused research shows potential for improvement.	Is more expensive than activated carbon in its current state. Treatment does not apply to all contaminants.
3 Reverse Osmosis	Contaminated water is forced through a very fine membrane which prevent the passage of PFAs by using high pressures.	Results in the lowest PFA contamination in drinking water. This is the only option that can fully remove PFAs.	The high water pressures required make this option very expensive and energy intensive.

None of the systems listed above destroy any PFAs. The cheapest option, an activated carbon system, costs upwards of \$50 million in large scale municipal systems.

Figure 2: Number of Testicular Cancer Cases in Horsham and Warminster



Data are from ATSDR

- High levels of PFA contamination has been linked to increased rates of testicular cancer in certain populations.
- Projected cases are calculated by the Pennsylvania Department of Health's projection based on the demographics of citizens.

## Conclusions

Horsham and Warminster, PA have had a heightened exposure to PFAs as a result of the use of firefighting foam on the Willow Grove Naval Base. The local drinking water still has a severe PFA contamination which will be very expensive to protect residents from. The exact health complications caused by PFAs are not yet definite, but evidence continues to accumulate that exposure is a serious health risk. Addressing this issue locally will be very expensive, but the evidence of the Navy being responsible is quite strong and it is very likely that they will need to pay for the damages caused. The lack of legislation and regulation regarding this contaminant does very little to protect this community from further harm.

## Teaching The Case Study

Through a combination of pre-class research and an in-class discussion of next steps from the points of view of various stakeholders a lot can be learned from this case study.

## Pre-Class:

Students will conduct research on the harms of PFAs, the ways to remove PFAs from drinking water, and the broader context of PFA contamination. This case happened after other PFA contamination cases occurred in the US. They will get to understand how other PFA contamination cases were handled, such as the dupont case, before addressing the case of Horsham and Warminster in class.

## In-Class Debate:

Students will be assigned the roles of Naval Base representatives, water department executives, local government officials, environmental protection agencies, health officials, and local residents. The Naval Base Representatives and the local government officials will be given budgets, and through an open debate all other stakeholders will present their case for monetary compensation, detailing how they will address the issue. Students will see the difficulty of litigating harms that have few protections and will be forced to make compromises on their current health, and future health of the region.