

# PFCs 101

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ITRC Per- and Polyfluoroalkyl Substances (PFASs) Team

**Rye NH Representative**

Health, Human Services & Elderly Affairs Committee

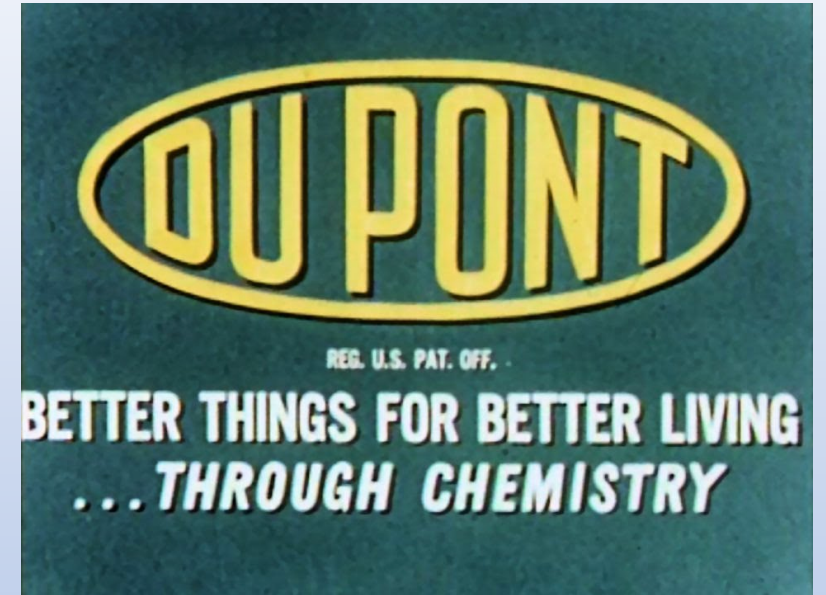
New Hampshire House of Representatives

# Topics...

- What are PFCs?
- How are they impacting our drinking water?
- How are they regulated?
- Health implications of PFCs in our drinking water?
- What can we do now?

# In The Beginning

- DuPont introduced Teflon in 1946
- 3M introduced Scotchgard in 1956
- Both were discovered by accident!



# Where Does PFC Contamination Come From?





# How Did PFCs Get in Rye Water?

- PFCs in Dumps, Landfills

- Into Surface Water

- Berry's Brook, Little Brook, etc.

- Through Fractured Ledge

- Underground
    - All directions
    - Unpredictable

- Becomes Groundwater in

- Private wells
    - Municipal and Town Water Supplies

- “PFCs are flowing from Coakley Landfill  
Into Rye, N. Hampton, and Greenland” per *NH DES, July 2017*

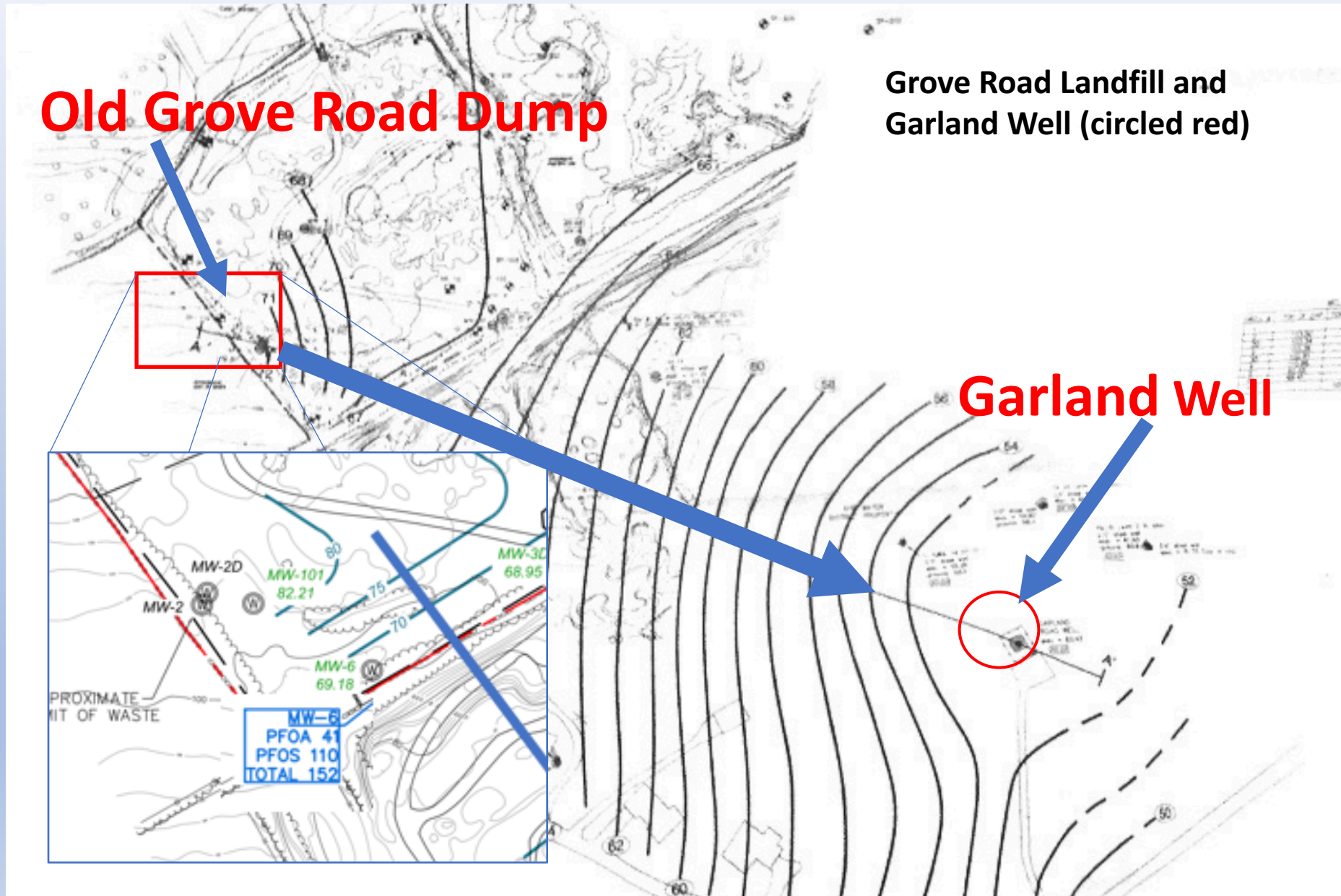


Coakley Landfill



Fractured Ledge

# Groundwater Flow



# Why the Concern About Our Water?

- 98% of Americans have PFCs in their blood (NHANES)

(Calafat et al., 2007, *EHP*. 115: 1596-1602)



- Some can bioaccumulate and biomagnify

(Conder et al., 2008, *ES&T*. 42:995-1003)

- Most vulnerable populations
  - Childbearing & lactating women
  - Infants and children
  - Immune compromised



# Overwhelming Majority of PFC Exposure Comes From Drinking Water

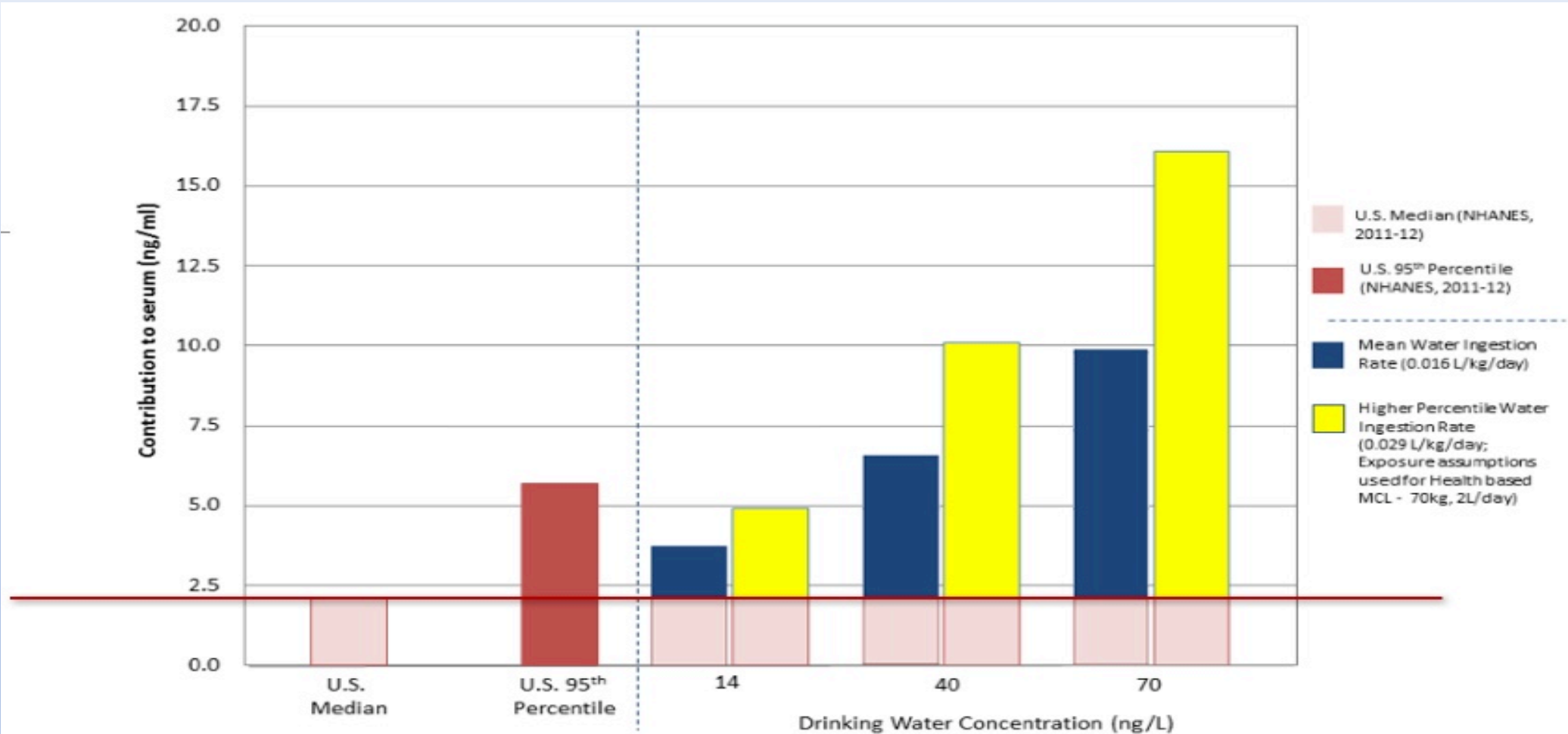


Figure 1. Increases in serum PFOA concentrations predicted from consumption of drinking water with various concentrations of PFOA (14 ng/L – Recommended Health-based MCL; 40 ng/L – NJDEP guidance (2007); 70 ng/L – USEPA Lifetime Health Advisory).



# Large Body of PFC Science on Health Risks

## Water Science & Technology

Contamination, bioaccumulation and toxic effects of perfluorinated chemicals (PFCs) in the water environment: a review paper

Fatihah Suja, Biplob Kumar Pramanik, Shahrom Md. Zain

Published September 2009, 60 (6) 1533-1544; DOI: 10.2166/wst.2009.504



AUGUST 20, 2015

## TEFLON CHEMICAL HARMFUL AT SMALLEST DOSES: PHASED OUT, BUT STILL A THREAT

Both PFOA and PFOS belong to a class of non-stick, waterproof, grease-proof chemicals historically called PFCs. Under pressure from EPA, 3M stopped making PFOS in 2002, and in 2005 DuPont agreed to phase out PFOA by this year. Those two chemicals are no longer produced in the U.S.

The collage features several scientific publications:

- Environmental Health Perspectives (ehp)**: A journal cover with the title "Do Perfluoroalkyl Compounds Impair Human Semen Quality?" and the volume information "Environ Health Perspect. 2009 Jun; 117(6): 923-927." It also includes the DOI "10.1289/ehp.0800517" and the PMCID "PMC2702407".
- Environmental Science & Technology**: A journal cover with the title "Health Risks in Infants Associated with Exposure to Perfluorinated Compounds in Human Breast Milk from Zhoushan, China".
- Environmental Science & Technology**: A snippet showing a search bar and navigation links like "Browse the Journal", "Articles ASAP", "Current Issue", "Multimedia", "Submission & Review", and "Open Access".



# PFC Science

- **C-8 Science Panel** 2005 - 2013
  - Peer reviewed series of studies by expert panel
  - 69,000 person sample
  - **“Probable links” to adverse health effects**
- **Vermont Department of Health** March 2016
- **Agency for Toxic Substances & Disease Registry** August 2016
  - **“May be associated with” adverse health effects**
- **Brown University** October 2016
- **New Jersey Drinking Water Quality Institute\*** March 2017
- **Minnesota Department of Health** June 2017

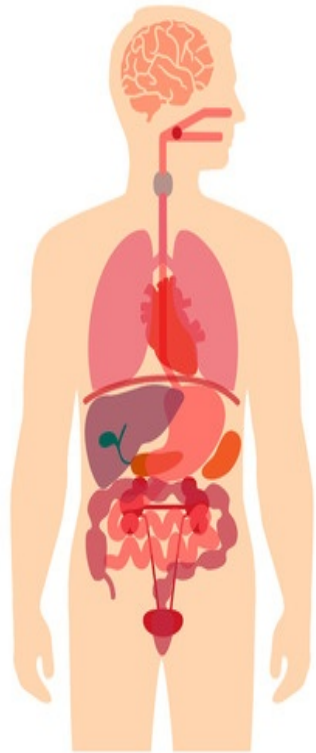
# What Are the Health Risks of PFCs?

## Humans

- Elevated cholesterol
- Thyroid disease
- Cancer (prostate, testicular, kidney, breast)
- Pregnancy-induced hypertension
- Ulcerative colitis
- Decreased fertility
- Immune system suppression
- Hormone system disruption

## Animals

- Cancer (liver, testicular, pancreatic)
- Liver enlargement
- Mammary gland tumors
- Altered breast development
- Immune system suppression
- Changes in cholesterol



### Sources:

C8 Science Panel: “Probable Links”

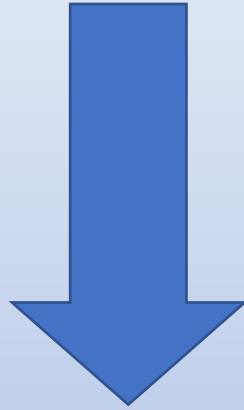
Agency for Toxic Substances and Disease Registry (ATSDR): “May be associated with”

Studies authored by Philippe Grandjean, Harvard T.H. Chan School of Public Health

# EPA & NH “Advisory” for PFOA + PFOS

## • Drinking Water

- Before May 2016
- After May 2016
- EPA Nov 2017



= 600 parts per trillion

= 70 parts per trillion

70 parts per trillion based on  
**Adults only, not fetal, infant or child**

## • Many Other PFCs





= Not regulated

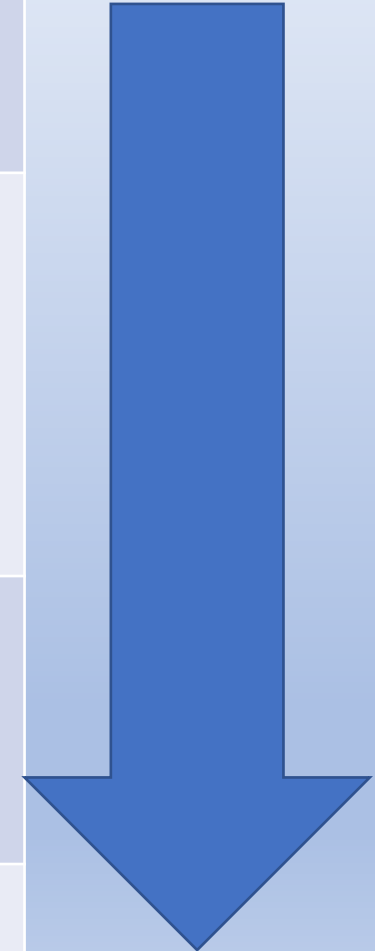
## • Surface Water

= Not regulated

Not regulated,  
does not  
mean safe

# Lower PFC Advisory: Maternal & Infant Risk

State	PFC Advisory (ppt)	PFC	Based on	Date
<b>Vermont</b>	<b>20</b>	PFOA		2016
<b>Minnesota</b>	<b>27</b> <b>35</b> <b>35</b> Others	PFOA PFOS PFHxS (use PFOS) various		2017
<b>New Jersey</b>	<b>Now 40</b> <b>Propose 14</b> <b>Propose 13</b>	PFOA  PFNA		2017
<b>Pennsylvania</b>	<b>Now 14</b> <b>Propose 1 – 6</b>	PFOA		2017



# Who Is Responsible Now?

Dump Site	Contaminants	Responsible Party
Coakley Landfill	Pease Ash Numerous toxic substances	Coakley Landfill Group*
Old Grove Rd. Dump	Unknown Incineration at site	Town of Rye
Breakfast Hill / Rte. 1	Pease Ash Numerous toxic substances	Town of Rye
Berry's Brook	From Coakley Landfill	Coakley Landfill Group*



# Superfund Area Sampling Results

## PFOS + PFOA

Location	Lowest	Highest
Coakley Dump Monitoring Wells		18 wells and surface water in Berry's Brook up to >35 times Standard!
Breakfast Hill Rd/Rte. 1 Dump	9.1ppt	82ppt
Berry's Brook Surface Water		1,250ppt
Berry's Brook Leachate from Coakley		2,586ppt

# Rye Sampling Results

## PFOS + PFOA

Rye Wells	Lowest	Highest
Old Grove Road Dump Monitoring Well	8.9ppt 4.3ppt	151ppt 88.6ppt
High and Low of Three Supply Wells	Non Detect	21ppt
25 Private Rye Wells Tested by NHDES	Non Detect	33.7ppt

# Other Area Sampling Results

## PFOS + PFOA

Two Rye Beach Districts	Lowest	Highest
Aquarion Well 6 in Hampton		Exceeded EPA Advisory Well Shutdown!
Aquarion Well 5A in Rye	4ppt	8.23ppt

Portsmouth	Lowest	Highest
Portsmouth City Wells	Non Detect	21ppt

# Conclusion



- **Public health approach**

- Precautionary principle of prevention
- Proactive
- Err on the side of caution

- **Children are our “gold standard”**

- Very small amounts matter
- Disrupt endocrine and immune systems
- Stay in their bodies for years

# What Can We Do Now?

- Stay Informed
- Understand Your Risk Tolerance. What's Your Number?
  - Watchful waiting.....
  - Proactive, preventive....
- Know Your Options
  - Home
    - Bottled water
    - Granulated, activated carbon filters
    - Reverse osmosis treatment
  - Town treatment
- Be Engaged
  - Town of Rye
  - NH State Legislature



# How to Stay Informed

- **Water Sampling Results**

- Town of Rye: [www.town.rye.nh.us/pages/RyeNH\\_WaterDistrict](http://www.town.rye.nh.us/pages/RyeNH_WaterDistrict)
- Portsmouth Water Quality Report: [www.files.cityofportsmouth.com/publicworks/waterqualityreports](http://www.files.cityofportsmouth.com/publicworks/waterqualityreports)
- Aquarion: [www.aquarion.com/NH/WaterQualityReports](http://www.aquarion.com/NH/WaterQualityReports)
- NH DES Private Wells Tests: [www.des.state.nh.us/DESONestop](http://www.des.state.nh.us/DESONestop)

- **PFC Health Effects**

- [www.atsdr.cdc.gov/pfc/index.html](http://www.atsdr.cdc.gov/pfc/index.html)
- [www.c8sciencepanel.org/prob link.html](http://www.c8sciencepanel.org/prob link.html)
- [www.pfasproject.com](http://www.pfasproject.com)

- **Home Water Treatment**

- [www.des.nh.gov/organization/commissioner/documents/pfoa-inhome-treatment-20160518.pdf](http://www.des.nh.gov/organization/commissioner/documents/pfoa-inhome-treatment-20160518.pdf)

- **NH Safe Water Alliance**

- On Facebook: <https://www.facebook.com/groups/108449969661474/>
- On Twitter: [@NHSafeWaterA](https://twitter.com/NHSafeWaterA)

# Garland Well PFC Water Sampling Results

