

# Vermont's Response to the PFAS Crisis

Vermont Legislature Presentation  
State House  
January 26, 2017

# Vermont's Experience

## Outline

What are Perfluoroalkyl Substances (PFASs)  
(PFOA) & (PFOS)

What are their Health Effects

Review current sites with PFASs

- North Bennington/Bennington/Pownal

Review Statewide Plan

Review challenges

Share lessons learned

# Perfluoro alkyl substances (PFASs)

## PerfluoroOctanic Acid (PFOA)

Perfluorooctanoic acid  
Chemical Compound



Perfluorooctanoic acid, also known as C8, is a synthetic perfluorinated carboxylic acid and fluorosurfactant. One industrial application is as a surfactant in the emulsion polymerization of fluoropolymers. [Wikipedia](#)

**Formula:**  $C_8HF_{15}O_2$

**Molar mass:** 414.07 g/mol

**Boiling point:** 372.2°F (189°C)

**Density:** 1.8 g/cm<sup>3</sup>

## Perfluorobutanesulfonate (PFOS)

Perfluorooctanesulfonic acid



Perfluorooctanesulfonic acid is an anthropogenic fluorosurfactant and global pollutant. PFOS was the key ingredient in Scotchgard, a fabric protector made by 3M, and numerous stain repellents. [Wikipedia](#)

**Molar mass:** 500.13 g/mol

**Formula:**  $C_8HF_{17}O_3S$

**Boiling point:** 271.4°F (133°C)

**Classification:** Sulfonic acid

# What are PFASs /What are their Health Effects

## What are PFASs in?

- Teflon production
- Electronics coatings
- Scotchguard/Gortex
- Fire fighting foam (AFFF) (PFOS)
- Textile coating (Chemfab) (PFOA)

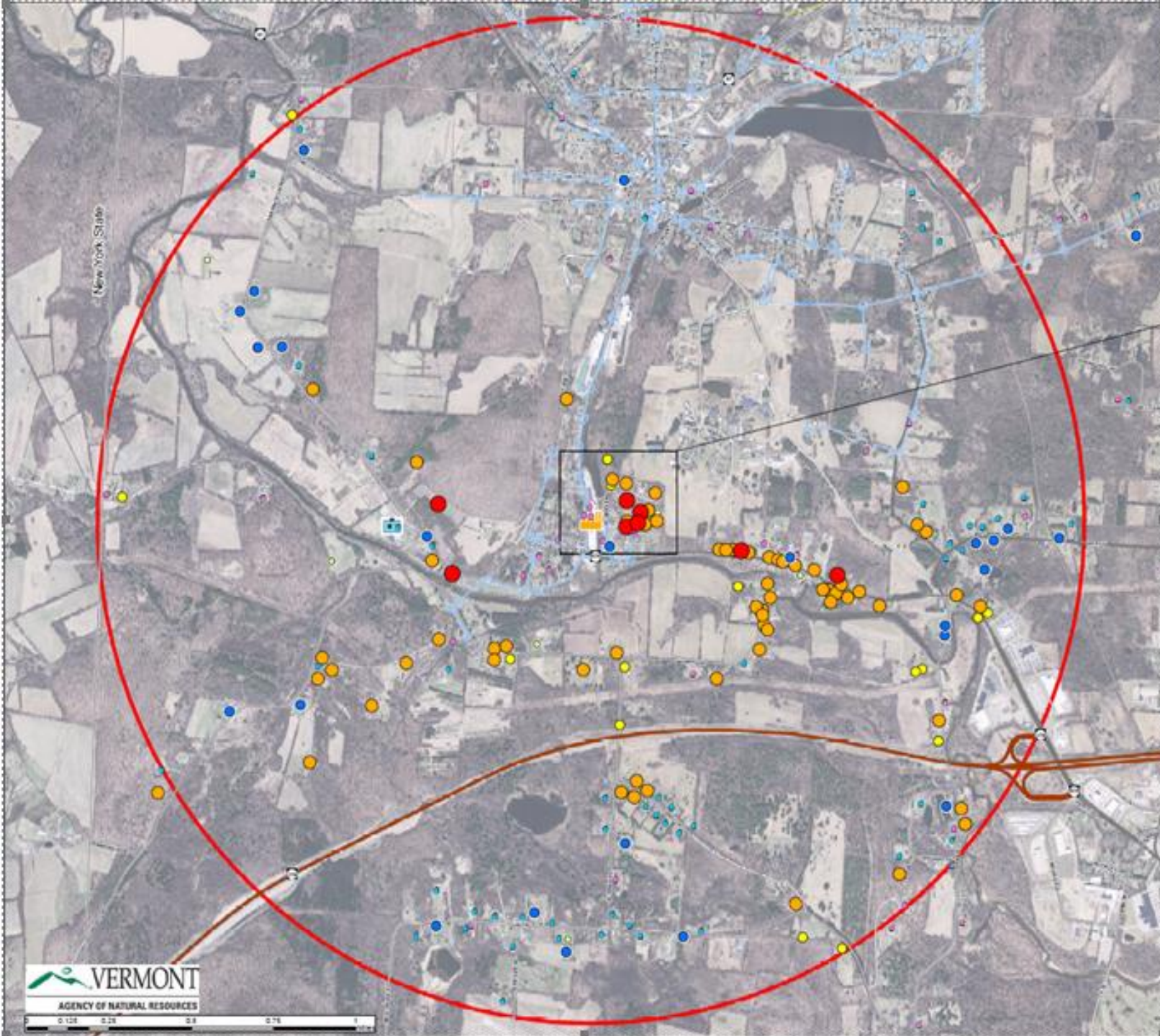
## PFASs Health Effects

- Concentrates in Blood Serum
- May cause hypertension, low birth weight, some immune systems effects, thyroid disease, kidney cancer, and testicular cancer
- Vermont Health Advisory at **20 ng/l (ppt)** for PFOA/PFOS combined

# Textile Coating Made at Chemfab







# Initial PFOA Results

- 50 samples
- 22 results : ND
- 9 results : 0–20 ppt
- 8 results : 20–100 ppt
- 11 results : > 100 ppt

Immediate notification to sampled parties

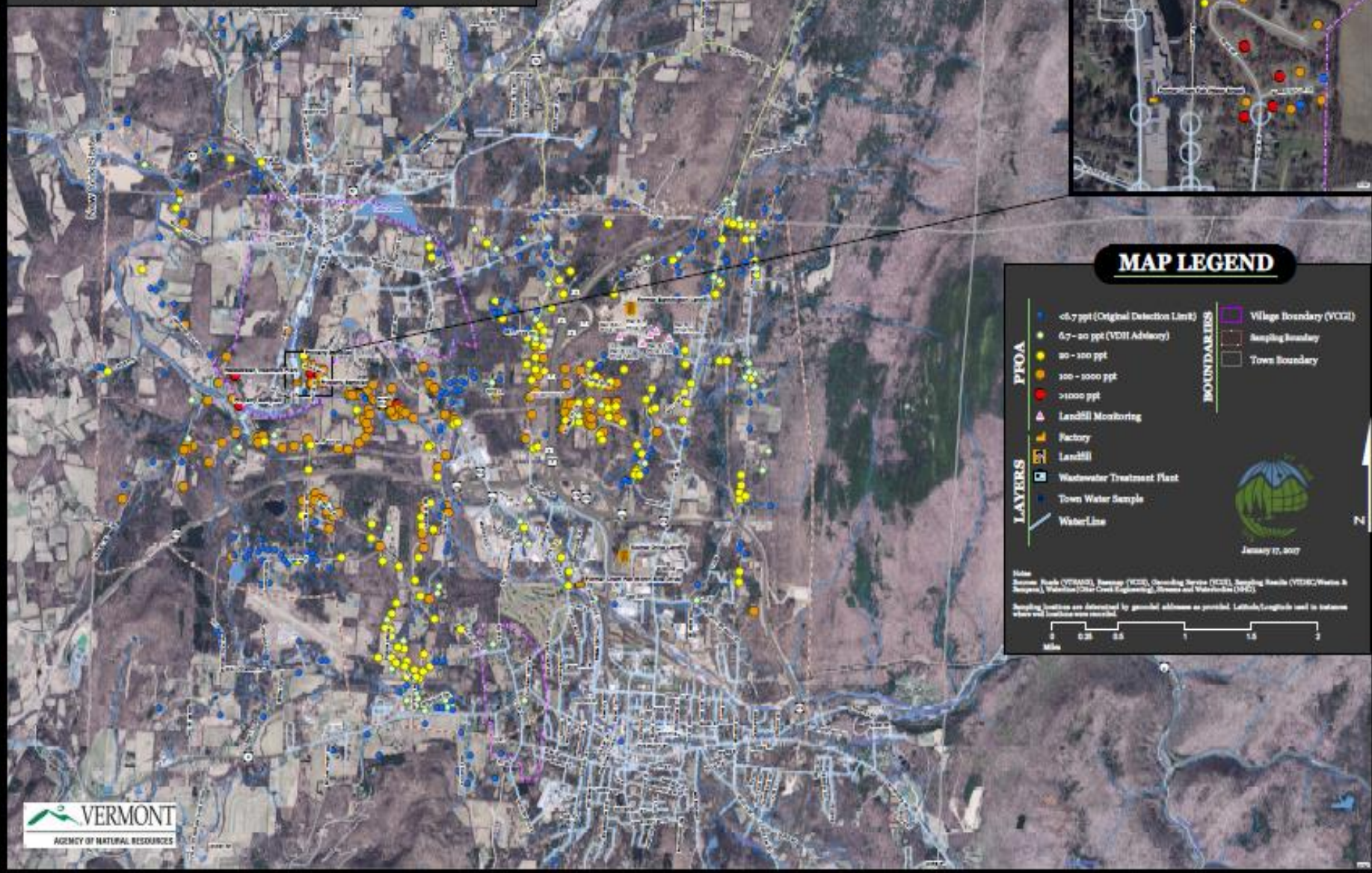
Governor's Press Conference

Public Meeting



# North Bennington/Bennington PFOA

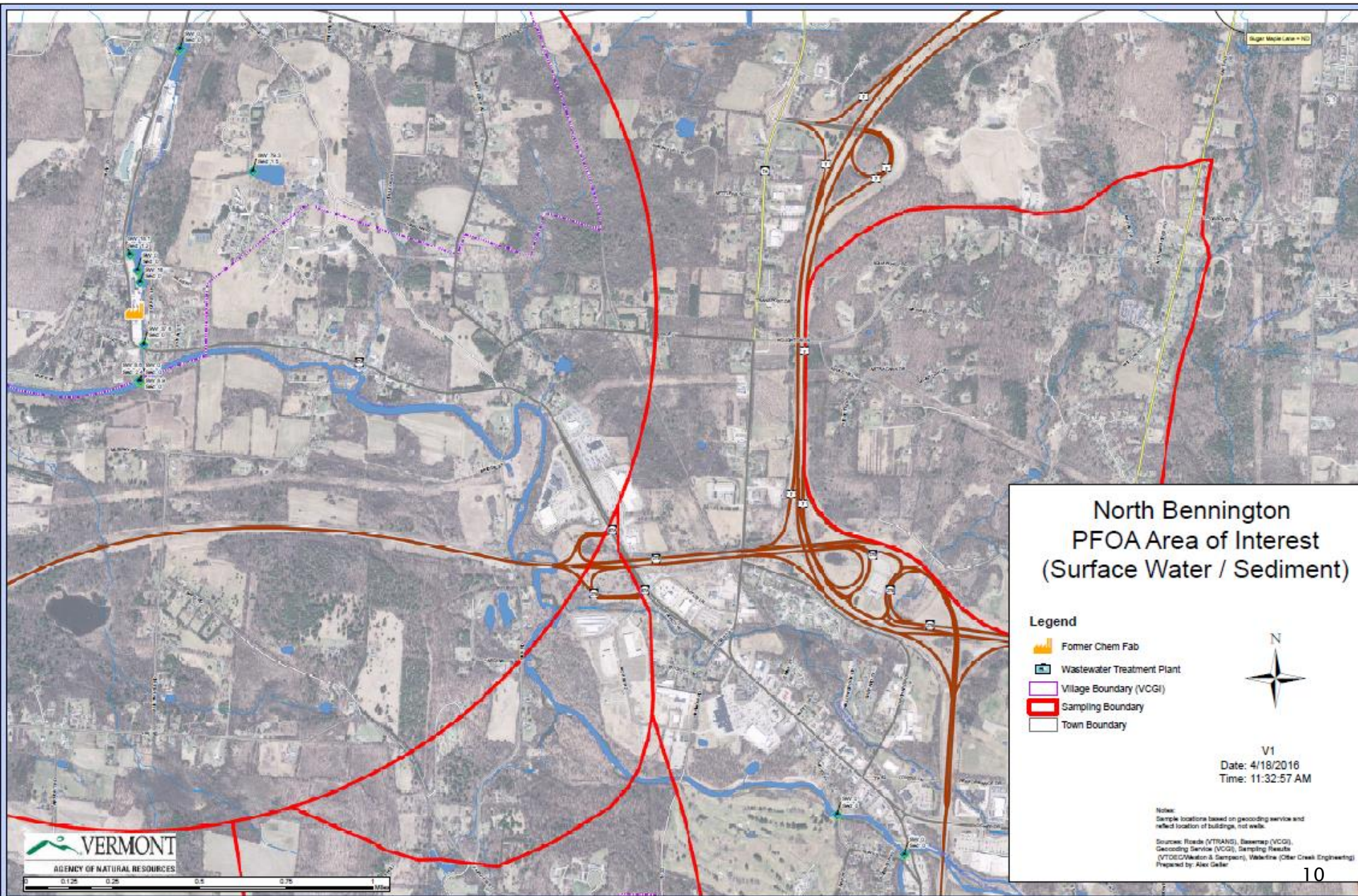
Sampling Test Results (Highest Concentration) - December 7, 2016





# Bennington PFOA Private Well Results

- 551 samples collected from private wells
- >60% of all wells had some level of PFOA
- 203 results : ND (37%)
- 79 results : 0–20 ppt (14%)
- 269 results : >20 ppt (49%)
- Recent Re-sampling efforts have changed these results



## North Bennington PFOA Area of Interest (Surface Water / Sediment)

### Legend

- Former Chem Fab
- Wastewater Treatment Plant
- Village Boundary (VCGI)
- Sampling Boundary
- Town Boundary



V1  
Date: 4/18/2016  
Time: 11:32:57 AM

Note:  
Sample locations based on geocoding service and  
called location of buildings, not wells.  
Source: Roads (VTRANS), Basemap (VCGI),  
Geocoding Service (VCGI), Sampling Results  
(VTOCC/Watson & Sampson), Waterline (Other Creek Engineering)  
Prepared by: Alex Geller



# Surface Water/Sediment Results

- Surface Water (10 samples)
  - Results ranged from ND – 79 ppt (additional samples taken by Bennington College show higher levels)
- Sediment (7 samples)
  - 4 samples ND
  - 3 samples ranged from 1.2 – 2.4 ppb
- Results show no risk to human health or most sensitive aquatic species
- Fish Tissue samples collected, results show PFCs in Fish, but not at a level of concern



Sample location 01 - 010

FWDA Depth	VT Soil Screening Value Limit
20"	Nil
41"	Nil
62"	Nil
83"	Nil

Sample location 01 - 010

FWDA Depth	VT Soil Screening Value Limit
20"	Nil
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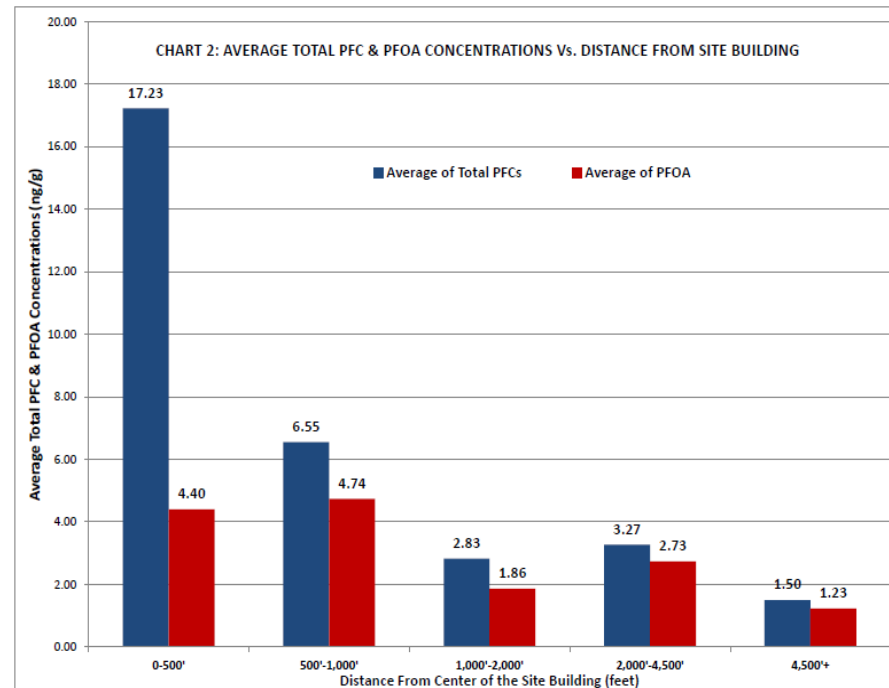
FWDA Depth	VT Soil Screening Value Limit
20"	Nil
41"	Nil
62"	Nil
83"	Nil

Sample location 01 - 010

Sample Depth	FWDA Depth	VT Soil Screening Value Limit
0' - 4'	4.1	Nil
4' - 12'	1.4	Nil
12' - 18'	2.3	Nil
18' - 24'	3.0	Nil

# Soil Results

- Collected over 100 samples
  - Results ranged from ND – 45 ppb
  - Majority of results < 10 ppb
- VDH soil screening level : **300 ppb**
- Surface soil remediation deemed not necessary for direct contact



# Gardening and Farming

- Do not expect to find measurable levels of PFOA in produce
- Recommendations
  - Use clean water for irrigation
  - Amend soil with clean compost
  - Wash your produce after harvest
  - Peel root vegetables
- Livestock
  - Should be given clean water
- Maple Syrup Tested free of PFOA !



# Sludge and Septage Sampling

- Collected sludge samples from WWTP and septic tanks
  - Results from WWTP influent 350 ppt
  - 5 pressed sludge samples from WWTP
    - Average 8 ppb
- 3 septic tank samples showed PFOA and PFOS
  - SPLP (leaching study) shows PFASs in water
- Compost shows no PFASs in compost sample
  - some PFASs in SPLP sample

# Immediate Challenge



# Getting Homes Clean Water

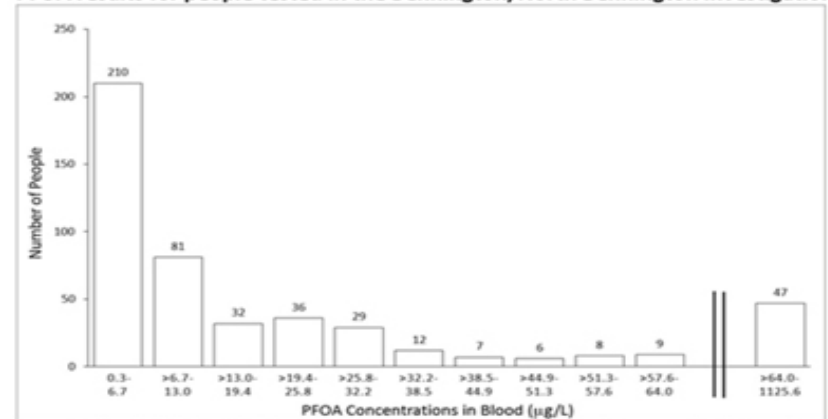
- Bottled water delivered immediately to all residents
- 11 homes/business connected to municipal system where water line nearby
- 255 systems Point of Entry Treatment (POET) systems installed
  - Connecting to municipal system is best long term solution



# VDH Blood Testing

- VDH tested more than 400 people
- PFOA in blood 0.3 – 1,126 ppb
- Average for Bennington – 10 ppb
  - 2.1 ppb – United States average
  - 33 ppb – Ohio workers
  - 1,130 ppb – Alabama workers
- PFOA half-life in blood: 2–4 years

PFOA results for people tested in the Bennington/North Bennington investigation



Note: The double black line (||) signifies a change in the PFOA concentration interval width in order to present all of the results on one chart – the range of test results represented in the bar on the far right is greater than the others presented. There is no clinical significance to this distinction.

# Work Performed

- State sampled 551+ drinking water wells
- POET systems installed on all wells >20 ppt
- POET systems sampled 3 times, O&M Manual
- Resampling performed for wells ND or <20 ppt
- Soils sampled around the former Chemfab
- Surface water, sediment, and fish sampled
- Maple syrup, milk, garlic (planned) sampled
- Facility Site Investigation performed, no results
- Engineering Study for Municipal Water line extension North Bennington and Bennington
- Evaluation for Treatment of Groundwater (CSM)
- Negotiation for Universal Site Consent Decree

# Contaminated Wells in Pownal





# Picture of Pownal Water Filtration System



# Statewide PFOA Response

- Reviewed limited state information on use of PFASs
- Prioritized industries to target
  - Semiconductor, wire coating, fire fighting training centers
- Also prioritized based on sensitive receptors (# of drinking water wells within ½ mile of facility)
- Phased sampling over 4–8 week period
- 11 Locations chosen for sampling
- Results showed 6 of these sites have PFASs released to the environment
- Include IBM, Air Guard Base, Pittsford Fire Training Center, etc

# Challenges to PFOA Response

- Magnitude of effected area
- Developing health advisory levels for water, soil, crops, fish, etc.
- Messaging of health advisory level in Vermont
  - Blood sampling results
- Understanding the fate and transport
- Presence of Arsenic from point-of-entry treatment systems
- Superfund sites – do we reopen?



# DEC PFOA Response Organization

Week of 21-27 March 2016, as of 0745 on March 25

## Public Information

- Public can call 2-1-1 for general information and referrals
- Specific questions go to leads as shown

## Schedule Highlights

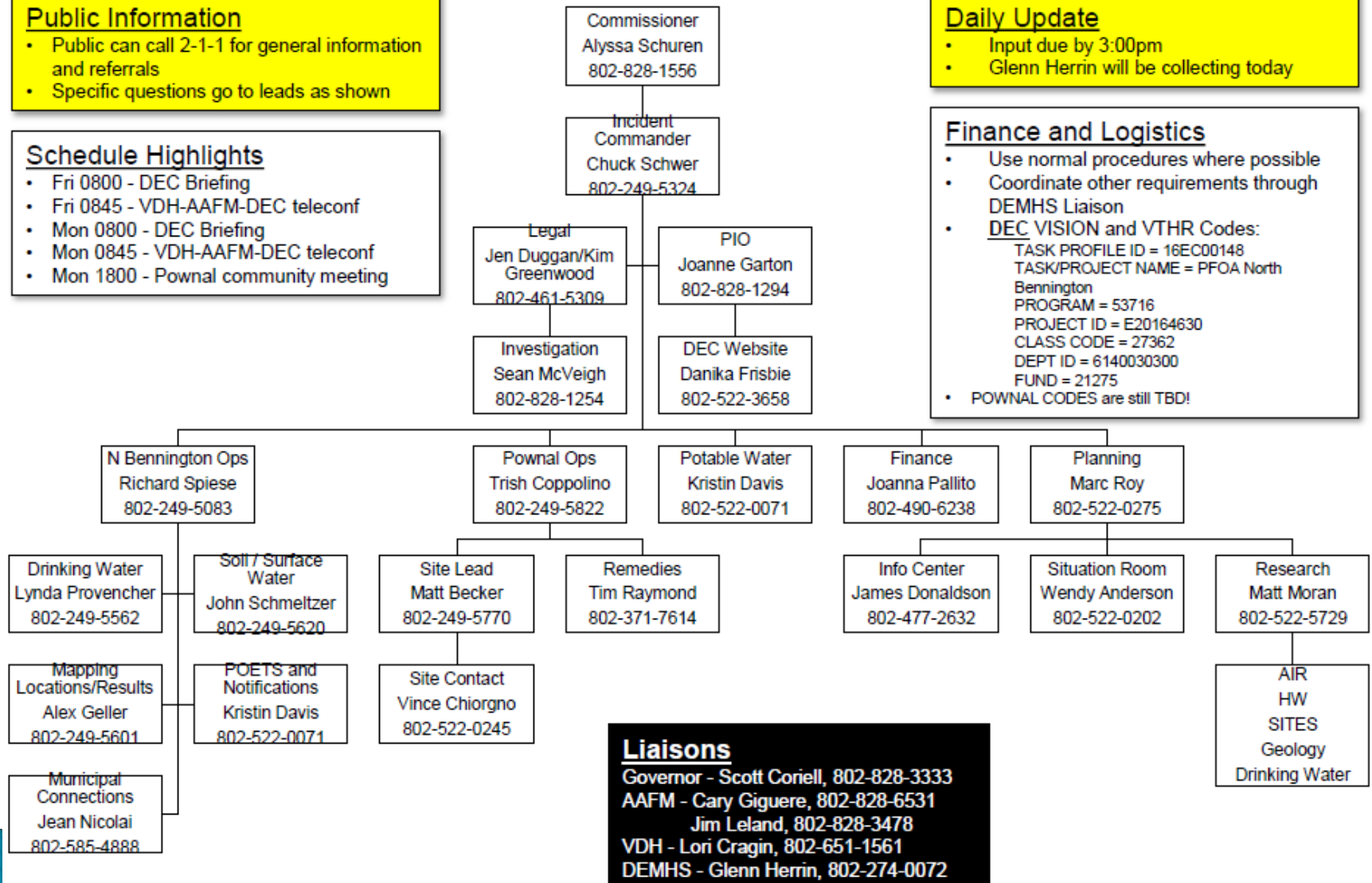
- Fri 0800 - DEC Briefing
- Fri 0845 - VDH-AAFM-DEC teleconf
- Mon 0800 - DEC Briefing
- Mon 0845 - VDH-AAFM-DEC teleconf
- Mon 1800 - Pownal community meeting

## Daily Update

- Input due by 3:00pm
- Glenn Herrin will be collecting today

## Finance and Logistics

- Use normal procedures where possible
- Coordinate other requirements through DEMHS Liaison
- **DEC VISION** and VTNR Codes:
  - TASK PROFILE ID = 16EC00148
  - TASK/PROJECT NAME = PFOA North Bennington
  - PROGRAM = 53716
  - PROJECT ID = E20164630
  - CLASS CODE = 27362
  - DEPT ID = 6140030300
  - FUND = 21275
- POWNAL CODES are still TBD!



## Liaisons

Governor - Scott Coriell, 802-828-3333  
 AAFM - Cary Giguere, 802-828-6531  
 Jim Leland, 802-828-3478  
 VDH - Lori Cragin, 802-651-1561  
 DEMHS - Glenn Herrin, 802-274-0072

# Lessons Learned

- 2-1-1 support
- Importance of immediate public meetings
- Weekly emails to community
- Importance of establishing clear Incident Command Structure
  - (assistance from VEM, DOH, Ag)
- Importance of reaching out to neighboring states
  - (NY, NJ, NH, MN)

# Questions?

## Thank you!

Contact information:

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