

NEWSVT Landfill

Leachate PFAS Treatment

September 17, 2025



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Background

A Little Bit About NEWSVT (Coventry)

- Only active landfill in Vermont
- Receives 80% of Vermont's waste (remaining 20% exported)
- Received approximately 500-550k tons per year
- Located on Coventry, VT
- Currently has about 18-20 years of permitted space left



PFAS

What Are PFA's

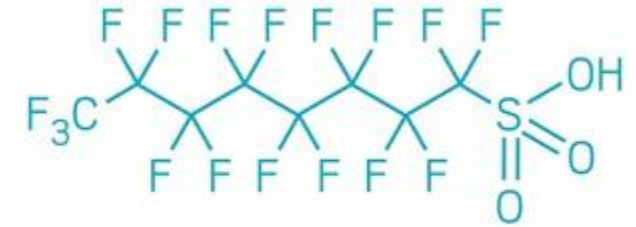
- Carbon fluorine bonded substances initially discovered (first created) in 1938
- Very Strong bonded substances, last a very long time (hence called forever chemicals)
- Today, thousands of different PFA compounds exist
- **What are they in? (hint thousands of items)**
- **Where are they found? (hint look around)**
- Historically used abundantly in many items

1. State of Vermont Drinking Water Standards

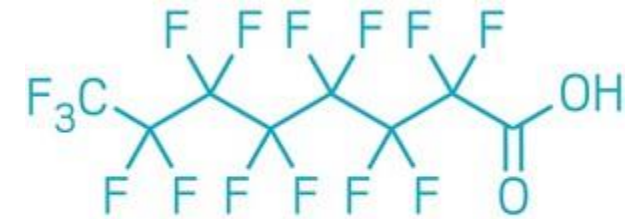
- 5 compounds PFOA, PFOS, PFNA, PFHpA, PFHxS
- 20 ppt combined of all 5 (1 ppt is one small droplet in an Olympic sized pool – 660,000 gallons)

2. New Federal Proposed Standards

- 6 compounds PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA (Gen X)
- **PFOA and PFOS at 4ppt each (lowest reliable level measurable)**, remaining at combined level based on hazard index.
- Health Advisory - PFOA = 0.004 ppt • PFOS = 0.02 ppt • GenX chemicals = 10 ppt • = 2,000 ppt



PFOS




PFOA

Source: Chemical Engineering News

PFAS in Products

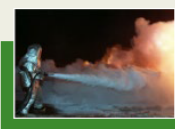
PFAS Are Everywhere



Dust in Daycare Center
142 parts per billion (ppb)



Microwave Popcorn Bag
68 – 167 ppb



Fire Training Center
695 ppb



Foundation Makeup
2,370 ppb

| Retailer | Product | Concentration (ppb) |
|--------------|--------------------------------|---------------------|
| Burger King | Wrapper for Whopper | 345,700 |
| Chipotle | Wrapper for burrito | 26,300 |
| Hannaford | Bakery plate under cake | 23,300 |
| McDonalds | Bag for Chicken McNuggets | 219,000 |
| Panera Bread | Container for flatbread pizza | 82,000 |
| Stop n’ Shop | Paper plates, bamboo | 368,700 |
| Stop n’ Shop | Paper plates, grease-resistant | 226,700 |
| Whole foods | Container for soup | 21,000 |

Graphic credit: Sanborn Head and Associates, food packaging data from May 24, 2022 Consumer Reports Article <https://www.consumerreports.org/health/food-contaminants/dangerous-pfas-chemicals-are-in-your-food-packaging-a3786252074/>

PFAS in the Environment

1. EWG Fish Analysis

- Seen across the country
- In rural and urban areas
- Ubiquitous in society



'Forever chemicals' in freshwater fish

'Forever chemicals' in freshwater fish

KEY FINDINGS

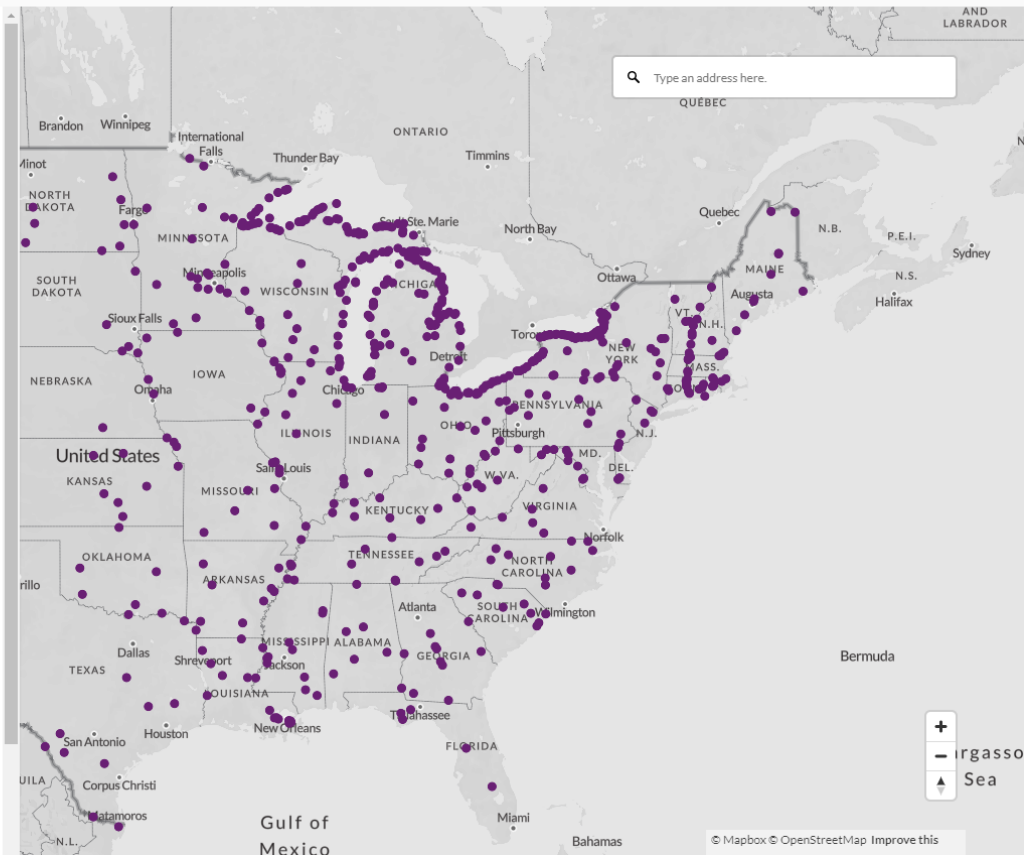
- 1 PFAS compounds are a class of nonstick, waterproof and stain-resistant compounds used in consumer products and industrial applications. Best known are PFOA, formerly used to make DuPont's Teflon, and PFOS, formerly in 3M's Scotchgard.
- 2 Very low exposure to some PFAS has been linked to cancer, thyroid disease, weakened childhood immunity and many other health problems.
- 3 Test results reveal the presence of PFAS, most commonly PFOS, in freshwater fish. The problem is widespread, affecting almost every state and in some states including several bodies of water.
- 4 PFAS contamination of freshwater fish not only poses risks to fish health but also creates environmental justice concerns for the communities that rely on those fish for their diets, since they are being exposed to PFAS when they consume the fish.
- 5 Eating just one PFAS-contaminated freshwater fish per month could be the equivalent of drinking a glass of water with very high levels of PFOS or other forever chemicals.

DETAILS

State: Maine
Waterbody: Saint John River
Fish species: Muskellunge
Sample taken: 2014

| PFAS | Result (ppt) |
|------------|--------------|
| PFOS | 7,210 |
| PFUnA | 1,620 |
| PFDA | 1,000 |
| PFDoDA | 540 |
| PFNA | 198 |
| Total PFAS | 10,568 |

Source: Environmental Protection Agency (EPA), Enforcement and Compliance History Online (ECHO), PFAS National Datasets, Ambient Environmental Sampling for PFAS. Available [here](#).



PFAS in Waste

At NEWSVT

- 100 samples taken (materials we take) + Leachate analysed
- Greater than 90% sequestered in NEWSVT landfill

Exhibit ES-2 - Estimated Total PFAS Mass Flux In and Out of the Landfill

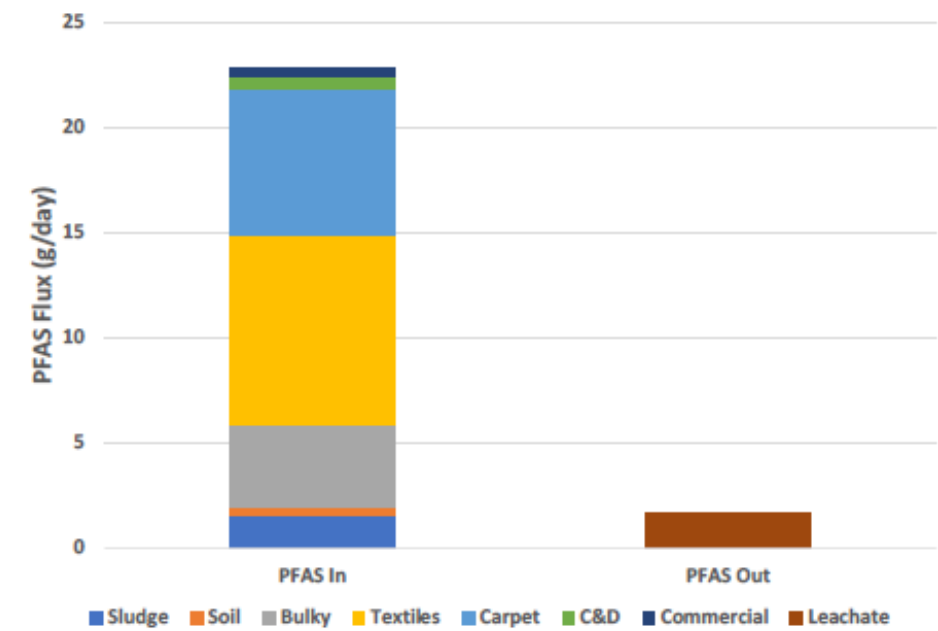
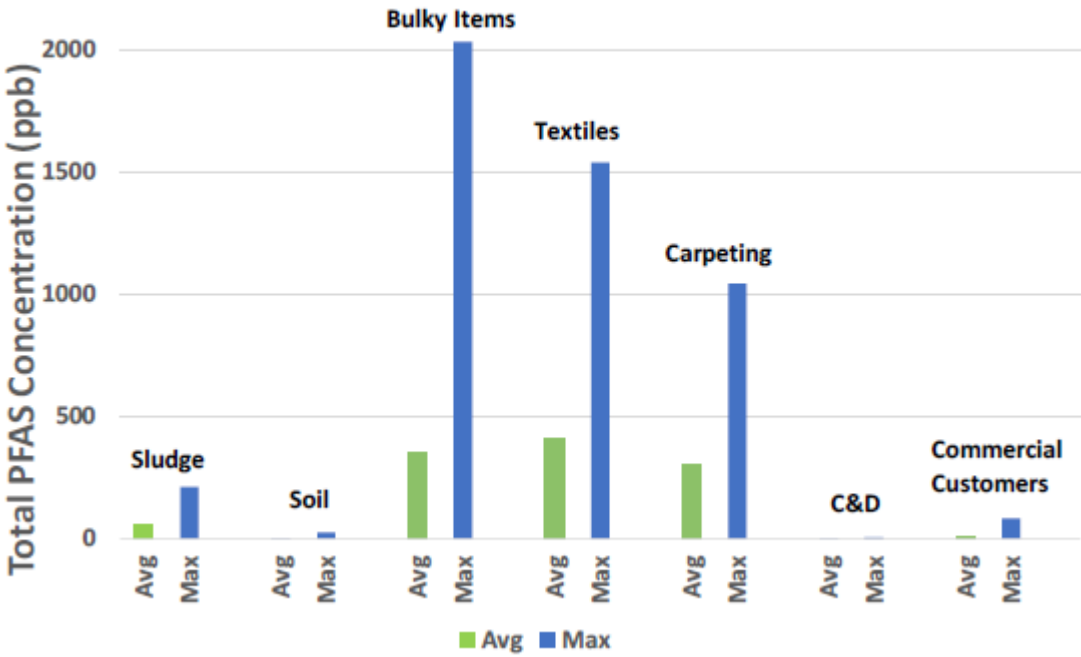


Exhibit ES-1 - Average and Maximum Total PFAS Concentrations by Waste Type



PFAS Content

PFAS Mass Quantity

- Landfill leachate contains 0.7 to 3.4 grams of PFAS (VT-5) in 30,000-50,000 gallons
- A queen size mattress contains 0.8 to 17.3 gsm (grams per square meter) of PFAS applied

Exhibit 1 – Estimated Potential PFAS Content of Mattresses

| Mattress Size | Weight (lbs) | Width (in) | Length (in) | Height (in) | Area (all 6 sides) (in ²) | Cover weight (lb) based on 275 gsm | Cover % of item weight | Potential PFAS (g) in mattress | | |
|-----------------|--------------|------------|-------------|-------------|---------------------------------------|------------------------------------|------------------------|---|-------------------------------------|--|
| | | | | | | | | Midrange 0.1% fluoropolymer and 275 gsm | High 0.5% fluoropolymer and 350 gsm | Low 0.05% fluoropolymer PFAS and 200 gsm |
| Full | 64.5 | 54 | 75 | 10 | 10,680 | 4.18 | 6.5% | 1.9 | 12.1 | 0.69 |
| Queen | 73.2 | 60 | 80 | 10 | 12,400 | 4.85 | 6.6% | 2.2 | 14.0 | 0.80 |
| King | 91.7 | 76 | 80 | 10 | 15,280 | 5.98 | 6.5% | 2.7 | 17.3 | 0.99 |
| California King | 91.6 | 72 | 84 | 10 | 15,216 | 5.95 | 6.5% | 2.7 | 17.2 | 0.98 |



One Day of leachate produced at NEWSVT
(fluoropolymer equivalents)

Technology Chosen

Foam Fractionation (FF)

- During 2019 study FF was not considered proven
- Recent advancements have had marked impact on treatment efficiency
- FF is an absorptive bubble separation technique
- This technology historically has been utilised for proteins, enzymes and surfactant type compounds
- Evaluation will occur in close coordination with vendor selected to assure best possible results



Photos courtesy of EPOC Environmental

SAFF



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SAFF – Building

1. \$4.5mm project budget
 - \$1mm ARPA Grant
2. 60 x 60 building to house leachate treatment system and infrastructure
3. Integrated into existing leachate collection



Testing

Test Results to Date with FF*

| | | |
|----|-------|------------------|
| 1. | PFOA | 95 to ND removal |
| 2. | PFOS | 94 to ND removal |
| 3. | PFNA | ND removal |
| 4. | PFHxS | 70 to ND removal |
| 5. | PFHpA | 40-95% removal |

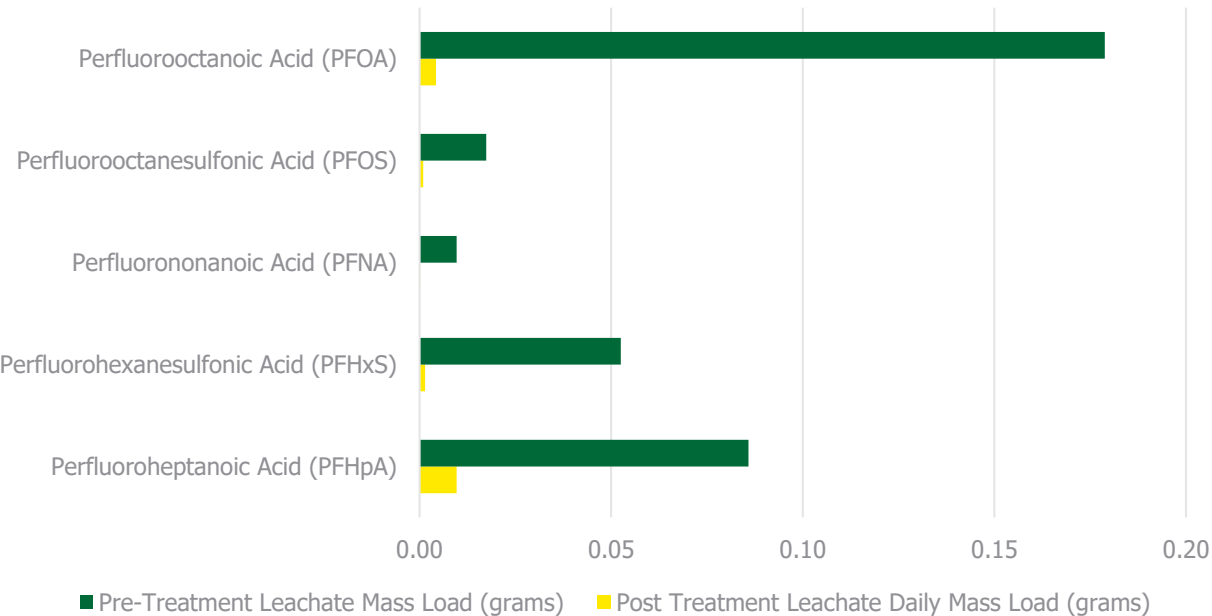
*Removal based on laboratory reporting limits to ND

For NY and Future EPA:

NY – PFDA – ND Removal

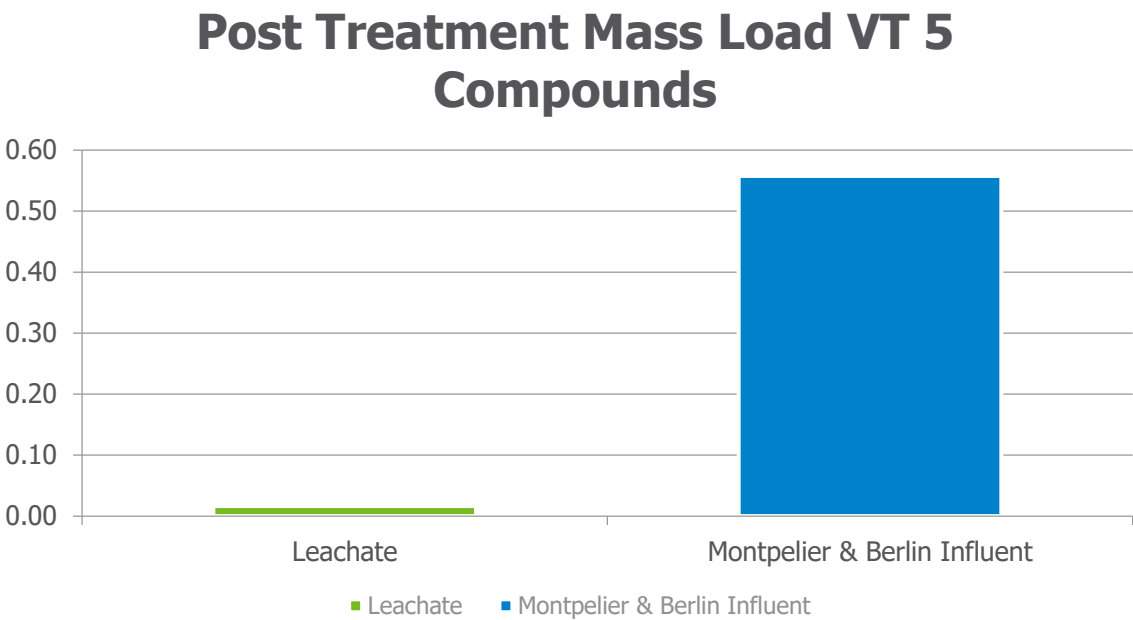
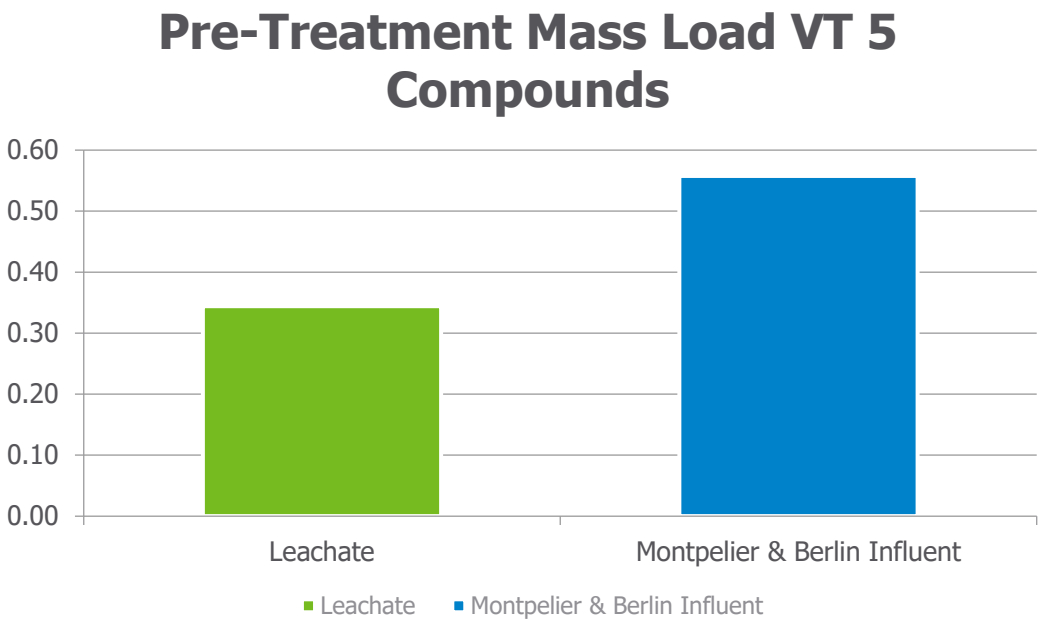
EPA – PFBS – 10-30% Removal (this is a tough one)

Mass Contribution of PFAS from Leachate



Treatment Effectiveness

Our contribution to Montpelier PFA's inputs



Current Focus

1. Optimizing system in preparation for upcoming State require pilot
2. Residuals management (big question in the industry currently)

Thank You!



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