

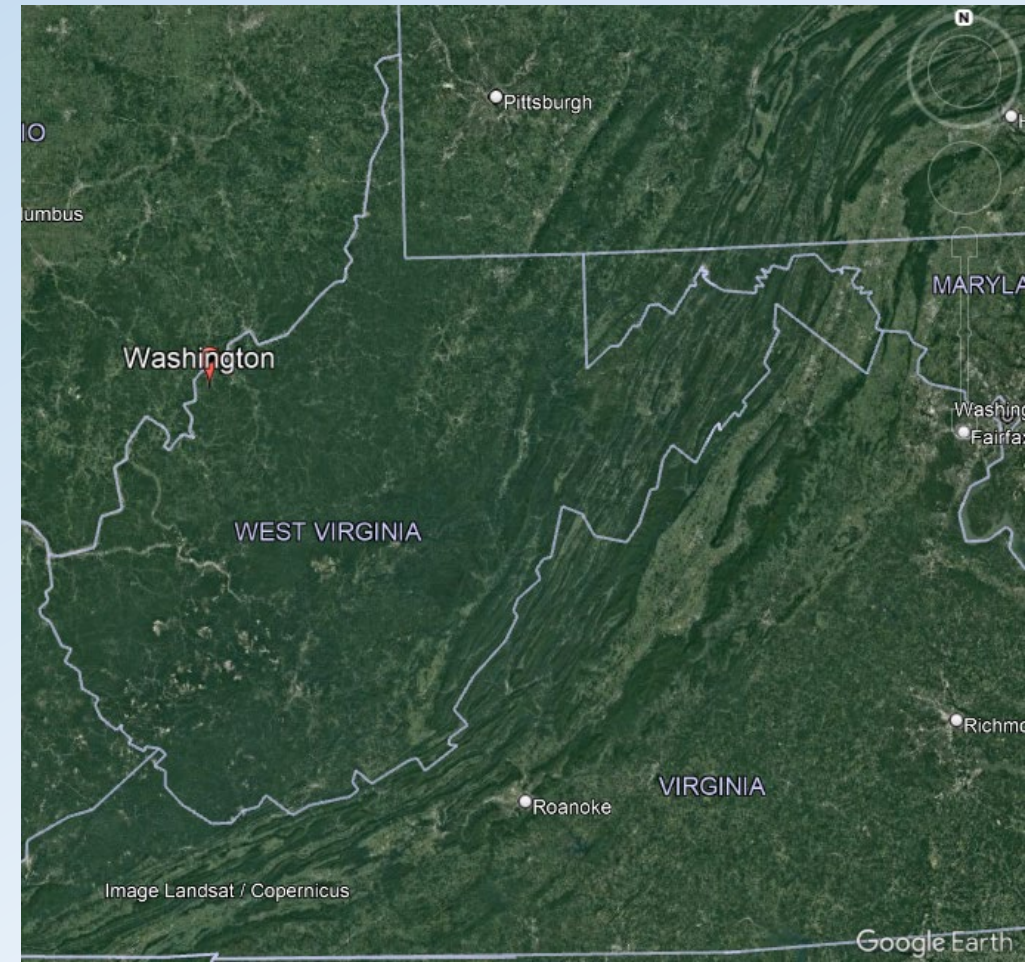


West Virginia Department of Environmental Protection's Experiences with PFAS

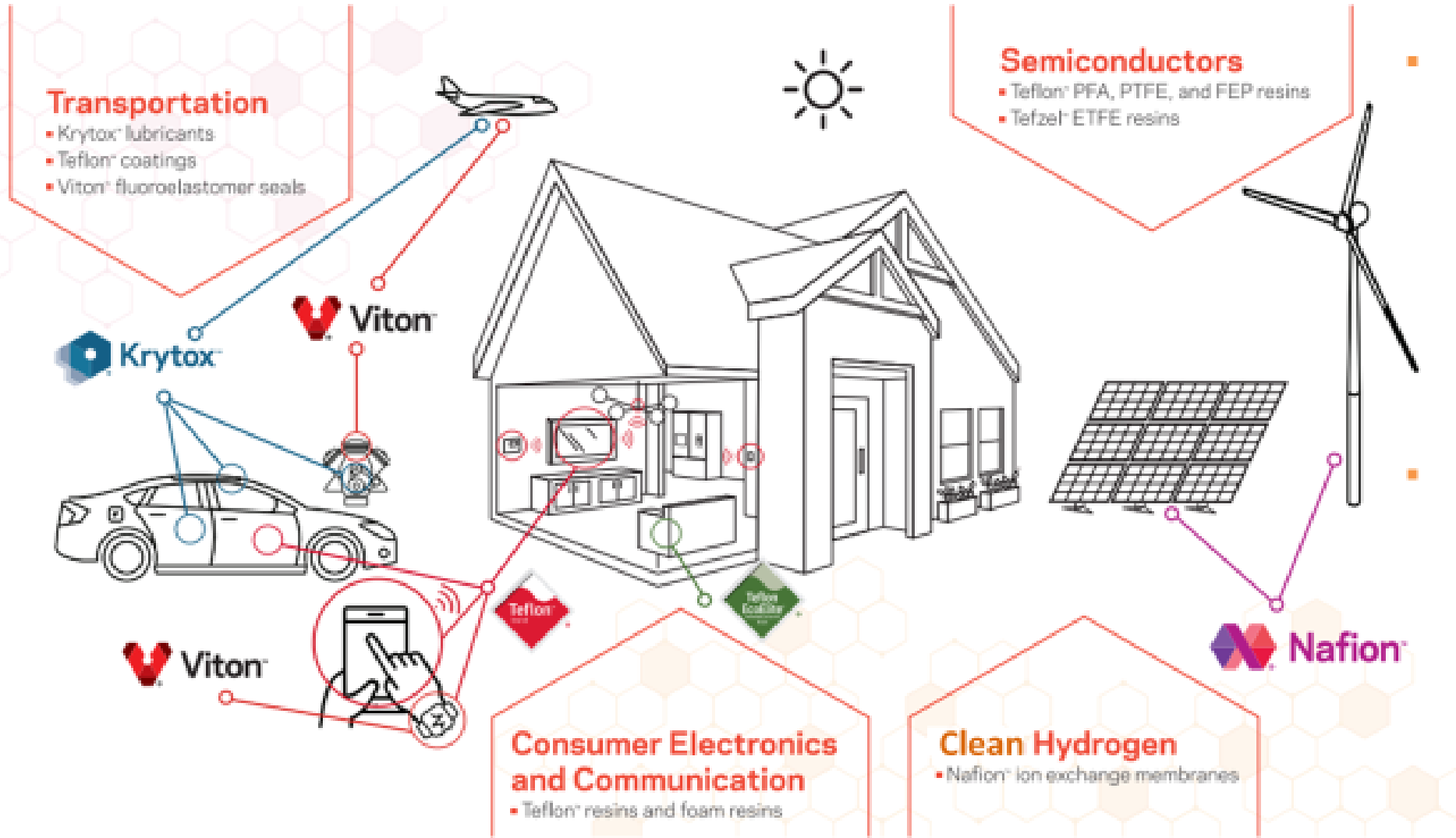
September 26, 2023

DuPont/Chemours Washington Works

- 1940's – Teflon production began
- 1950's – DuPont began using APFO/C8/PFOA
- 2013 – PFOA was phased out and replaced with C3-Dimer Acid/GenX
- 2015 – Part of DuPont was sold to Chemours
- 2015 – WVDAQ banned the use of PFOA
- 2018/2019 – Stack testing was performed with split samples sent to EPA ORD



Advanced Performance Materials (APM)



- Chemours' APM business is supported by two WV plants – **Belle and Washington Works** – that produce critical solutions and play an important role in many **emerging technologies** that are enabling a better future for all.
- Our fluoropolymers are essential building blocks to **advanced electronics, the hydrogen economy, semiconductors, and electric vehicles.**

Table 1
The Chemours Company - Washington Works
TC Scrubber Outlet
Parkersburg, West Virginia

Run Identification	Run 1	Run 2	Run 3	Average
Run Date	23Jul19	23Jul19	23Jul19	
Start/Stop Time	0948-1133	1250-1436	1536-1721	
<u>Exhaust Gas Conditions</u>				
Temperature (deg. F)	117	114	115	115
Moisture (volume %)	9.3	10.4	9.4	9.7
Oxygen (dry volume %)	4.5	4.1	4.1	4.2
Carbon Dioxide (dry volume %)	9.93	9.78	9.81	9.84
<u>Volumetric Flow Rate</u>				
acfm	1,981	1,895	2,068	1,981
dscfm	1,648	1,564	1,724	1,645
<u>C3 Dimer Acid Emissions</u>				
mg/dscm	6.78E-04	1.27E-03	3.01E-04	7.51E-04
lb/hr	4.19E-06	7.47E-06	1.94E-06	4.53E-06
<u>PFOA Emissions</u>				
mg/dscm	6.09E-04	2.01E-04	2.18E-04	3.43E-04
lb/hr	3.76E-06	1.18E-06	1.41E-06	2.11E-06
<u>E-1 Emissions</u>				
mg/dscm	<2.34	<1.67	<1.56	<1.86
lb/hr	<1.44E-02	<9.81E-03	<1.01E-02	<1.14E-02

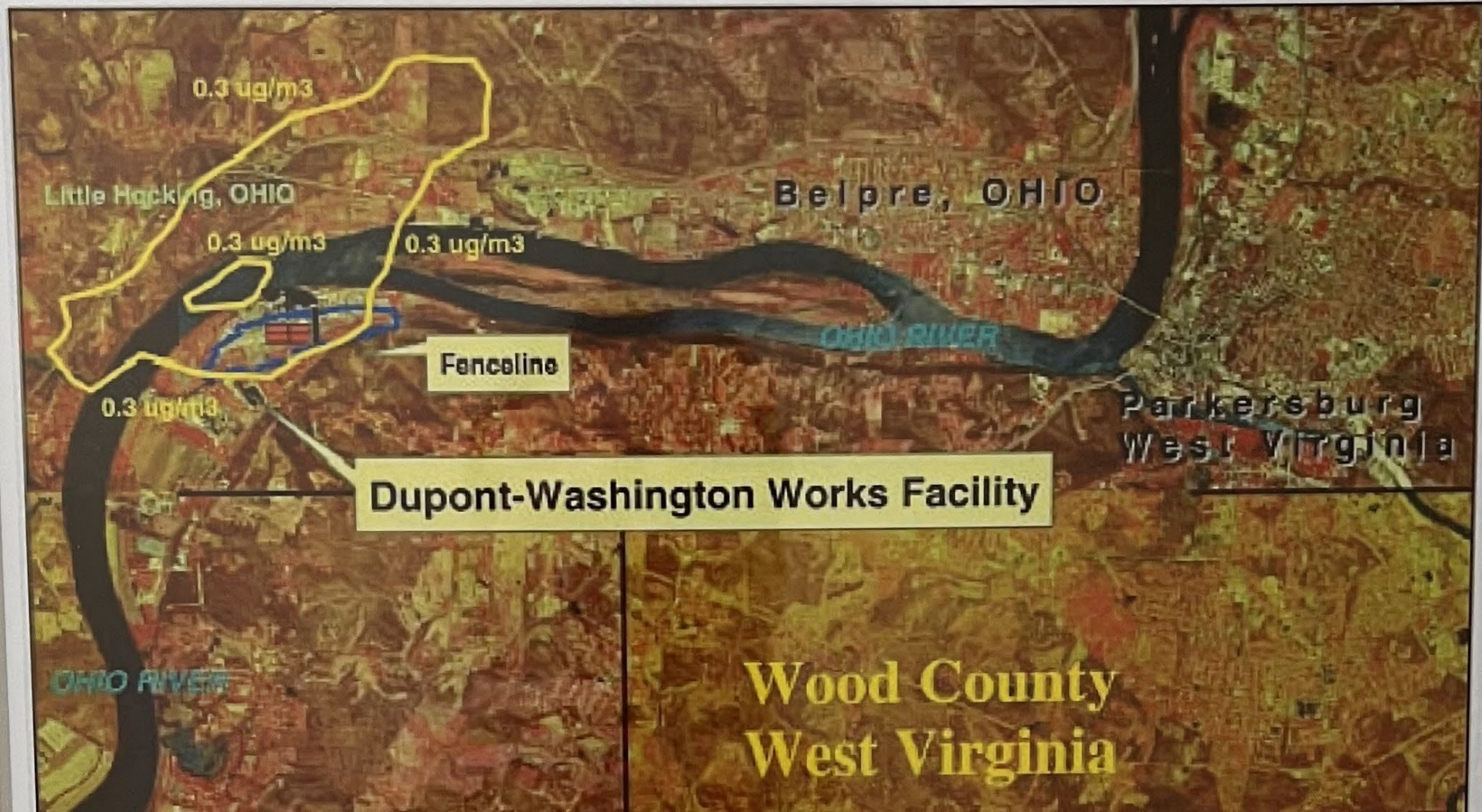
<u>PFBA</u>	mg/dscm	6.35E-02	3.76E-02	5.02E-02	5.04E-02	1.10E-02	6.90E-03	7.22E-03	8.39E-03	
	lb/hr	7.54E-05	4.86E-05	7.07E-05	6.49E-05	1.50E-05	1.37E-05	1.42E-05	1.43E-05	78.0
<u>PFPeA</u>	mg/dscm	5.59E-01	4.97E-01	4.90E-01	5.16E-01	6.04E-02	3.38E-02	2.58E-01	1.18E-01	
	lb/hr	6.64E-04	6.43E-04	6.90E-04	6.66E-04	8.21E-05	6.72E-05	5.08E-04	2.19E-04	67.1
<u>PFHxA</u>	mg/dscm	8.99E-02	1.10E-01	9.63E-02	9.87E-02	5.64E-03	1.66E-03	2.16E-03	3.15E-03	
	lb/hr	1.07E-04	1.42E-04	1.36E-04	1.28E-04	7.67E-06	3.31E-06	4.24E-06	5.07E-06	96.0
<u>PFHpA</u>	mg/dscm	5.02E+00	5.73E+00	5.17E+00	5.31E+00	1.25E-02	1.45E-02	1.38E-02	1.36E-02	
	lb/hr	5.96E-03	7.40E-03	7.28E-03	6.88E-03	1.70E-05	2.88E-05	2.72E-05	2.43E-05	99.6
<u>PFOA</u>	mg/dscm	3.21E-01	4.24E-01	1.01E+00	5.83E-01	1.51E-03	1.35E-03	1.53E-03	1.46E-03	
	lb/hr	3.81E-04	5.49E-04	1.42E-03	7.82E-04	2.05E-06	2.67E-06	3.01E-06	2.58E-06	99.7
<u>PFNA</u>	mg/dscm	5.94E+00	7.43E+00	6.92E+00	6.76E+00	4.50E-03	2.56E-03	2.59E-03	3.22E-03	
	lb/hr	7.05E-03	9.61E-03	9.74E-03	8.80E-03	6.12E-06	5.08E-06	5.08E-06	5.43E-06	99.9
<u>PFDA</u>	mg/dscm	1.89E-01	2.29E-01	2.08E-01	2.09E-01	3.61E-03	1.15E-03	1.13E-03	1.96E-03	
	lb/hr	2.24E-04	2.96E-04	2.93E-04	2.71E-04	4.91E-06	2.29E-06	2.21E-06	3.14E-06	98.8
<u>PFUnA</u>	mg/dscm	4.03E+00	5.26E+00	4.92E+00	4.74E+00	5.37E-03	2.68E-03	2.54E-03	3.53E-03	
	lb/hr	4.79E-03	6.80E-03	6.93E-03	6.17E-03	7.30E-06	5.33E-06	5.00E-06	5.87E-06	99.9
<u>PFDaA</u>	mg/dscm	8.96E-02	1.17E-01	1.12E-01	1.06E-01	3.93E-04	2.13E-04	1.09E-04	2.38E-04	
	lb/hr	1.06E-04	1.51E-04	1.58E-04	1.39E-04	5.34E-07	4.22E-07	2.14E-07	3.90E-07	99.7
<u>PFTriA</u>	mg/dscm	3.27E+00	4.02E+00	4.11E+00	3.80E+00	3.08E-03	2.51E-03	1.53E-03	2.37E-03	
	lb/hr	3.88E-03	5.20E-03	5.78E-03	4.96E-03	4.18E-06	5.00E-06	3.00E-06	4.06E-06	99.9
<u>PFTeA</u>	mg/dscm	4.31E-02	4.60E-02	5.76E-02	4.89E-02	1.14E-04	9.40E-05	5.31E-07	6.94E-05	
	lb/hr	5.12E-05	5.94E-05	8.12E-05	6.39E-05	1.54E-07	1.87E-07	1.04E-09	1.14E-07	99.8
<u>HFPO-DA</u>	mg/dscm	3.75E+02	3.01E+02	4.77E+02	3.84E+02	2.16E+00	2.69E+00	2.21E+01	8.99E+00	
	lb/hr	4.45E-01	3.89E-01	6.72E-01	5.02E-01	2.94E-03	5.35E-03	4.35E-02	1.72E-02	96.6

C8 Annual Average Modeled Air Concentration

Unit of Concentration: micrograms per cubic meter

NOTE: Dupont CEG (community exposure guideline = 0.3 ug/m³)

Modeling based on year 2000 annual actual emissions and most recent facility controls and stack parameters





Assessment of Per- and Polyfluoroalkyl Substances (PFAS) in West Virginia's Public Source-Water Supplies

July 19, 2023

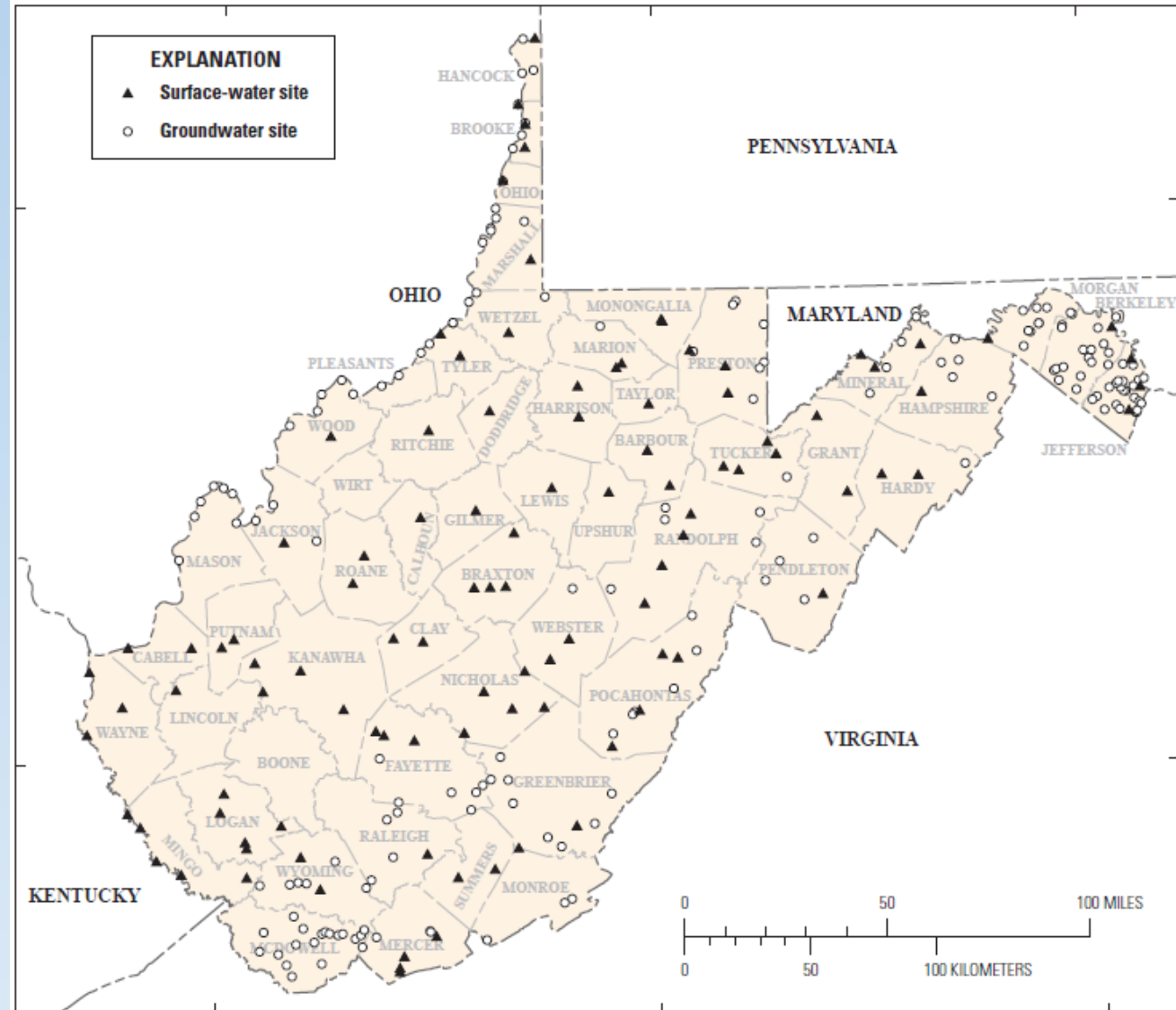
Modified September 26, 2023

2020 SCR 46

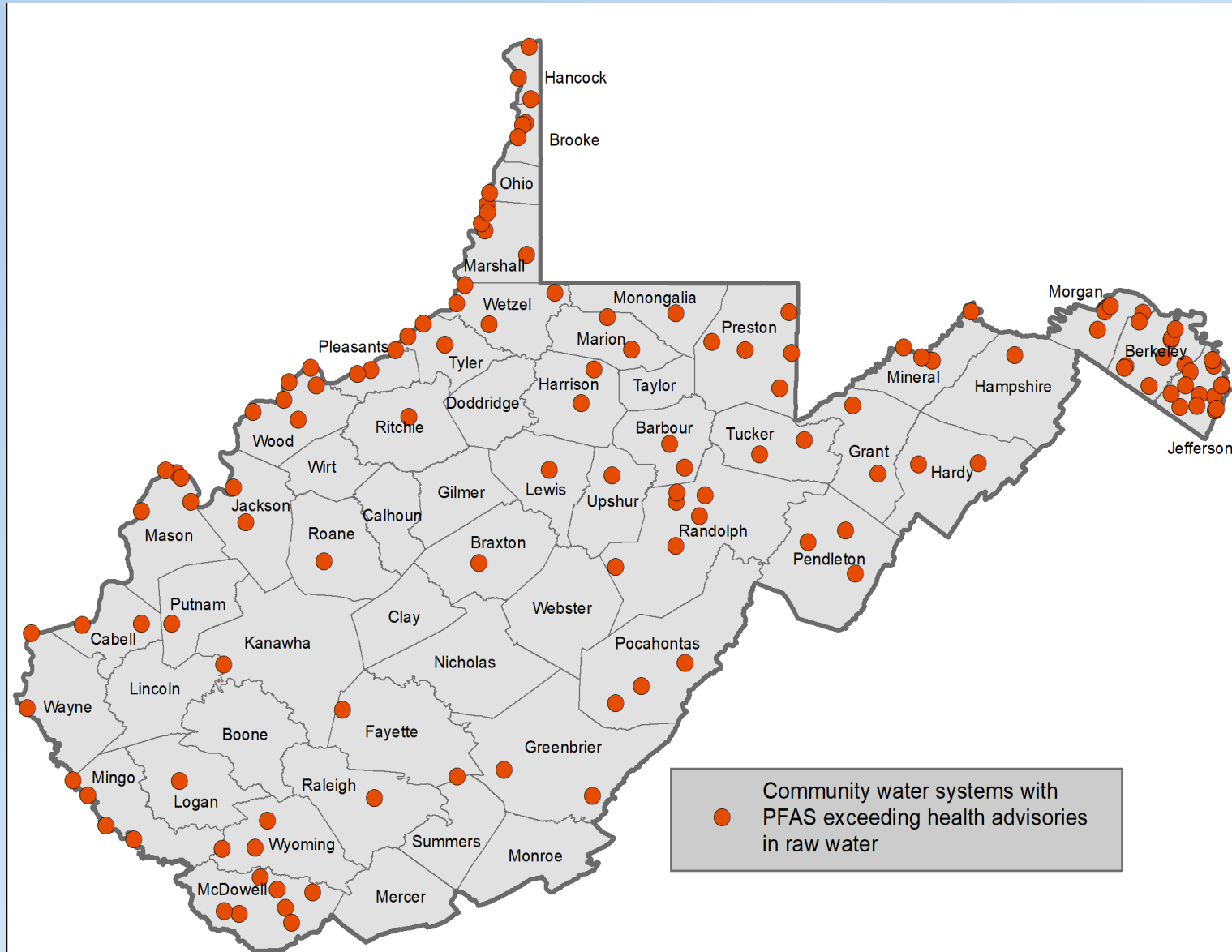
- **Requesting the DEP and the DHHR cooperatively initiate a public source-water supply study plan to sample per and polyfluoroalkyl substances for all community water systems in WV, including schools and daycares that operate treatment systems regulated by the WV DHHR.**
- **Contracted with USGS to sample/test and write a report**

Study Area

- Data collected from May 2019 to May 2021
- 279 environmental samples
- GW and SW sites are not evenly distributed throughout the state



PFAS in WV's Drinking Water Supplies



EPA's Interim Health Advisories: (June 2022)

- **PFOS: 0.02 ppt**
- **PFOA: 0.004 ppt**

EPA's Health Advisories: (June 2022)

- **PFBS 2000 ppt**
- **HFPO-DA (GEN X) 10ppt**

1 ppm is 1 sec in 12 days

1 ppb is 1 sec in nearly 32 years

1 ppt is 1 sec in nearly 32,000 years.

EPA's proposed MCL (March 2023)

Compound	Proposed MCLG	Proposed MCL (enforceable levels)
PFOA	Zero	4.0 parts per trillion (also expressed as ng/L)
PFOS	Zero	4.0 ppt
PFNA (10)	1.0 (unitless) Hazard Index	1.0 (unitless) Hazard Index
PFHxS (9)		
PFBS (2000)		
HFPO-DA (commonly referred to as GenX Chemicals) (10)		

$$\text{Equation Hazard Index} = ([\text{GenXwater}] / [10 \text{ ppt}]) + ([\text{PFBSwater}] / [2000 \text{ ppt}]) + ([\text{PFNAwater}] / [10 \text{ ppt}]) + ([\text{PFHxSwater}] / [9.0 \text{ ppt}])$$

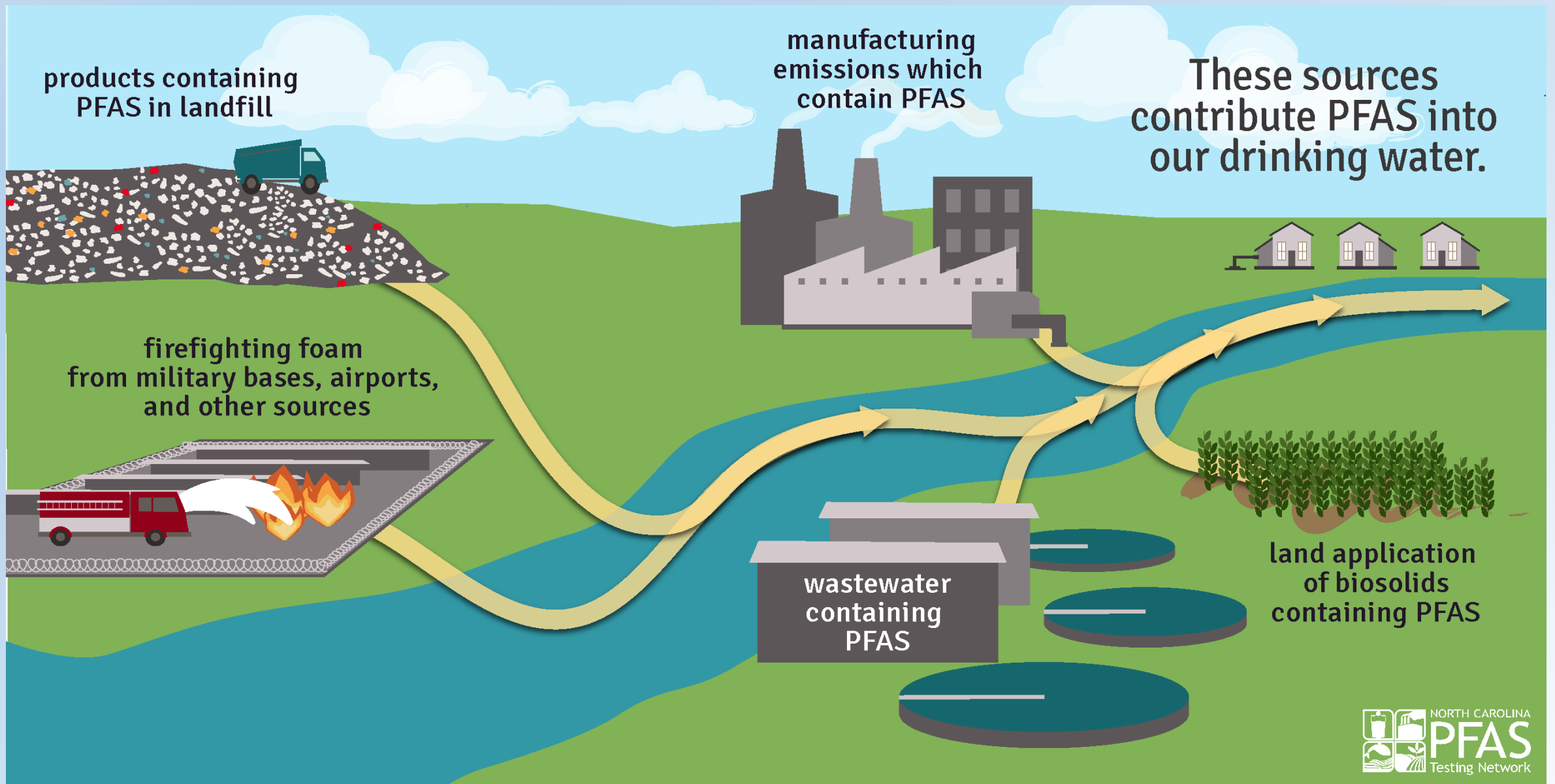
- **Step 1.** Divide the measured concentration of Gen X by the health-based value of 10 ppt
- **Step 2.** Divide the measured concentration of PFBS by the health-based value of 2000 ppt
- **Step 3.** Divide the measured concentration of PFNA by the health-based value of 10 ppt
- **Step 4.** Divide the measured concentration of PFHxS by the health-based value of 9 ppt
- **Step 5.** Add the ratios from steps 1, 2, 3 and 4 together.
- **Step 6.** To determine HI compliance, repeat steps 1-5 for each sample collected in the past year and calculate the average HI for all the samples taken in the past year.
- **Step 7.** If the running annual average HI greater than 1.0, it is a violation of the proposed HI MCL.

USGS Raw Water Study statistics

- **PFOA + PFOS** 37 sites had hits above the PQL (13%), 100 sites had hits above MDL but below the PQL (36%), total=137 (49%), all are above the HA
- **PFOA** HA 0.004ppt -29 sites had hits above the PQL (10%), 94 sites had hits above the MDL but less than the PQL (34%). Total=123 (44%)
- **PFOS** HA 0.02ppt - 16 sites had hits above PQL (6%), 30 sites had hits above the MDL but less than PQL (11%), total=46 (16%)
- **GEN X (HFPO-DA)** HA 10ppt - 3 sites had hits above the PQL (1.1%) none above the HA, 26 sites had hits above the MDL but below the PQL (9%), total =29 (10%)

- **PFBS HA 2000ppt**
- **12 sites had hits above the PQL (4.3%) none above HA, 64 sites had hits above the MDL but below the PQL (23%), total=76 (27%)**
- **General statistics on the 28 PFAS compounds tested for**
- **166 sites have hits above the MDL for PFOA, PFOS, PFBS or Gen X (59%)**
- **48 sites had a hit above the MDL for a PFAS other than PFOA, PFOS, GEN X or PFBS**
- **214 sites had a hit of some PFAS above the MDL (77%)**

How do PFAS enter drinking water supplies?



Results of Finished Drinking Water at 37 intakes

- **19 hits above the new proposed MCL(17 ground water and 2 surface water)(6 PFOA)(12 PFOS)(1 GENX)**
- **9 hit below 4.0 ppt**
- **27 hits above the new Health advisory**
- **7 have Hazard Index above 1.0**

The PFAS Protection Act: HB 3189

- Requires DEP to develop action plans to identify and address the sources of PFAS in raw water (**Getting started this month**)
- DEP shall initiate a study to test the finished drinking water for the 100 sites with PFAS hits above the HA that have not been tested (**DEP has a contract with USGS to test 106 additional finished water samples, testing will begin in October 2023**)
- Industries which manufacture, use, or have used PFAS chemicals in their production process must report the use to DEP, and the DEP is required to add quarterly monitoring of the chemical to the discharge (**Sending a letter to all NPDES holders to notify them of their responsibility**)
- After EPA establishes a recommended WQS for PFAS, DEP shall propose adopting appropriate criteria by rule
- Water companies must report findings of PFAS in UCMR5 to the customers

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