Establishing Regulatory Limits for PFAS in Virginia Drinking Water

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ICPRB - Potomac River Basin Drinking Water Source Protection Partnership



Virginia Department of Health May 05, 2021



HB586

HB1257

Patron: Delegate Guzman (GA 2020)

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- The State Health Commissioner to convene a PFAS workgroup,
- Conduct a detailed investigation on current literature and what other states are doing,
- Conduct PFAS occurrence study at no more than 50 waterworks and source waters,
- May develop MCL guidelines
- Timeline: December 01, 2021

Potential Issues: No state funding

- Establish MCLs for PFOA, PFOS, and other PFAS compounds, 1,4-Dioxane, and Chromium (VI)
- Provide status report by 11/01/2020
- Provide detailed report by 10/01/2021
- Effective Date: 01/01/2022

Potential Issues:

- No comprehensive PFAS,1,4-dioxane, or Cr(VI) occurrence data in VA
- No funding



PFAS Analytes

May develop recommendations for specific maximum contaminant levels (MCLs) for:

- Perfluorooctanoic acid (PFOA)
- Perfluorooctane sulfonate (PFOS)
- Perfluorobutyrate (PFBA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorohexane sulfonate (PFHxS)
- Perfluorononanoic acid (PFNA)

And other PFAS "as deemed necessary"



Virginia PFAS Workgroup - Scope

Scope: PFAS in Drinking Water only (including source waters)





VA PFAS Workgroup - Outreach

ODW reached out to stakeholders via:

- Waterworks Advisory Committee (WAC)
- VA Water/Wastewater Agency Response Network (VA WARN)
- Other VDH communications
- Through ODW Field offices/Regional contacts



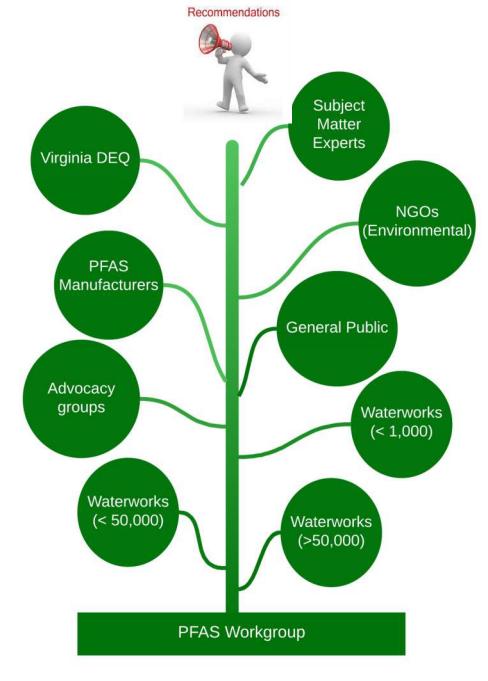


PFAS Workgroup Member Expectations

- Possess knowledge/expertise in "emerging contaminants in the environment"
- Participate and contribute to the topic of interest (PFAS and emerging contaminants in drinking water) at meetings (3 4 hours)
- Commitment of 5-10 hours per month to study, review, interpret and develop new documents / guidelines / recommendations
- Participate and contribute to at least one sub-workgroup



PFAS Workgrou rginia



4 people - Community waterworks serving>50,000 persons.*

1 person - Community waterworks serving < 50,000 persons.*

1 person - Community waterworks serving< 1,000 persons.*

2 people – VA advocacy groups represents waterworks

1 person - A manufacturer with chemistry experience.

2 people - Non-governmental environmental organizations.

1 person – A consumer of public drinking water.

1 person - ODW's technical staff

1 person - Commonwealth of Virginia State Toxicologist.

1 person - VDH local health department (District Health Director)

1 person - The Virginia Department of Environmental Quality (DEQ).

*At least one representative from community waterworks from a private company that operates waterworks.









"Water is the only drink for a wise man." ~Henry David Thoreau











American Water Works Association

• Virginia Section

















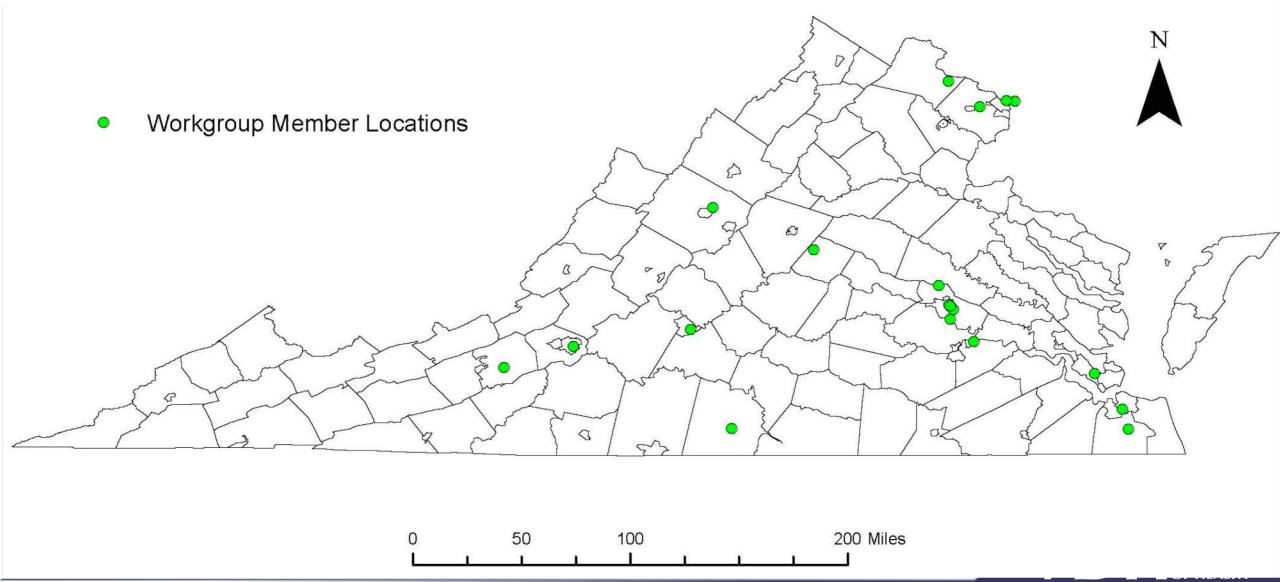








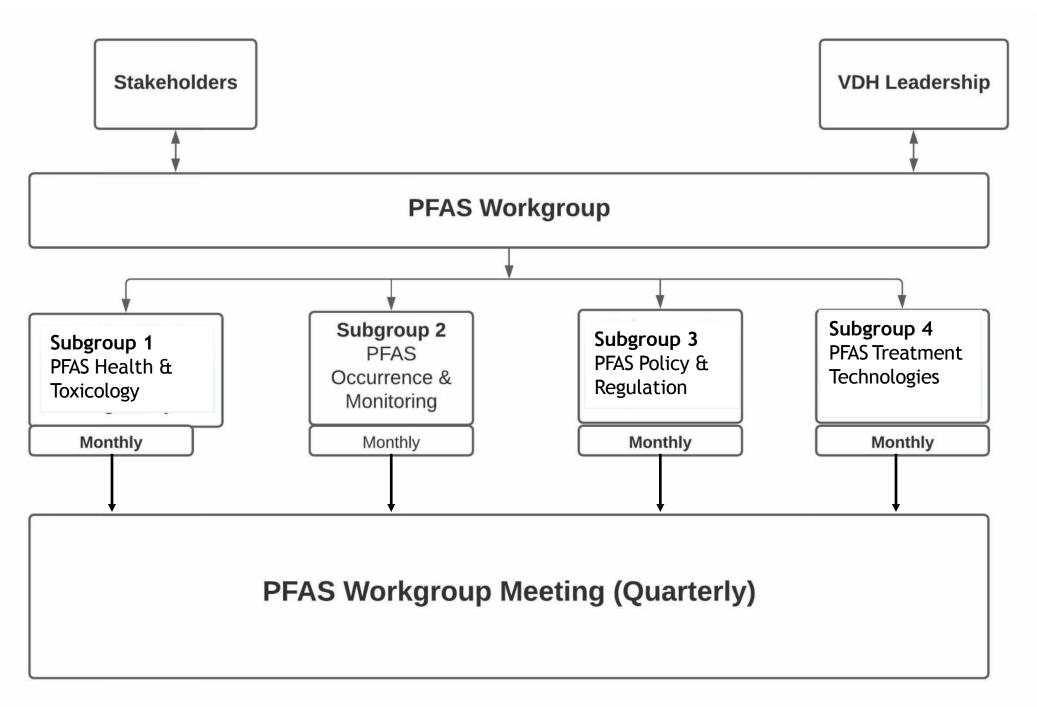
Geographical Coverage



Virginia PFAS Subgroups

- PFAS Health & Toxicology
 - Health impact/Risk Assessment; Selection of PFAS
- PFAS Occurrence & Monitoring
 - Design and Coordinate a PFAS Sampling & Monitoring Study
- PFAS Policy and Regulatory
 - How the above data/info could be used for Virginia?
- PFAS Treatment Technologies
 - Best Available Treatment Technologies, economics & relevance to VA







Data sharing – MS Teams/SharePoint

Meeting information on Town Hall (www.townhall.virginia.gov).

PFAS Webpage: www.vdh.virginia.gov/drinking-water/pfas/

Tech and Admin support – Office of Drinking Water (ODW) staff

Meeting Information –

Meeting #	When (Tentative)	Where
1	October 2020	Virtual
2	January 2021	Virtual
3	March 2021 (Interim)	Virtual
4	April 2021	Virtual
5	July 2021	Northern Virginia
6	October 2021	Southwest Virginia



VA PFAS Sampling Study Design

Approaches based on:

- Available funding → number of sampling sites
- Maximum public health risk reduction
- Proximity to potential PFAS contamination

Strategy

- 1. Hybrid approach using ArcGIS
 - 1. Large waterworks (Surface water systems)
 - 2. Select potential high risk Groundwater systems
 - 3. Select source waters intakes



PWSID	PWS name	City / County	Population	# EPs	#CCs
6059501	FAIRFAX COUNTY WATER AUTHORITY	FAIRFAX COUNTY	1074422	2	1
3810900	VIRGINIA BEACH, CITY OF	VIRGINIA BEACH	446067	0	1
3700500	NEWPORT NEWS, CITY OF	NEWPORT NEWS	407300	2	0
4041845	CHESTERFIELD CO CENTRAL WATER SYSTEM	CHESTERFIELD	320658	1	2
4087125	HENRICO COUNTY WATER SYSTEM	HENRICO	292000	1	1
6107350	LOUDOUN WATER - CENTRAL SYSTEM	LOUDOUN	286202	1	1
3710100	NORFOLK, CITY OF	NORFOLK	234220	2	0
6013010	ARLINGTON COUNTY	ARLINGTON	215000	0	1
4760100	RICHMOND, CITY OF	RICHMOND CITY	197000	1	0
3550051	CITY OF CHESAPEAKE - NORTHWEST RIVER SYS	CHESAPEAKE	166704	2	0
2770900	WESTERN VIRGINIA WATER AUTHORITY	ROANOKE CITY	155000	2	0
6153600	PWCSA - EAST	PRINCE WILLIAM	153000	0	1
6510010	ALEXANDRIA, CITY OF	ALEXANDRIA	146970	0	2
6153251	PWCSA - WEST	PRINCE WILLIAM	130001	0	2
3740600	PORTSMOUTH, CITY OF	PORTSMOUTH	120400	1	0
6179100	STAFFORD COUNTY UTILITIES	STAFFORD	112285	2	0
6177300	SPOTSYLVANIA COUNTY UTILITIES	SPOTSYLVANIA	84390	2	0
Totals				19	12

Total EP + CC = 31





Potential PFAS Contamination - Heat Maps

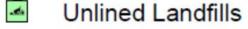
- Focus on "community and NTNC" waterworks
- Prioritize based on risk due to proximity to certain activities:
 - Landfills
 - Airports
 - Industrial sites
 - Military usage and discharge of fire fighting foams
- Known or suspected contamination
- Any previous available data

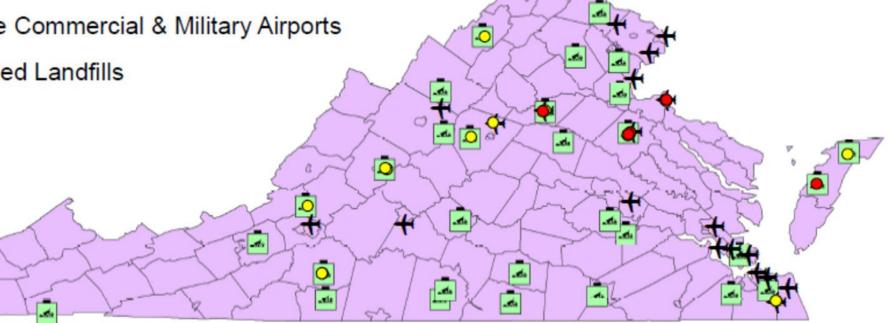






- High Risk Sources
- Moderate Risk Sources
- Large Commercial & Military Airports





Potential High Risk: < 1/2 mile of large airport or unlined landfill

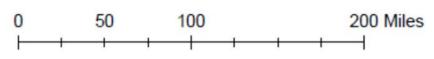
Potential Moderate Risk: <1 mile of large airport or unlined landfill

6 – Potential High risk wells

--→ 5 Systems

13 – Potential Moderate risk wells. --→ 11 Systems







System Name	PWSID	Facility Name	ID	System	Population
				Type	Served
NAVAL SUPPORT FACILITY_DAHLGREN	6099340	WELL3 -BLDG 274A (RESERVOIR WELL)	WL003	C	11000
NAVAL SUPPORT FACILITY_DAHLGREN	6099340	WELL 1 -BLDG 1288 (BRONSON WELL)	WL001	C	11000
BOWLING GREEN_TOWN OF	6033550	WELL4	WL004	С	1152
PUNGOTEAGUE ELEMENTARY SCHOOL	3001790	WELL	WL001	NTNC	610
RSAROUTE 20	6137120	WELL#2 (MAY LANE)	WL002	С	6 387
FT A PHILL - HEADQUARTERS	6033251	WELL HQ #2 (PWAT 28)	WL028	С	180
NAVAL SUPPORT FACILITY_DAHLGREN	6099340	WELL2 -BLDG 1190 (CASKEYWELL)	WL002	С	11000
BOWLING GREEN_TOWN OF	6033550	WELL5	WL005	C	1152
BOWLING GREEN_TOWN OF	6033550	WELL 1A	WL01A	C	1152
LONGHOLLOW	2163400	LHWDC WELL1	WL001	С	578
LONG HOLLOW	2163400	LHWDC WELL2	WL002	С	578
EARLYSVILLE FOREST	2003255	WELL 6	WL006	С	488
EARLYSVILLE FOREST	2003255	WELL5	WL005	C	488
PEACOCK HILL SUBDIVISION	2003650	WELL8	WL008	С	475
RSAROUTE 20	6137120	WELL#1 (PORTER RD)	WL001	C	387
MOUNTAIN VIEW ELEM SCHOOL	2163560	MTN VIEW WELL	WL001	NTNC	250
ROANOKE CEMENT COMPANY	2023180	WELL-ROANOKE CEMENT COMPANY	WL001	NTNC	190
FT A PHILL - HEADQUARTERS	6033251	WELL HQ#1 (PWAT29)	WL029	C	180
FRANKLIN COUNTY COMMERCE CENTER	5067137	WELLNO. 5	WL005	NTNC	103,



Groundwater Systems



Major Water Sources

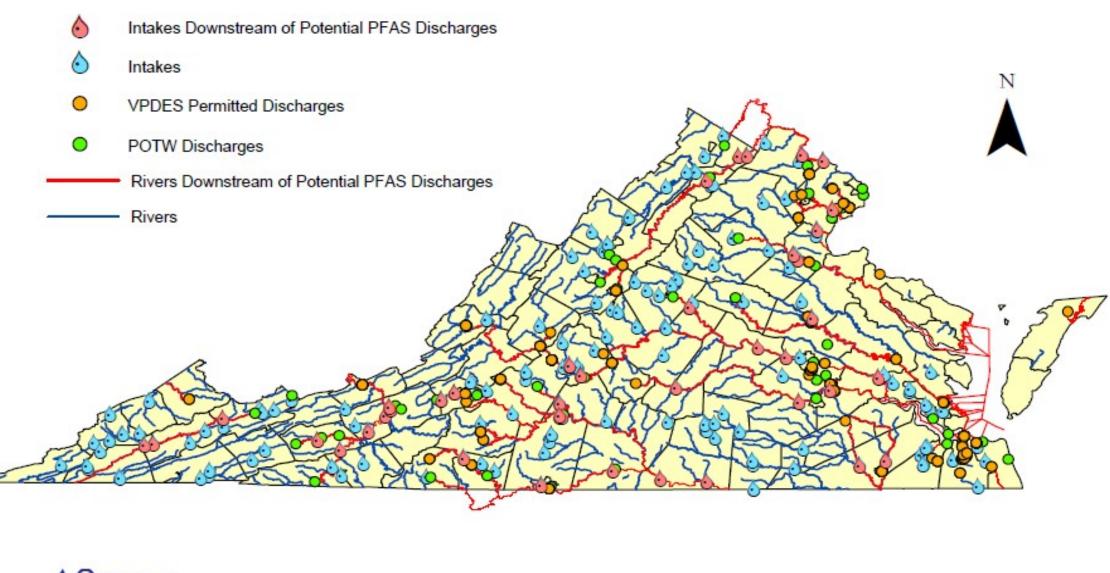
VDH-VDEQ lists of potential sources of PFAS:

- VPDES discharge permits (Potential direct dischargers)
- POTWs with Significant Industrial Users

Based on Standard Industrial Classification (SIC) Codes for

- Significant Industrial Users
- Direct Dischargers
- Potential use and/or discharge PFAS











Major Water Sources

- Traced potentially impacted drinking water intakes (45 intakes)
- Excluded intakes from 17 large systems covered by entry point sampling
- Sorted the remaining list (largest to smallest population served)
- Select one intake for each PWS
 - Yielded 29 intakes; Proposal is to select 22 from this list
 - Preference based on vulnerable age groups; population served etc
 - DEQ and ODW input may adjust priority from this list

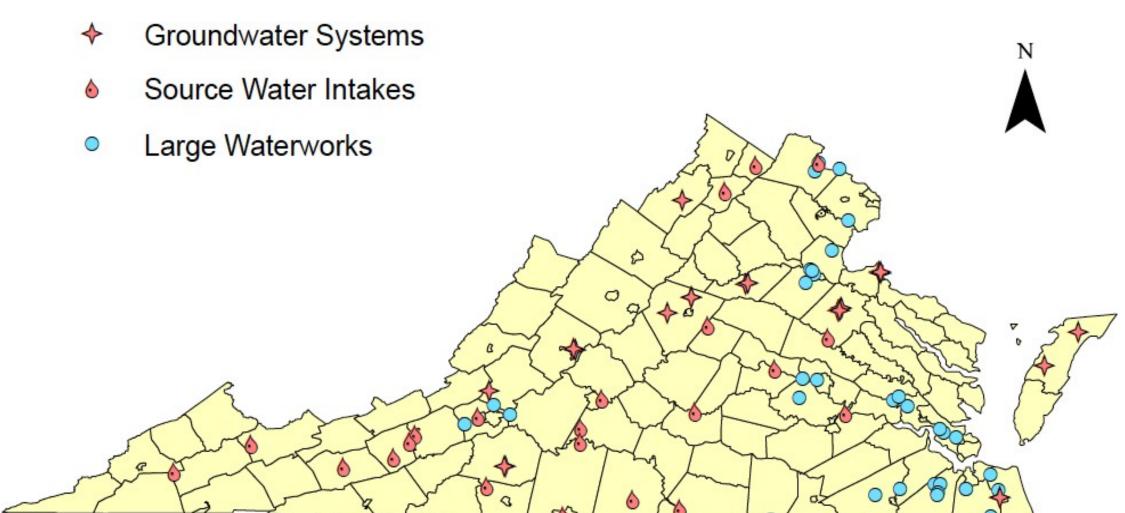


5680200	LYNCHBURG, CITY OF	JAMES RIVER-ABERT
4085398	HANOVER SUBURBAN WATER SYSTEM	NORTH ANNA RWI
6107300	LEESBURG TOWN OF	POTOMAC INTAKE
5590100	DANVILLE, CITY OF	DAN RIVER INTAKE
5089852	UPPER SMITH RIVER WATER SUPPLY	SMITH RIVER INTAKE
3670800	VIRGINIA-AMERICAN WATER CO.	APPOMATTOX RIVER
2775300	CITY OF SALEM WTP	ROANOKE RIVER
5031150	CAMPBELL COUNTY CENTRAL SYSTEM	BIG OTTER RIVER
6153675	QUANTICO MARINE BASE-MAINSIDE	BRECKINRIDGE RESERVOIR
1750100	RADFORD CITY OF	INTAKE ON NEW RIVER
2187406	FRONT ROYAL TOWN OF	SOUTH FORK SHENANDOAH RIVER
2065480	LAKE MONTICELLO	RIVANNA RIVER
1195900	WISE COUNTY REGIONAL WATER SYSTEM	CLINCH RIVER INTAKE
1155641	PULASKI COUNTY PSA	CLAYTOR LAKE
5780600	HCSA- LEIGH STREET PLANT	RAW WATER INTAKE
5147170	FARMVILLE TOWN OF	APPOMATTOX RIVER
1197810	WYTHEVILLE TOWN OF	REED CREEK
4075735	JAMES RIVER CORRECTIONAL CTR	JAMES RIVER INTAKE
1185695	RICHLANDS TOWN OF	IN001 - CLINCH RIVER INTAKE
2043125	BERRYVILLE_ TOWN OF	SHENANDOAH RIVER
5031050	ALTAVISTA, TOWN OF	STAUNTON RIVER
1121643	RADFORD ARMY AMMUNITION PLANT	NEW RIVER
5117310	CLARKSVILLE TOWN OF	KERR RESERVOIR INTAKE
1195700	ST PAUL TOWN OF	CLINCH RIVER
5117707	ROANOKE RIVER SERVICE AUTHORITY	LAKE GASTON INTAKE
2043634	MOUNT WEATHER EMERGENCY OPERATION CENTE	SSHENANDOAH RIVER
1121057	NRV REGIONAL WATER AUTHORITY	NEW RIVER (RAW WATER) PUMP STATION
1197435	NEW RIVER REGIONAL WATER AUTHORITY	INTAKE - NEW RIVER
4041035	APPOMATTOX RIVER WATER AUTHORITY	LAKE CHESDIN RAW WATER INTAKE

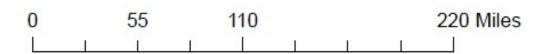


Group -3 Major Water Sources (Intakes)













Hybrid Approach Summary

	# Samples	# Systems	Population
17 Large Waterworks	31	17	4,541,619
GW – Potential High Risk	6		13,329
GW – Potential Medium Risk	13	11	2,124
Major Water Sources	22	22	
Total	72	50	4,557,072



Sampling Procedure

- •Waterworks personnel will collect PFAS samples from:
 - Entry points to the distribution system
 - Consecutive Connections
 - Intakes (raw water sample taps)
- VDH-ODW will provide written PFAS sampling instructions
- A VA PFAS Sampling webinar was organized on April 14, 2021, and is available on VDH-ODW PFAS webpage and VDH youtube channel https://youtu.be/YJ63us3RS0U





Selection of Analytical Method

- Perfluorooctanoic acid (PFOA)
- Perfluorooctane sulfonate (PFOS)
- Perfluorobutyrate (PFBA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorohexane sulfonate (PFHxS)
- Perfluorononanoic acid (PFNA)

VDH-ODW will monitor for 25 analytes using EPA Method 533 (Isotope dilution method)

VDH contracted a lab that is certified for both EPA Method 533 and PFAS by LCMSMS Compliant w/ QSM 5.3 Table B-15 (DoD method)



Communications with Stakeholders

- 1. VDH-ODW Regional Field office staff reached out to owners (via phone/email)
 - Heads-up, initial conversation
- 2. Formal letter to Waterworks owners/operators (via email)
 - Informs owners
 - Requests owners to indicate willingness to participate
 - Requests point of contact and shipping address for sample kits
 - Included PFAS sample study design document
- 3. Formal letter to Local Health Districts/Environmental Health Managers (via email)
 - General awareness
 - Local point of contact for PFAS informational material at LHDs
 - Included PFAS sample study design document



Feedback from Stakeholders

- Overall very positive
- 28 Waterworks have responded "Yes" so far
- 1 declined; 1VDH withdrew request
- Rest still waiting

Some concerns about sharing the PFAS results & need for more support/information



VA PFAS Sampling Logistic Updates

- Phase 1 VA PFAS Sampling will consist of Entry Point sampling and groundwater systems
- Phase II will focus on source water sampling; analytical method issue
- Recommended sampling on the week of May 10th 2021;
- The lab will start shipping PFAS sampling kits on April 30, 2021; Return shipping label will be included in the kits.



Information Handling/Sharing

VDH-ODW is working on a "PFAS Communication Toolkit"

- Plans for how and when to share the results.
- Fact sheets for waterworks owners and general public
- Messaging for customers
- Available resources for Waterworks and general public on PFAS in Drinking Water



PFAS Sampling Study: Data Review, Verification, and Validation

Data review will begin with comparison of the laboratory reports (received as .pdf files) and Electronic Data Deliverable (EDD) files

ODW will:

- review each sample report for data qualifiers indicating a data quality problem.
- review the field reagent blanks associated with each water sample to confirm the field reagent blank is clean.
- review the recovery of analytes near or at the Method Recovery Limit (MRL) to confirm results are within method limits.
- compare the chain of custody information in the data with the contents of the laboratory report to confirm sample location, sample collection time and date, and evaluate sample hold times for compliance with the method requirements.
- review the case narrative for data qualifiers.

In addition, ODW will conduct in-depth review on at least 20% of the water samples for quality assurance purposes.

Sampling Results

- Laboratory reports emailed to ODW and waterworks
- Electronic Data Deliverable (EDD) emailed to ODW

ODW will maintain results in a searchable database

- Reports for Subgroup & Workgroup Meetings
- Not in SDWIS; Not available on Drinking Water Watch (DWW)

Quality Assurance Project Plan (QAPP)

- Specifies project quality assurance requirements
- Evaluate if data meets Quality Control (QC) criteria
- Evaluate usability and bias of data not meeting criteria
- Discard data if it fails QA/QC requirements



In-depth Data Validation

Reviewing laboratory records

Method 533 requirements:

Preservation and holding times;

Instrument performance check;

Initial calibration;

Quality Control of Samples;

Continuing Calibration Check

Field Duplicates;

Field Reagent Blanks;

Laboratory Fortified Sample Matrix;

Blanks

Surrogate Analyte Standard percent

recovery

Laboratory Fortified Blank

Matrix spike and matrix spike duplicate

analysis

Internal Standard

Target Analyte Identification

Target Analyte Quantification

System Performance

Performance Evaluation Sample

Regional Quality Assurance and

Quality Control

Overall Assessment of Data



Moving forward; April - June 2021

- PFAS sampling related activities are underway
- PFAS Communication Toolkit under prepartion
- PFAS webpage https://www.vdh.virginia.gov/drinking-water/pfas/
- PFAS report due to the VA General Assembly by October 01, 2021
- VDH-ODW will have the PFAS results by June 2021



Have any Question, Comment or Suggestion, contact Us

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