

PFAS (Per-and Polyfluoroalkyl Substances) The City and County of Broomfield

City and County of Broomfield Industrial Pretreatment Department
Leigha Gad

Agenda

PFAS Overview

City and County of Broomfield PFAS Permit Timeline

City and County of Broomfield Permit Sampling

Source Investigation Study Sampling and Inspections

Challenges

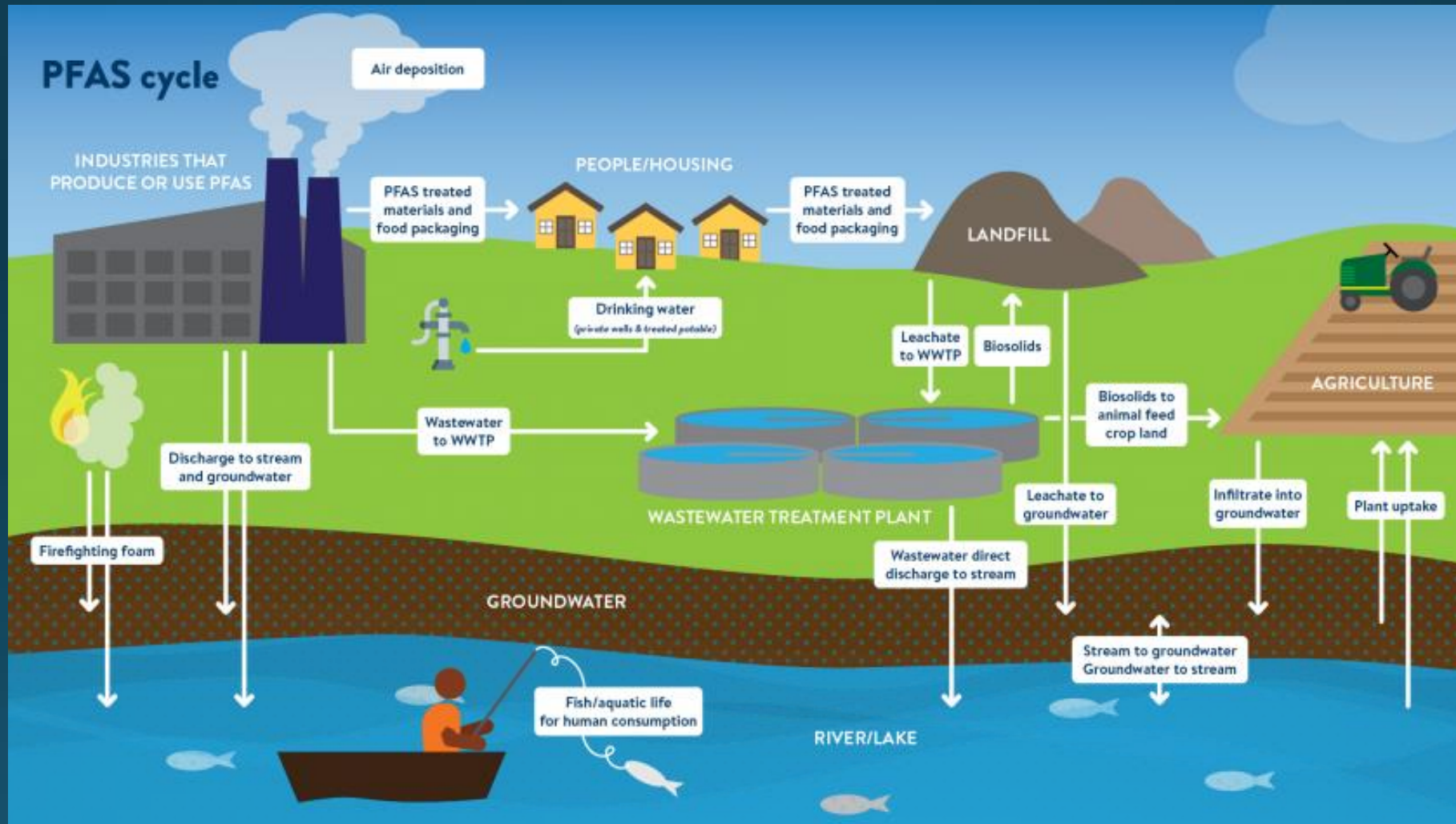
Current and Future of PFAS

What is PFAS?

- The per- and polyfluoroalkyl substances (PFAS) are a group of chemicals used to make fluoropolymer coatings and products that resist heat, oil, stains, grease, and water. PFAS can be in a variety of products. These include clothing, furniture, adhesives, food packaging, AFFF foam, and non-stick cooking surfaces. PFAS are a concern because they:
 - do not break down in the environment.
 - can move through soils and contaminate water sources.
 - bio accumulate in fish and wildlife.
 - potential to cause adverse health effects.



PFAS Water Cycle



The City and County of Broomfield (CCOB) Permit Timeline for PFAS

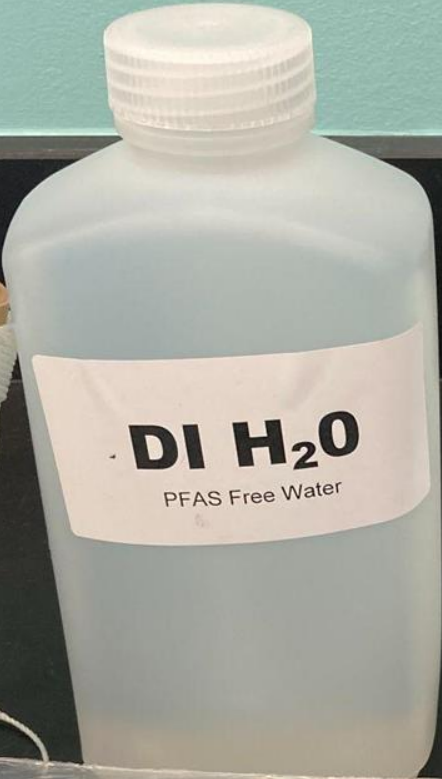
- **January 2020**- CCOB permit was reissued.
- **August 2020**-Completed the Colorado Department of Public Health and Environment (CDPHE) PFAS Survey.
- **May 2021**-Notification of potential permit modifications for wastewater permits to include PFAS sampling.
- **August 2021**-CCOB received a call that the CCOB permit will implement PFAS monitoring.
- **November 2021**-CCOB permit was officially reopened to include PFAS monitoring.
- **January 2022**-CCOB CDPS Permit went into effect for PFAS sampling at the Effluent and Reuse Effluent.
- The permit modification included a PFAS Source Identification Study. Due June 30, 2024.
 - “Submit final study results summarizing PFAS influent and effluent data to date, analyzing temporal trends or patterns in the data, and identifying sources of PFAS to the facility. Source investigations could include identifying potential sources, evaluation source control options, industrial user inventories, or other investigations.”

City and County of Broomfield Permit Sampling

- Locations: Effluent and Reuse
- Sample Collection: Bailer and direct outfall grab
- Blanks: Equipment Blank (Bailer) and Field Blank for each location, PFAS Free Water
- Clothing: 100% Cotton shirt, jeans, and steel toe boots
- Analysis: EPA 537 Modified Water Method
- Parameters: 25 PFAS constituents and a sum equation of 7 constituents
- Duration: Monthly monitoring January 2022-December 2023
- Report: Monthly DMR

Source Investigation Sampling

- Locations: Influent, 6 Domestic Areas, 4 Industrial Areas, 2 Airport Areas, and 3 Discharging Industries
- Sample Collection: Bailer and portable sampler
- Blanks: Equipment Blank (Bailer or portable sampler) and Field Blank for each location, PFAS Free Water
- Clothing: 100% Cotton shirt, jeans, and steel toe boots
- Analysis: EPA 537 Modified Water Method
- Parameters: 25 PFAS constituents and a sum equation of 7 constituents
- Duration: Monthly sampling events then will re-evaluate next steps
- Report: Source Investigation Study to the State due June 30, 2024



<u>ICIS Code</u>	<u>Effluent Parameter</u>	<u>Effluent Limitation</u>		<u>Monitoring Requirements</u>	
		<u>Daily Maximum</u>	<u>30-day Average</u>	<u>Frequency</u>	<u>Sample Type</u>
51521	Perfluorooctanoic Acid [PFOA], ng/l	Report	Report	Monthly	Grab
51522	Perfluorobutanoic Acid [PFBA], ng/l	Report	Report	Monthly	Grab
51525	Perfluorooctanesulfonamide [PFOSA (or FOSA)], ng/l	Report	Report	Monthly	Grab
51623	Perfluoropentanoic acid [PFPeA], ng/l	Report	Report	Monthly	Grab
51624	Perfluorohexanoic acid [PFHxA], ng/l	Report	Report	Monthly	Grab
51625	Perfluoroheptanoic acid [PFHpA], ng/l	Report	Report	Monthly	Grab
51626	Perfluorononanoic acid [PFNA], ng/l	Report	Report	Monthly	Grab
51627	Perfluorodecanoic acid [PFDA], ng/l	Report	Report	Monthly	Grab
51628	Perfluoroundecanoic acid [PFUnA (or PFUdA)], ng/l	Report	Report	Monthly	Grab
51629	Perfluorododecanoic acid [PFDoA], ng/l	Report	Report	Monthly	Grab
51630	Perfluorotridecanoic acid [PFTrDA (or RFTriA)], ng/l	Report	Report	Monthly	Grab
51631	Perfluorotetradecanoic acid [PFTeDA (or PFTA or PFTeA)], ng/l	Report	Report	Monthly	Grab
51643	2-[N-ethylperfluorooctanesulfonamido] acetic acid [NEtFOSAA], ng/l	Report	Report	Monthly	Grab
51644	2-[N-methylperfluorooctanesulfonamido] acetic acid [NMeFOSAA], ng/l	Report	Report	Monthly	Grab
52602	Perfluorobutanesulfonic acid [PFBS], ng/l	Report	Report	Monthly	Grab
52603	Perfluorodecanesulfonic acid [PFDS], ng/l	Report	Report	Monthly	Grab
52604	Perfluoroheptanesulfonic acid [PFHpS], ng/l	Report	Report	Monthly	Grab
52605	Perfluorohexanesulfonic acid [PFHxS], ng/l	Report	Report	Monthly	Grab
52606	Perfluorooctanesulfonic acid [PFOS], ng/l	Report	Report	Monthly	Grab
52607	4:2 Fluorotelomer sulfonic acid [4:2 FTS], ng/l	Report	Report	Monthly	Grab
52608	6:2 Fluorotelomer sulfonic acid [6:2 FTS], ng/l	Report	Report	Monthly	Grab
52609	8:2 Fluorotelomer sulfonic acid [8:2 FTS], ng/l	Report	Report	Monthly	Grab
52610	Perfluoropentane sulfonic acid [PFPeS], ng/l	Report	Report	Monthly	Grab
52611	Perfluorononane sulfonic acid [PFNS], ng/l	Report	Report	Monthly	Grab
52612	Hexafluoropropylene oxide dimer acid [Gen-X (or HFPO-DA or HPFA-DA)], ng/l	Report	Report	Monthly	Grab
87006	PFAS Sum, ng/l*	Report	Report	Monthly	Calculated

*The PFAS sum is calculated based on the following equation:

$$PFAS\ Sum\ (ng/l) = [PFOA]\ (ng/l) + [PFOSA]\ (ng/l) + [PFNA]\ (ng/l) + ([NEtFOSAA]\ (ng/l) * 0.85) + ([NMeFOSAA]\ (ng/l) * 0.88) + [PFOS]\ (ng/l) + ([8:2\ FTS]\ (ng/l) * 0.78)$$

Source Investigation Surveys/Inspections

- While CCOB has not started to do source investigation inspections, IPP is planning to start them after the evaluation of PFAS analytes present in the wastewater.
- CCOB investigation action:
 - PFAS specific industrial wastewater questionnaires
 - Provide educational information
 - Communication with industries and users of PFAS specific products
 - Inspections as needed (challenging)

Preliminary Data

- PFAS is present in CCOB wastewater.
- CCOB has found most PFAS has been found in industrial areas and not in the domestic areas.
- Effluent has higher PFAS results than the Influent (Effluent Avg: 12ppt).
- Effluent and Reuse results are very similar.
- Some PFAS constituents are parent compounds and are potentially breaking down into other PFAS constituents.
- Airport has not discharged any AFFF Foam, but we are getting high results of PFAS.
- CCOB has higher PFAS results in collection system, lower PFAS results at the wastewater plant.
- Not all 25 constituents are present in CCOB wastewater.

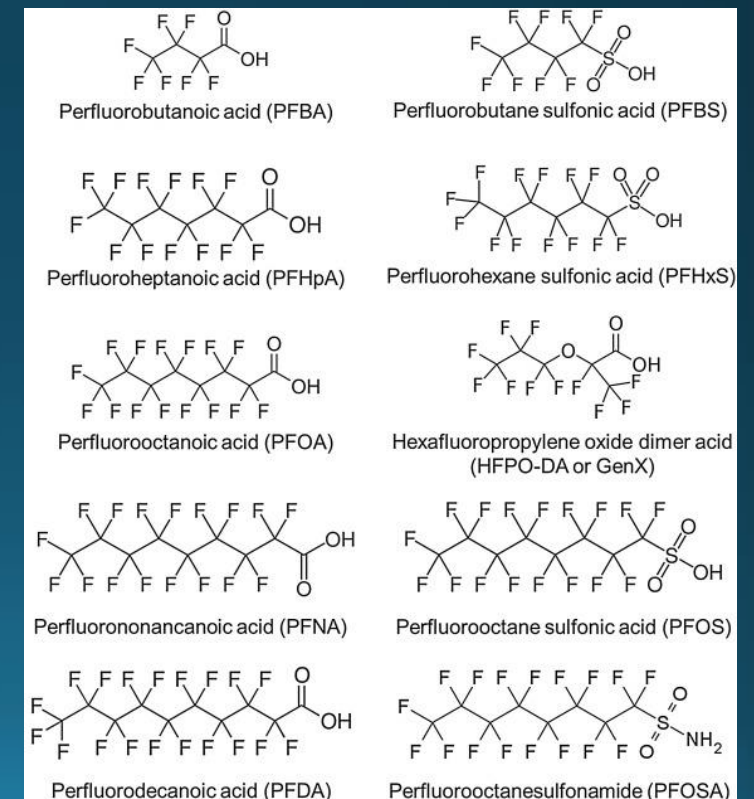
ICIS Code	Effluent Parameter	Effluent Limitation		Monitoring Requirements	
		Daily Maximum	30-day Average	Frequency	Sample Type
51521	Perfluorooctanoic Acid [PFOA], ng/l	Report	Report	Monthly	Grab
51522	Perfluorobutanoic Acid [PFBA], ng/l	Report	Report	Monthly	Grab
51525	Perfluorooctanesulfonamide [PFOSA (or FOSA)], ng/l	Report	Report	Monthly	Grab
51623	Perfluoropentanoic acid [PFPeA], ng/l	Report	Report	Monthly	Grab
51624	Perfluorohexanoic acid [PFHxA], ng/l	Report	Report	Monthly	Grab
51625	Perfluoroheptanoic acid [PFHpA], ng/l	Report	Report	Monthly	Grab
51626	Perfluorononanoic acid [PFNA], ng/l	Report	Report	Monthly	Grab
51627	Perfluorodecanoic acid [PFDA], ng/l	Report	Report	Monthly	Grab
51628	Perfluoroundecanoic acid [PFUnA (or PFUdA)], ng/l	Report	Report	Monthly	Grab
51629	Perfluorododecanoic acid [PFDoA], ng/l	Report	Report	Monthly	Grab
51630	Perfluorotridecanoic acid [PFTrDA (or RFTriA)], ng/l	Report	Report	Monthly	Grab
51631	Perfluorotetradecanoic acid [PFTeDA (or PFTA or PFTeA)], ng/l	Report	Report	Monthly	Grab
51643	2-[N-ethylperfluorooctanesulfonamido] acetic acid [NEtFOSAA], ng/l	Report	Report	Monthly	Grab
51644	2-[N-methylperfluorooctanesulfonamido] acetic acid [NMeFOSAA], ng/l	Report	Report	Monthly	Grab
52602	Perfluorobutanesulfonic acid [PFBS], ng/l	Report	Report	Monthly	Grab
52603	Perfluorododecanesulfonic acid [PFDS], ng/l	Report	Report	Monthly	Grab
52604	Perfluoroheptanesulfonic acid [PFHpS], ng/l	Report	Report	Monthly	Grab
52605	Perfluorohexanesulfonic acid [PFHxS], ng/l	Report	Report	Monthly	Grab
52606	Perfluorooctanesulfonic acid [PFOS], ng/l	Report	Report	Monthly	Grab
52607	4:2 Fluorotelomer sulfonic acid [4:2 FTS], ng/l	Report	Report	Monthly	Grab
52608	6:2 Fluorotelomer sulfonic acid [6:2 FTS], ng/l	Report	Report	Monthly	Grab
52609	8:2 Fluorotelomer sulfonic acid [8:2 FTS], ng/l	Report	Report	Monthly	Grab
52610	Perfluoropentane sulfonic acid [PFPeS], ng/l	Report	Report	Monthly	Grab
52611	Perfluorononane sulfonic acid [PFNS], ng/l	Report	Report	Monthly	Grab
52612	Hexafluoropropylene oxide dimer acid [Gen-X (or HFPO-DA or HPFA-DA)], ng/l	Report	Report	Monthly	Grab
87006	PFAS Sum, ng/l*	Report	Report	Monthly	Calculated

*The PFAS sum is calculated based on the following equation:

$$PFAS\ Sum\ (ng/l) = [PFOA]\ (ng/l) + [PFOSA]\ (ng/l) + [PFNA]\ (ng/l) + ([NEtFOSAA]\ (ng/l) * 0.85) + ([NMeFOSAA]\ (ng/l) * 0.88) + [PFOS]\ (ng/l) + ([8:2\ FTS]\ (ng/l) * 0.78)$$

Challenges

- Money/budget-Estimating \$300 per sample for the current method
 - CDPHE PFAS Grant
- Time-Sampling/Prep, Data Processing/Entry, Research
- Resources- Time, money, and people
- Learning Curve
 - Lack of regulations and information
 - Policy 20-1
- Products that contain these PFAS constituents
 - An industrial user checked for PFAS parameters
- PFAS constituent names



Challenges Continued

- Sampling challenges:
 - Safety
 - Aware of surroundings
 - Contamination
- Contract Lab-testing delays
- EPA 537 Water Modified Method is the current approved wastewater method
 - Draft Method 1633 is set to be approved in the next 1-2 years
 - Similar to the current method
- Data
 - Dilution factors with the current 537 method for wastewater samples
 - 5x-100x dilution
 - Reporting limit over 200 ng/L



Current and Future of PFAS

- There are still many questions and research to be done about PFAS.
- EPA Memo
 - Released April 28, 2022
- Current EPA Health Advisory Limit: 70 PPT
- Potential regulatory requirements:
 - Stormwater
 - Groundwater
 - Biosolids
 - Drinking water
 - Air



Current and Future of PFAS-EPA MEMO

- This memo details how the EPA will address PFAS discharges in EPA-issued NPDES permits and for Industrial Users (IUs) where EPA is the pretreatment control authority.
 - Influent, Effluent, and Biosolids
 - 40 PFAS Parameters vs the current 25 parameters that are currently being monitored
 - Update IU Inventory: Permits to POTWs should contain permit requirements to identify and locate all possible IUs that may be subject to the pretreatment program and identify the character and volume of PFAS pollutants.
 - Require BMPs and pollution prevention to address PFAS discharges to POTWs.
 - Update IU permits/control mechanisms to require quarterly monitoring.
 - Develop IU BMPs or local limits. 40 CFR 403.5(c)(4) authorizes POTWs to develop local limits in the form of BMPs.
 - In the absence of local limits, POTWs to encourage pollution prevention, product substitution, and good housekeeping practices to make meaningful reductions in PFAS releases to POTWs.

Questions?

Contacts:

Leigha Gad

Industrial Pretreatment Specialist

City and County of Broomfield

Email: lgad@broomfield.org

Office: 303.464.5686

Cell: 303.901.3353

Dennis Rodriguez

Industrial Pretreatment/Stormwater

Administrator

City and County of Broomfield

Email: drodriguez@broomfield.org

Office 303.464.5648

Cell 303.901.1949

