PFAS (Per-and Polyfluoroalkyl Substances) The City and County of Broomfield Updates 2023

City and County of Broomfield Industrial Pretreatment Department

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Agenda

PFAS Overview

City and County of Broomfield PFAS Permit Timeline

City and County of Broomfield Permit Sampling

Biosolids

Source Investigation Study Sampling and Inspections

Management/Time/Money

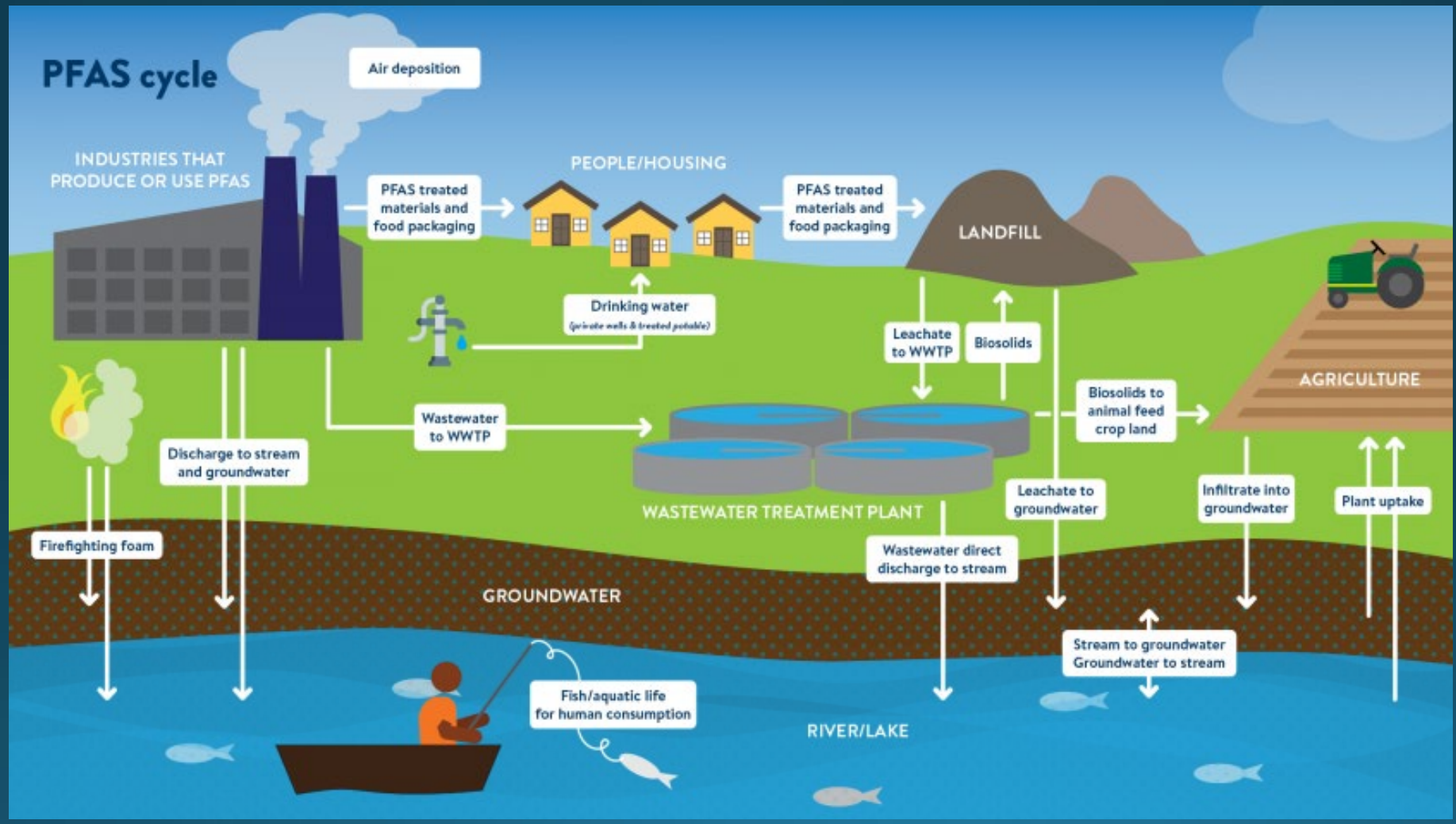
Current and Future of PFAS

Questions for Pretreatment Programs

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. There are now over 9,000 PFAS compounds.
- 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.
- **January 2022**-CCOB CDPS Permit went into effect for PFAS sampling at the Effluent and Reuse Effluent.
  - Sampling 25 PFAS Parameters with the most current method (537 modified water method)
- 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."
- **August 2022**-Notification of another permit modification occurred to now include 40 PFAS parameters and to implement the new draft 1633 method.
  - CCOB received the new revised permit effective Nov 1.

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, steel toe boots, and no personal care products containing PFAS
- Analysis: EPA 537 Modified Water Method, now the draft 1633 method
- Parameters: 25 PFAS parameters and a sum equation of

  7 parameters, now switched to 40 PFAS parameters
- Duration: Monthly monitoring January 2022-December 2023
- Report: Monthly DMR
- With issues with getting results back on time for the DMR, the state allows late submission of results.

City and County of Broomfield Permit Sampling Biosolids (CO-Reg 64)

- Location: Effluent Biosolids Chimney Sampling Port
- Sample Collection: Direct grab
- Analysis: Draft 1633 method
- Parameters: 40 PFAS parameters
- Duration: Once every 2 months monitoring

  January 2023-December 2023
- Report: PFAS analytical data must be reported electronically to the division.

- PFAS Source Control Program – Source identification and reduction efforts may be required based on PFAS analytical results of biosolids and/or the final product material derived from biosolids.

Source Investigation Sampling

- Locations: Influent, 6 Domestic Areas, 4 Industrial Areas, 2 Airport Areas, and 3 Discharging Industries
  - Now we are starting to explore other locations like car washes and other locations within the airport
- Similar Sampling for Effluent and Reuse
- Duration: Sampling events scheduled variously throughout the year.
- Report: Source Investigation Study to the State due June 30, 2024

PFAS sample sites

Industrial areas sample sites

- 39.925159, -105.090431
- 39.923978, -105.091907
- 39.917734, -105.089527
- 39.907541, -105.072755

Domestic areas sample site

- 39.948652, -105.063690
- 39.926076, -105.025828
- 39.929940, -105.058137
- 39.923973, -105.081684
- 39.973547, -105.055998
- 39.999530, -105.044583

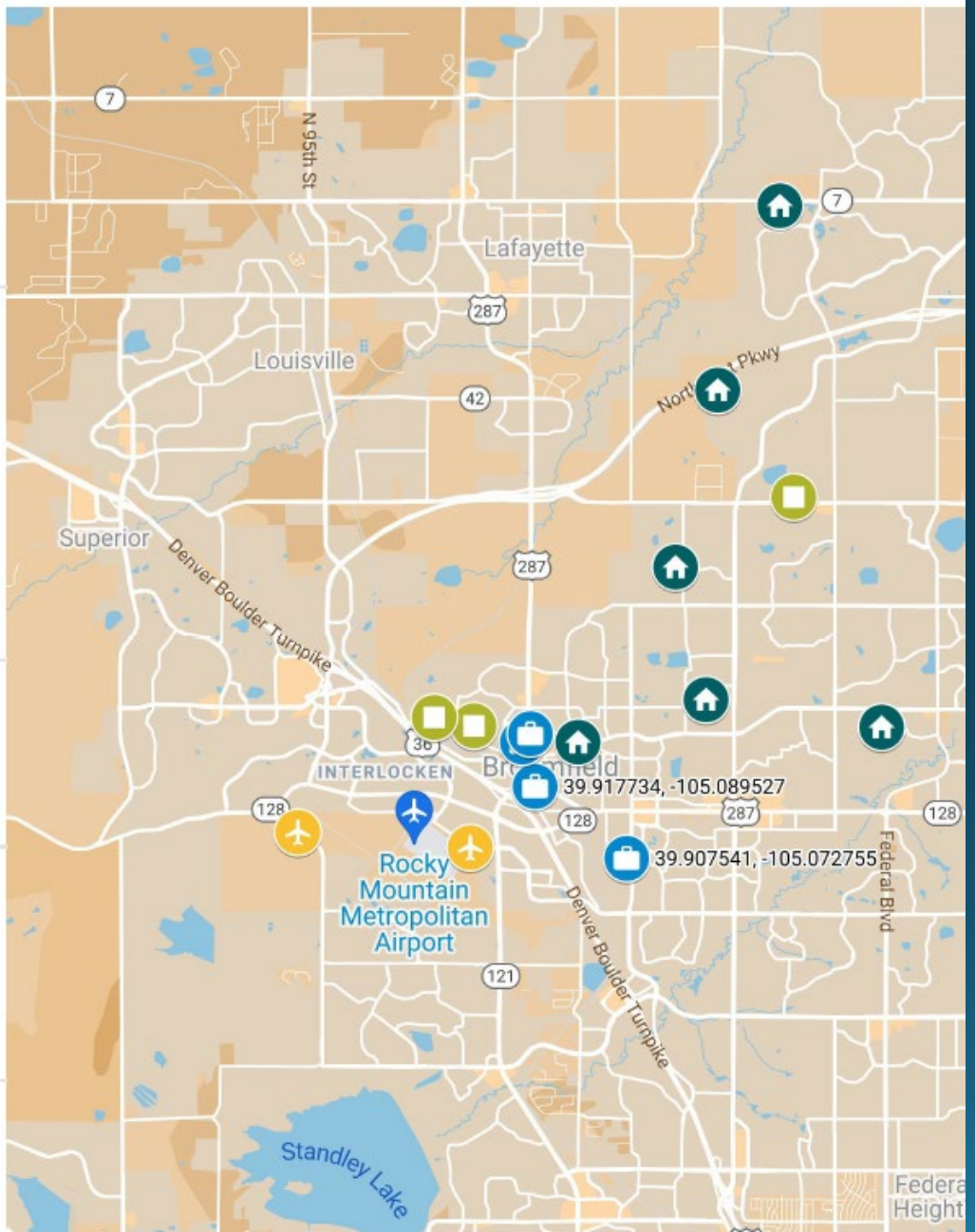
Airport area sample site

- 39.909050, -105.101514
- 39.911281, -105.133122

Permitted Industry sample sites

- 39.927420, -105.108100
- 39.926242, -105.100789
- 39.958491, -105.041974

Location of manholes for collecting PFAS samples.



Source Investigation Surveys/Inspections

- CCOB IPP sent out PFAS specific industrial wastewater questionnaires to permitted industries.
- Questions in the survey:
  - AFFF Foam, "B" class foam
  - Type of business-process that likely contain PFAS
  - Aware of any effluent discharge from the facility of PFAS
  - Use of any products specifically from the vendors: "Dow, CHEM-GUARD, 3M, and Dupont"
- CCOB IPP has started to send out surveys to other IUs with the potential to have PFAS
  - Car washes (sampling)
  - Airport
- Providing an Education pamphlet with survey
- Inspections
  - Depending on the response, PFAS inspections will occur

Source Investigation Surveys/Inspections Challenges

- Typical IPP Inspections are not sufficient to find contributing sources.
  - PFAS is everywhere
  - Vendors are unsure/unreliable
  - Not represented in SDS's
    - SDS's do not have to list out PFAS.
    - If they list hazardous chemicals they only provide percentage amounts and there are trade secrets behind chemicals. So, we could never determine if PFAS is even on the SDS's .

3. Composition/information on Ingredients

3.1. Mixture

The following component(s) in this product are considered hazardous under applicable OSHA(USA)

Chemical name	CAS No.	weight-%
Sucrose	57-50-1	5 - 10
Sodium Octyl Sulfate	142-31-4	3 - 7
2-(2-Butoxyethoxy)ethanol	112-34-5	1 - 5
Polyfluorinated alkyl polyamide	Proprietary	1 - 5
Ethylene Diamine Tetraacetic Acid, Sodium Salt	64-02-8	1 - 5

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

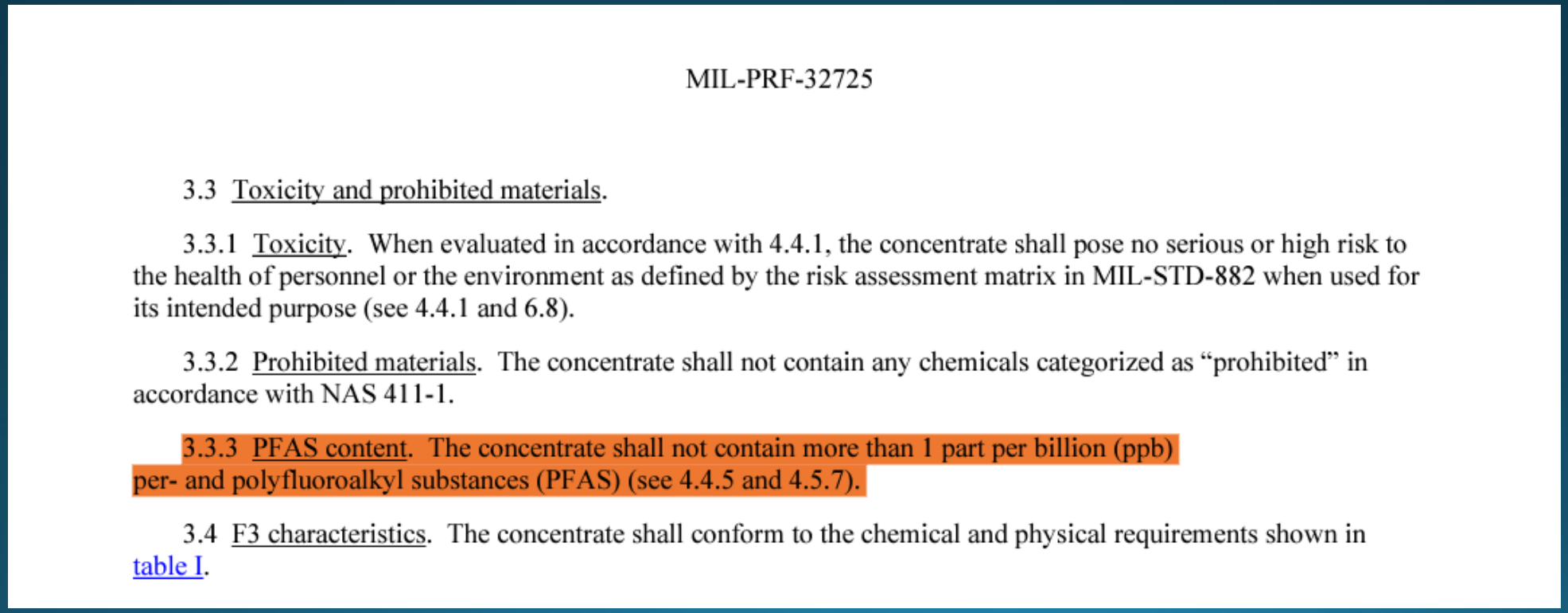
Name	Product identifier	%
Ammonium Polyphosphate Solution (Non-hazardous)	(CAS-No.) Trade Secret	60 - 80
Performance Additives (Non-hazardous)	(CAS-No.) Trade Secret	5 - 10
Attapulgus Clay	(CAS-No.) 8031-18-3	0.5 - 1.5
Iron oxide	(CAS-No.) 1309-37-1	0.5 - 1.5

***Chemical name, CAS number and/or exact concentration have been withheld as a trade secret**

1 ppb is considered “PFAS free” for firefighting foam

FIRE EXTINGUISHING AGENT, FLUORINE-FREE FOAM (F3) LIQUID CONCENTRATE, FOR LAND-BASED, FRESH WATER APPLICATIONS- a military spec sheet that states “The concentrate shall not contain more than 1 part per billion (ppb) per- and polyfluoroalkyl substances (PFAS)”- January 6-2023

Firefighting industry states “no intentionally added PFOA or PFOS in product”
Potential breaking down of other PFAS.



MIL-PRF-32725

3.3 Toxicity and prohibited materials.

3.3.1 Toxicity. When evaluated in accordance with 4.4.1, the concentrate shall pose no serious or high risk to the health of personnel or the environment as defined by the risk assessment matrix in MIL-STD-882 when used for its intended purpose (see 4.4.1 and 6.8).

3.3.2 Prohibited materials. The concentrate shall not contain any chemicals categorized as “prohibited” in accordance with NAS 411-1.

3.3.3 PFAS content. The concentrate shall not contain more than 1 part per billion (ppb) per- and polyfluoroalkyl substances (PFAS) (see 4.4.5 and 4.5.7).

3.4 F3 characteristics. The concentrate shall conform to the chemical and physical requirements shown in table I.

Preliminary Data

- PFAS is present in CCOB wastewater.
- CCOB IPP has performed 5 sampling events to date for the Source investigation study (January-March, changed to 1633 method: November 2022, and February 2023)
  - Sampling 2 more times this year
  - Draft 1633 method has higher dilution factors then 537.1, losing "Visibility" based on the reporting limits
- Not all 40 parameters are present in CCOB wastewater.
  - Usually the same 15 parameters
- CCOB has found most PFAS has been found in industrial areas and not in the domestic areas.
- CCOB has higher PFAS results in collection system, lower PFAS results at the wastewater plant. (influent highest: 10ppt)
- Effluent has higher PFAS results than the Influent (Effluent Avg: 12ppt, Influent: 10ppt).
- Airport has not discharged any AFFF, but we are getting high results of PFAS.
- Some PFAS constituents are parent compounds and are potentially breaking down into other PFAS constituents.

Money/Time/Management

- Money/budget-
  - $300 per sample for the 537.1 modified method
  - Approximately $600 per sample Draft 1633 method
  - $19,200 per sampling event at 15 location sites, includes samples and blanks with the 1633 method

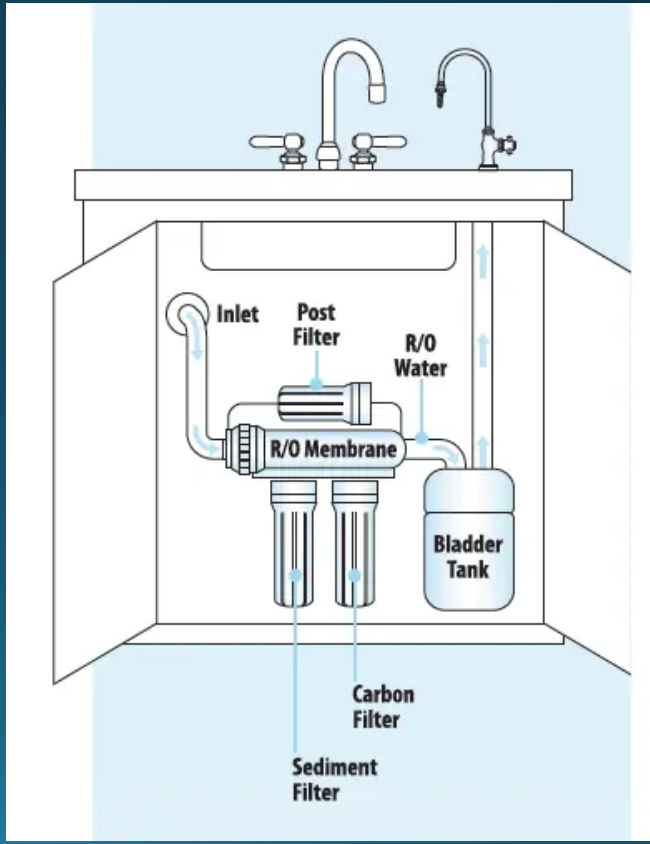
  2022 Expenses:

  $45,000 for 4 sampling events at 15 locations (3-537.1 method, 1-1633 method)
- Time-Sampling/Prep, Data Processing/Entry, Research
  - Admin: Dennis, Lesa, Leigha spend about 50-60% of our time on PFAS
  - Sampling: 3 personnel for sampling, estimated 4-5 hours of sampling per two days-Grab samples, contract labs, 7 locations for each day
- Personnel- IPP added another FTE to be able to take on PFAS sampling and to keep up with our on going regulatory requirements.
- IPP has requested $100,000 for PFAS sampling for the 2024 budget.

Treatment

- Broomfield's Wastewater and Water Treatment Plant are already undergoing master plans for expansions and treatment for future needs.
- Broomfield is exploring treatment options for PFAS both the water and wastewater treatment plants if needed or required.
- Early estimated costs of $86 million for the wastewater plant and $40 million for the water plant. This is for construction only.

RO? GAC?



Current and Future of PFAS

- EPA will designate certain PFAS as Hazardous Substance under CERCLA by Summer 2023.
- Drinking Water Limits proposed at 4ppt for PFOA and PFOS and a hazard index for PFNA, PFHxS, PFBS, and Gen-X
- Potential regulatory requirements:
  - Stormwater
  - Groundwater
  - Wastewater permits for landfills have limits
  - Drinking water (UCMR-5) and proposed limits
  - Biosolids
    - Added to CO wastewater permits in 2023.

How do we proceed as IP programs?

- There are only recommendation that are available from Federal level standards or guidance (Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs memo).
- How do we implement BMPs when we don't know the sources?
  - How do we know if other "recommended" chemicals that do not have PFAS?
- How can we put heavy costs on our industries for treatment?
  - How is it equitable to put it on industries with PFAS?
- How can industries plan for treatment when there are no limits?
- Residential education-residents love their PFAS products so how do we change that mentality of using these great products?

How do we proceed as IP programs?

- How do we create a local limit without treatment?
  - How do you create a local limit with effluent is higher then influent?
- How can we enforce discharges if there are no water quality standards?
- How do you set a limit on a draft method?
  - What changes may invalidate data?
- How do we pay for infrastructure and expensive treatment of PFAS?
  - Taxes?
  - Bipartisan bill infrastructure

Questions?

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  - Part per billion reference