

EMERGING CONTAMINANTS & REGULATORY UPDATE

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

EMERGING CONTAMINANTS OF CONCERN

You Tube



- Two Main Factors Leading to Additional Contaminant Monitoring
 - Science and Technology allow us to monitor and detect contaminants to lower levels
 - Social Media drives a demand to know “what is in the water we’re drinking?”

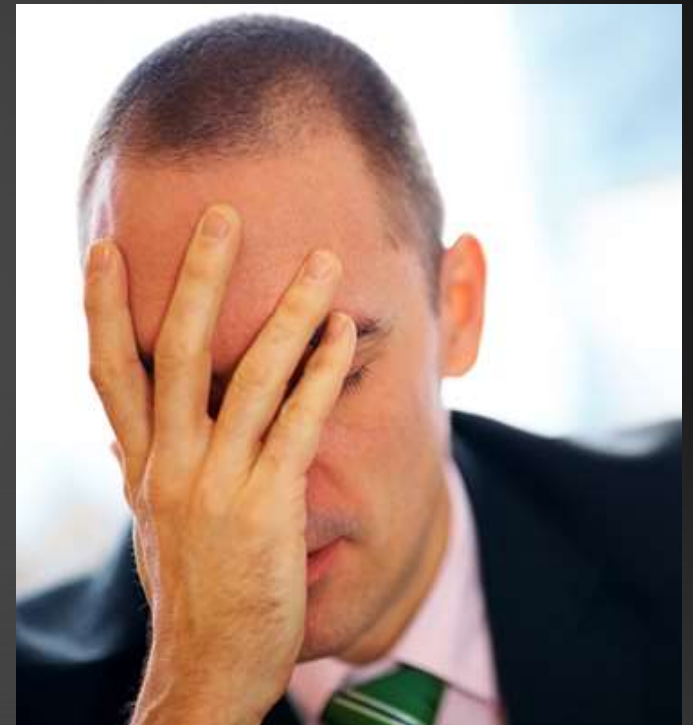


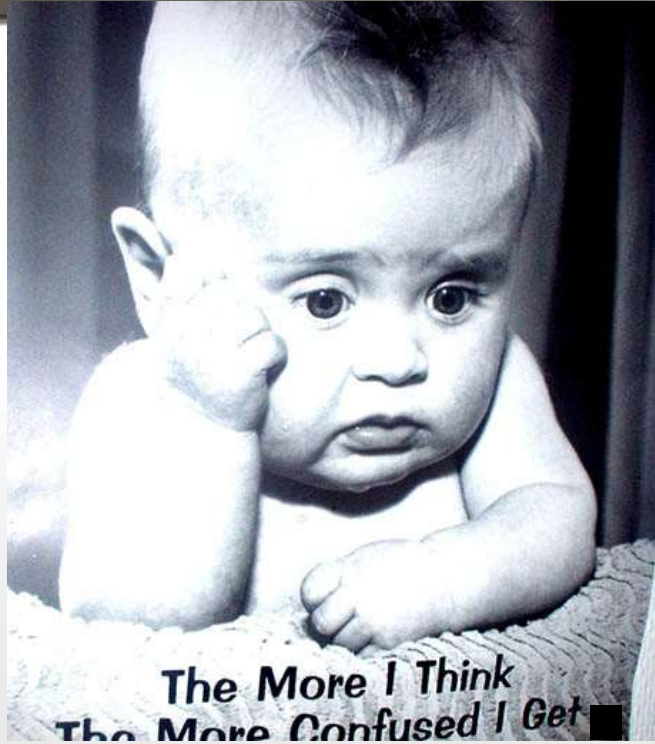
USEPA AND UCMR

- Unregulated Contaminant Monitoring Rule Requirements
 - Monitoring < 30 contaminants w/o current health-based standards every 5 years
 - Monitoring provided by systems serving >10,000 people
 - Analytical results are stored in the National Contaminant Occurrence Database for evaluation of need for regulatory actions

UCMR

- UCMR Monitoring Rounds
 - UCMR 1 (2001-2005)
 - UCMR 2 (2007-2011)
 - UCMR 3 (2012-2016)
 - UCMR 4 (2017-2021)
 - UCMR 5 (2022-2026?)





**TRYING TO
MAKE SENSE
OF ALL OF THIS!**

EMERGING CONTAMINANTS

Subjects for Today:

Lead & Copper

Harmful Algal Blooms

PFAS



[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)

LEAD & COPPER RULE REVISIONS (LCRR)

- Finalized Rulemaking on December 22, 2020!
- Includes Lead Inventory Requirement
- Sets a Trigger Level of 10 ug/L and keeps the Action Level at 15 ug/L
- Requires testing at Schools and Day Care facilities
- Requires all samples to be taken from LSL homes (if available)
- Samples from LSLs use 5th liter in sampling
- Long-term goal is the removal of all Lead!

Lead
and
Copper

Lead and Copper Sample Site
Plan:



Make sure all Pb/Cu sample
sites are Tiered properly



Make sure that the sample site
plan is consistent with the
Materials Inventory that is
submitted annually.

**LEAD &
COPPER**

LEAD & COPPER

- Biggest Changes in the last 5-10 years:
 - Implementation of Materials Inventory
 - Evolving Corrosion Control Studies and Scale Analysis
 - Monitoring Impacts of Water Quality Changes on Corrosivity Characteristics...
 - Source Water Changes
 - Treatment Changes
 - Seasonal Changes

LEAD & COPPER

- IEPA Work Group Meets Every Monday To Evaluate Proposed Changes by Community Water Supplies and Determine Appropriate Corrosion Control Studies and Monitoring Schedules



LEAD & COPPER

- Valuable (or not) Advice for Operators:
 - Evaluate the Lead and Copper sample site plan and make appropriate changes to prioritize sample sites containing lead.
 - Continue Efforts to Complete the Materials Inventory.
 - Document the Location of all Lead Service Lines (utility and customer owned).
 - Begin Implementation of a Plan to Remove All System Lead

LEAD & COPPER

- Valuable (or not) Advice for Operators:
 - Contact the Agency Regarding Any Change in Source or Treatment.
 - Phosphate Blend Changes
 - Disinfectant Changes
 - pH Adjustment Changes
 - Long-Term Use of Emergency Interconnections or Secondary Sources
 - And.....Always remember to Provide Lead Disturbance Notification When Required!!!!



LEAD AND COPPER

LET'S ALL WORK TOGETHER FOR
SOLUTIONS....

A photograph of two young children outdoors. The child on the left is a girl with short brown hair, wearing a white headband with a pink flower and a dark blue long-sleeved shirt with colorful horizontal stripes. She is looking towards the right with a neutral expression. The child on the right is a boy with short brown hair, wearing a white short-sleeved shirt with a blue collar. He is crying with his eyes closed and mouth open, holding a green and orange water bottle. The background is a blurred outdoor setting with green grass, trees, and a building.

LEAD AND COPPER

INSTEAD OF LITIGATING THE RESOLVE!



HARMFUL ALGAL BLOOMS (HABS)

IEPA



HABs

- Causes:
 - Excess Nitrogen and Phosphorus From:
 - Agriculture
 - Stormwater
 - Wastewater
 - Residential Fertilizers
 - Warm / Stagnant Water

HABs

- Effects of contact or incidental ingestion:
 - Human Health Impacts
 - Rashes
 - Gastrointestinal Distress
 - Respiratory Problems
 - Neurological Effects



This Photo by Unknown Author is licensed under CC BY-SA

NOTICE

An algae bloom has made
this area potentially
unsafe for water contact.
Avoid direct contact with
visible surface scum.

HABS

- Potential Toxins Involved: Cyanotoxins
 - Microcystin
 - Cylindrospermopsin



Cyanotoxin	Drinking Water Health Advisory (10-day)	
	Bottle-fed infants and pre-school children	School-age children and adults
Cylindrospermopsin	0.7 µg/L	3.0 µg/L
Microcystins	0.3 µg/L	1.6 µg/L

HABS

- Recommended Human Health Recreational Ambient Water Quality Criteria (Swimming Advisories for Microcystins and Cylindrospermopsin)
 - From USEPA
 - Avoid primary contact with water above these levels

Microcystins	Cylindrospermopsin
8 ug/L	15 ug/L

HABs

- Desk Top Monitoring for Microcystins (Presence/Absence)



HABS



- IEPA's HAB Program:
 - Routine Monitoring of Targeted Subset of Inland Lakes
 - Routine Monitoring of Subset of Lake Michigan PWS' Intakes
 - Event Response Monitoring
 - Visual
 - Reported- Bloom Report Form
<https://www2.illinois.gov/epa/Documents/epa.state.il.us/water/algal-bloom/forms/bloom-report-form.pdf>

HABs

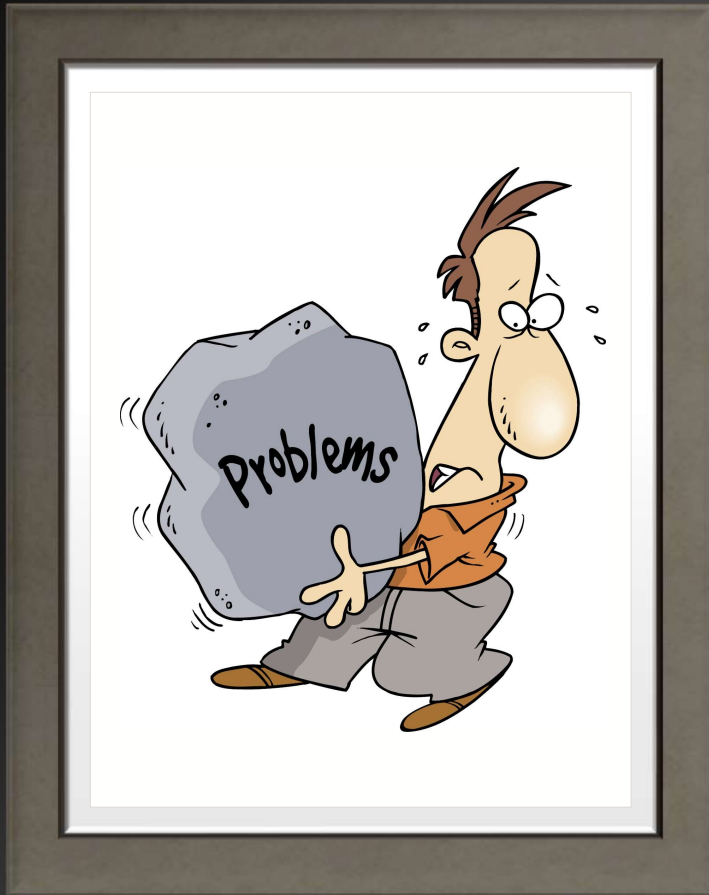
- SAMPLING

- RAW – prior to any treatment



- FINISHED – after all treatment (TPXX)





HABS

- Problems Associated w/ HABs
 - Distribution Taste & Odor Issues
 - Operational/Treatment impacts associated with pH changes (disinfectant residuals, coagulation/sedimentation, shortened filter runs, etc.)

HABs – IS IT FIXABLE?

HABs

- Treating the Source Water (Lake / Reservoir)
 - Copper Sulfate Products Can Be Used to Prevent Bloom (Not effective: $\text{pH} > 8.2$)
 - Increase Carbon Feed Rate to Minimize Taste & Odor Impacts
 - Destratifiers Have Been Beneficial in Minimizing Conditions that Promote Bloom Growth
 - Install Treatment for Reducing Compounds that create T&O problems
 - UV w/ Advanced Oxidation Process (Hydrogen Peroxide Feed)



PFAS

PFAS : WHAT IS IT?

- Per- and Polyfluoroalkyl Substances are Man-Made Chemicals manufactured for their oil and water-resistant properties.
- Used In A Wide Range of Consumer Products (cookware, carpets, clothing), Industrial Processes, Fire-Fighting Foams, etc.
- Known as “Forever Chemicals” because the Carbon and Fluorine Bond does not breakdown easily.
- PFAS chemicals are very mobile in soil and groundwater!



PFAS
RESEARCH

- My Recommendations:
- “Troubled Waters” – book that can be purchased anywhere
- “The Devil We Know” – documentary found on YouTube

TREATING PFAS IN DRINKING WATER

- Membrane Filtration
 - Reverse Osmosis – high removal efficiency for PFAS especially short-chain parameters.
 - Consideration should be given to waste stream.
 - Nanofiltration – also considered effective in short-train parameter removal.
 - Pre-treatment and post-treatment may be necessary to prevent membrane fouling and stabilization.

TREATING PFAS IN DRINKING WATER (CONT'D)

- Anion Exchange – more effective in the removal of long-chain PFAS
 - Removal efficacy is dependent upon the type of resin used
 - Again - Consideration should be given to the waste stream

TREATING PFAS IN DRINKING WATER (CONT'D)

- Granular Activated Carbon
 - Generally more effective for long-chain PFAS
 - Individual Treatment Units
 - Package Treatment Skids
 - Mobile Treatment Trailers

TREATING PFAS IN DRINKING WATER (CONT'D)

- Granular Activated Carbon (cont'd)
 - Efficacy dependent on raw water quality and the competition for absorption by GAC.
 - Disposal of “spent” GAC must be considered
 - Thermal regeneration of GAC is possible
 - Incineration has been shown to destroy PFAS, but may cause release to atmosphere

TREATING PFAS IN DRINKING WATER (CONT'D)

- Powdered Activated Carbon
 - Can be fed a dry powder or slurry during coagulation process
 - PAC is not as effective as GAC, membrane filtration, or anion exchange
 - Again – consideration must be given to waste stream

PFAS – AGENCY SAMPLING PROGRAM

- The Illinois EPA will begin PFAS sampling at approximately 1450 entry points.
- Sampling for 18 PFAS parameters
- Systems will be notified by mail regarding scheduled sampling times (don't ignore the letter)
- Follow-up correspondence will be provided for notification of sample results.



**PFAS – I HAVE
THE RESULTS,
NOW WHAT?**

PFAS – FIND THE SOURCE

- Find the source of contamination
 - Sampling of source water
 - Wells
 - Intake(s)

PFAS SAMPLING

- National Environmental Laboratory Accreditation Conference (NELAC) accredited lab must be used to analyze PFAS (Method 537.1)
- NELAC has an online database to provide labs to analyze PFAS
- When conducting sampling, a sample collection SOP will be provided and include the protocol used by IEPA

PFAS
SAMPLING –
I FOUND THE
PROBLEM



PROBLEM SOLVING

Have you got a problem?

This Photo

PFAS – OTHER CONSIDERATIONS

- Other Considerations:
 - Proximity to potential sources (examples)
 - Industrial Sites
 - Landfills
 - Military Bases
 - Firefighter Training Locations
 - Metal Plating Facilities

PFAS – I FOUND THE PROBLEM

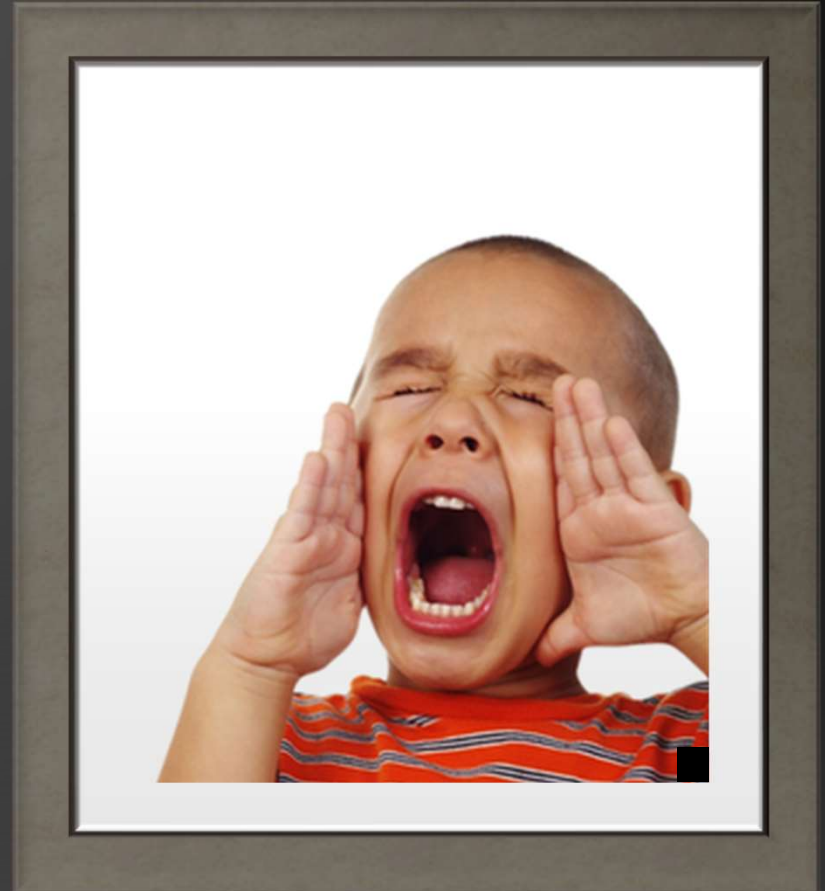
- Can the contaminated source (well/intake) be eliminated and still meet daily demand?
- Can treatment changes be made to remove PFAS contaminants?
 - Is there treatment in place that can be modified? (changing membranes/resin/carbon, etc.)

PFAS – I HAVE NO TREATMENT OPTIONS – WHAT CAN I DO?

- Consider the following:
 - Do I have access to an alternative source (interconnection with another public water supply)?
 - Point-of-Use / Point-of-Entry Devices
 - Bottled Water

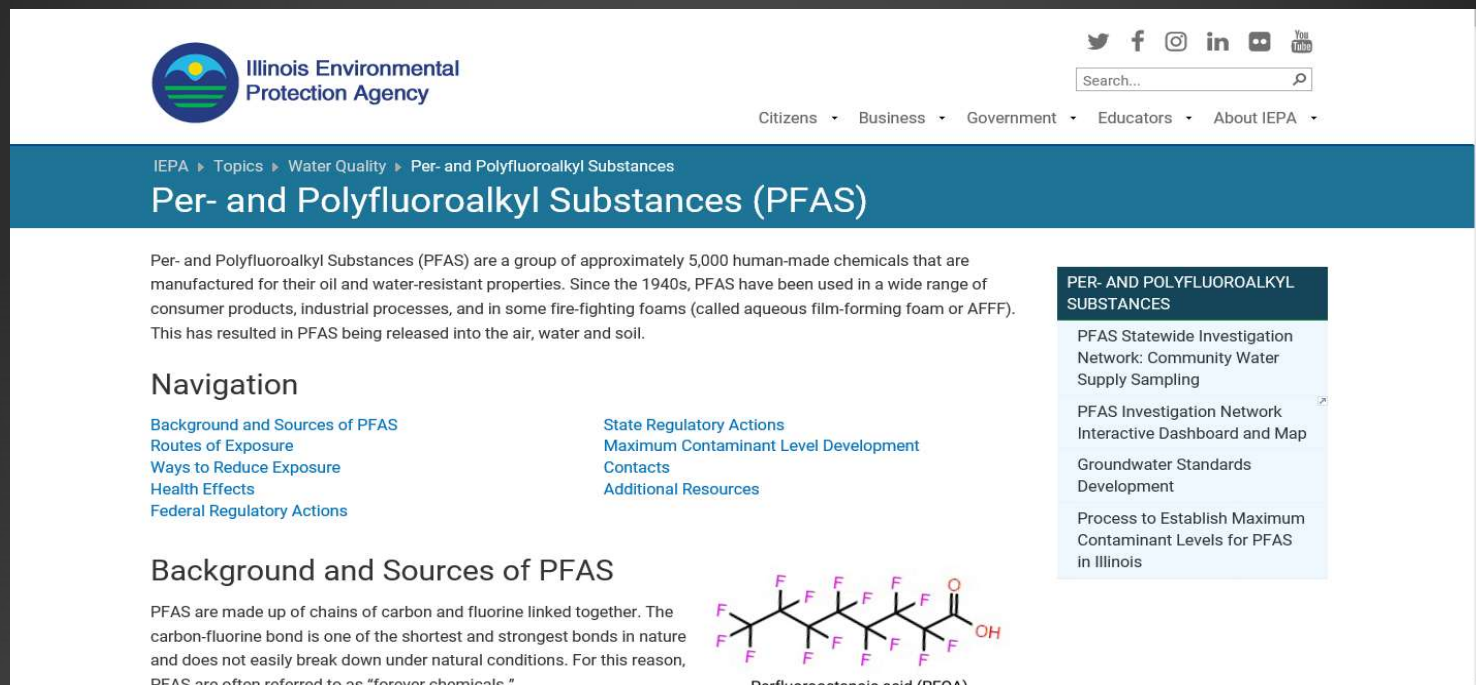
PFAS – CONCLUSIONS

- Where can I find HELP!
 - Illinois EPA
 - Consultant Engineers
 - Interstate Technology Regulatory Council
 - <https://pfas-1.itrcweb.org/fact-sheets/>
 - USEPA
 - <https://www.epa.gov/pfas>



ILLINOIS EPA PFAS WEBPAGE

[HTTPS://WWW2.ILLINOIS.GOV/EPA/TOPICS/WATER-QUALITY/PFAS/PAGES/DEFAULT.ASPX](https://www2.illinois.gov/epa/topics/water-quality/pfas/pages/default.aspx)



The screenshot shows the Illinois Environmental Protection Agency's website page for Per- and Polyfluoroalkyl Substances (PFAS). The page features a navigation menu, a search bar, and a main content area with a navigation sidebar and a list of resources.

Illinois Environmental Protection Agency

Twitter Facebook Instagram LinkedIn YouTube

Search...

Citizens Business Government Educators About IEPA

IEPA Topics Water Quality Per- and Polyfluoroalkyl Substances

Per- and Polyfluoroalkyl Substances (PFAS)


Per- and Polyfluoroalkyl Substances (PFAS) are a group of approximately 5,000 human-made chemicals that are manufactured for their oil and water-resistant properties. Since the 1940s, PFAS have been used in a wide range of consumer products, industrial processes, and in some fire-fighting foams (called aqueous film-forming foam or AFFF). This has resulted in PFAS being released into the air, water and soil.

Navigation

- Background and Sources of PFAS
- Routes of Exposure
- Ways to Reduce Exposure
- Health Effects
- Federal Regulatory Actions
- State Regulatory Actions
- Maximum Contaminant Level Development
- Contacts
- Additional Resources

Background and Sources of PFAS

PFAS are made up of chains of carbon and fluorine linked together. The carbon-fluorine bond is one of the shortest and strongest bonds in nature and does not easily break down under natural conditions. For this reason, PFAS are often referred to as "forever chemicals."



Perfluorooctanoic acid (PFOA)

PER- AND POLYFLUOROALKYL SUBSTANCES

- PFAS Statewide Investigation Network: Community Water Supply Sampling
- PFAS Investigation Network Interactive Dashboard and Map
- Groundwater Standards Development
- Process to Establish Maximum Contaminant Levels for PFAS in Illinois



QUESTIONS?