

# PFAS SAMPLING

Jessica White

City of Dayton-Water Laboratory Sampling Technician

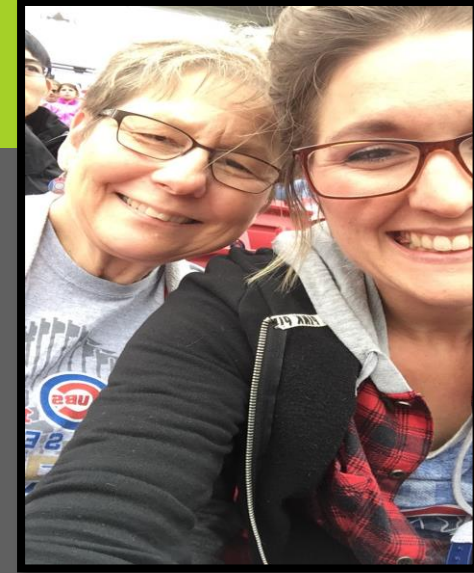
# OVERVIEW

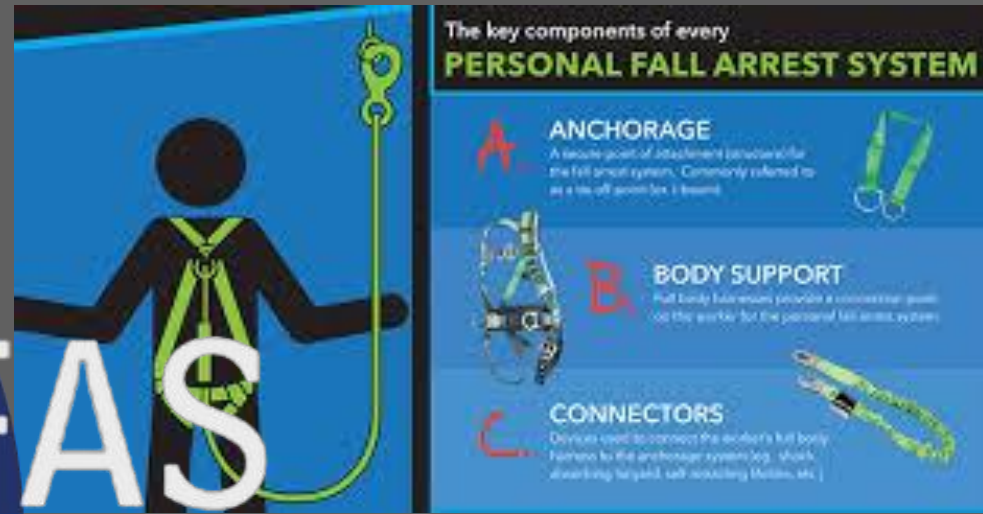
- Who I am?
- Who, what, where & when of PFAS
  - City of Dayton's involvement
    - What we learned
  - Future involvement
    - Conclusion
    - Questions

# ABOUT ME...

## Jessica White

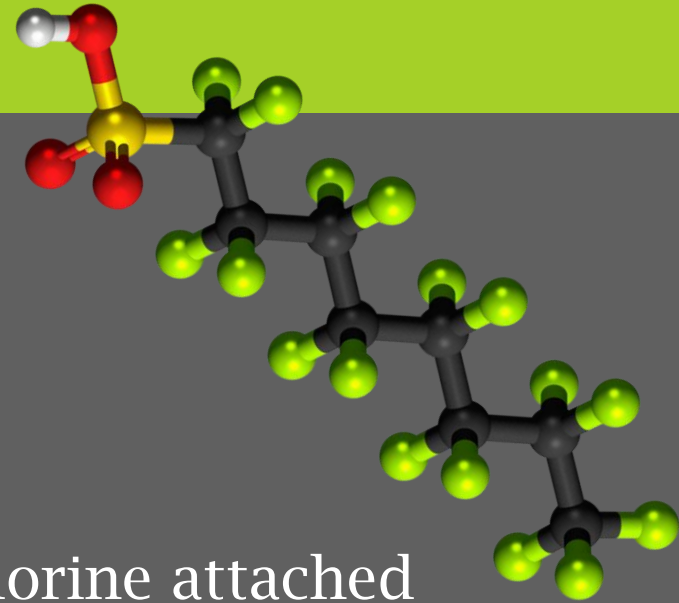
- City of Dayton Field Sampler
  - Sampling for approx. 4 years
  - B.S. in EHS from WSU
- **WARNING: I AM NOT AN EXPERT ON PFAS**
  - But...I did learn a lot of interesting things and I am going to share them with you
  - This was my first time sampling PFAS
- And sometimes I talk really fast with a Chicago accent so bare with me...  
GO Cubs & Hawks!!!



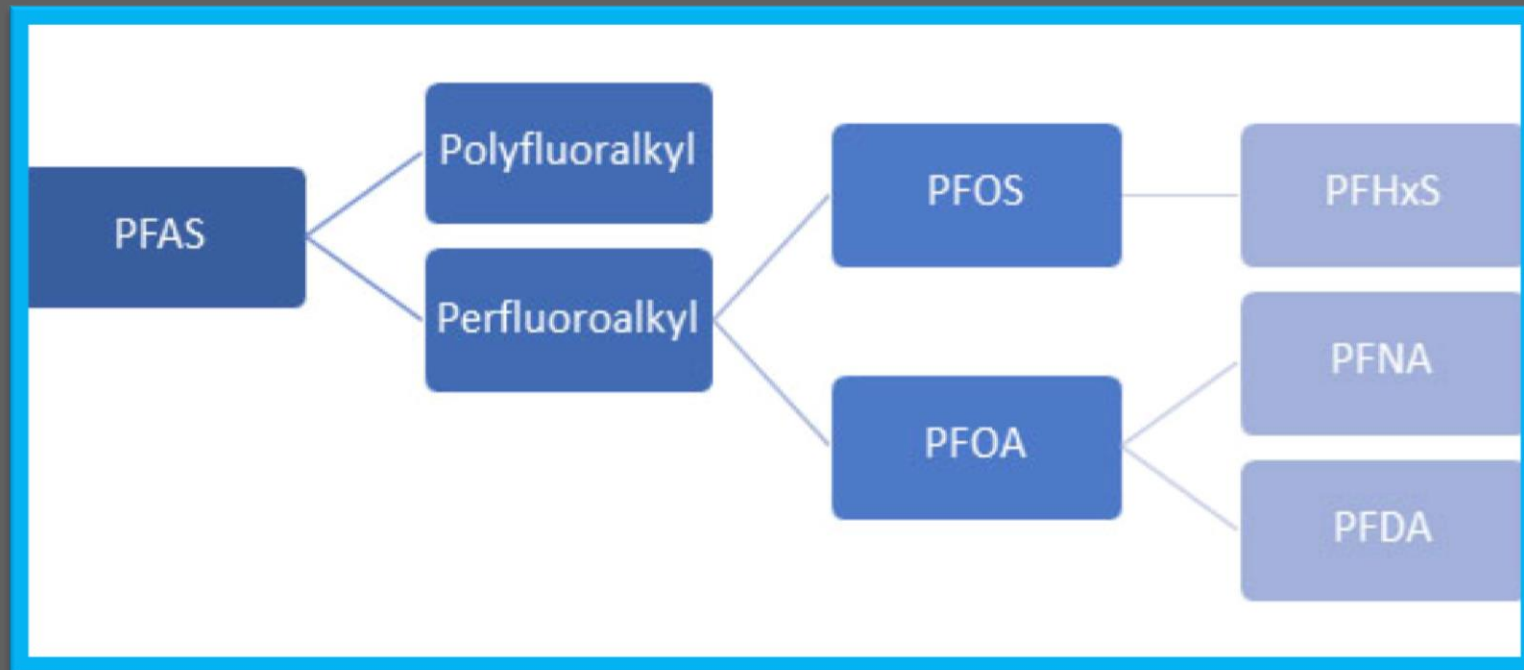


# OH PFAS...

- Poly & Perfluoroalkyl Substances (PFAS)
  - Two Key Chemicals
    - Perfluorooctanoic Acid (PFOA)
    - Perfluorooctyl Sulfonate (PFOS)
- Synthetic Compounds formed from carbon chains with a fluorine attached
  - Can also include Hydrogen, Sulfur, Oxygen & Nitrogen
  - Chain Length is differentiating factor
- Very stable, very mobile and have negative health effects
  - Longer the chain, the more toxic
  - Shorter the chain, the more mobile
  - Bioaccumulation in wildlife and humans

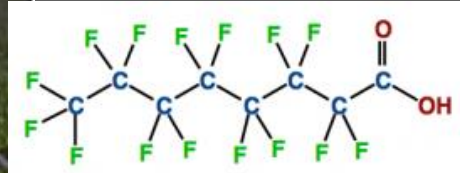


# PFAS CLASSIFICATION CHART

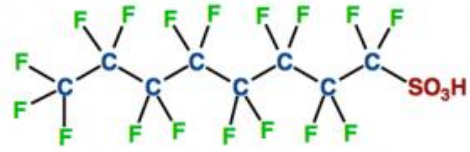


# PFAS ARE ALL AROUND US

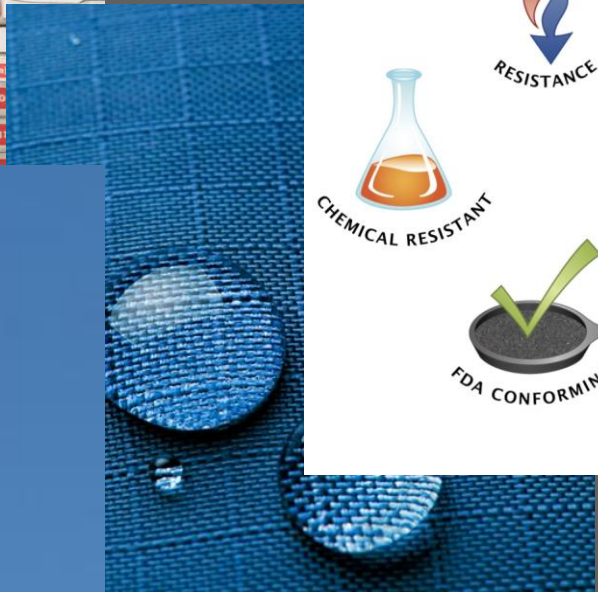
- Used for decades in manufacturing for stain resistant, waterproof & non-stick
  - Food from adhering to cookware
  - Fabrics & upholstery water and stain resistant
  - Mattresses & shoes waterproofing
  - Food from sticking to packages
  - **Fire retardant (airfields)**



PFOA - perfluorooctanoic acid



PFOS - perfluorooctanesulfonic acid



HI/LO TEMP RESISTANCE  
 LOW FRICTION  
 NONSTICK  
 CHEMICAL RESISTANT  
 FDA CONFORMING  
 ABRASION RESISTANT  
 ELECTRICAL





# SOME MORE INFORMATION

- Widespread throughout the WORLD!
  - Result of manufacturing domestically/internationally
- Certain PFOA/PFOS are NO LONGER manufactured in the U.S.
  - Voluntary Phase-out
  - Give 3M some credit...thanks😊
- Persistent in the environment
  - Exposure to air, water and sunlight will not break them down
- Human Exposure lengths for PFAS months-years prior
- Reality...most likely you have come in contact with them
  - Positive trend US exposures appear to be declining

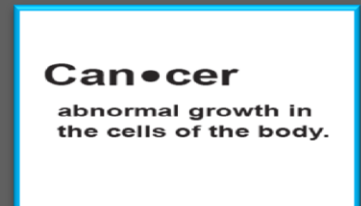
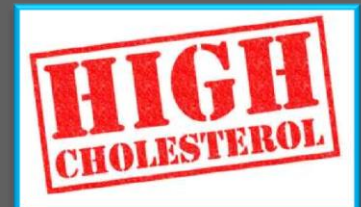
# EXPOSURE THROUGH WATER

- Drinking water can be an exposure source
  - Contamination is generally localized
- Airfield where fire retardants were used-Wright Patt



# SO WHAT'S IT DOING TO ME?

- Ingestion of PFAS leads to rapid absorption and accumulation in the body for long periods of time
- Different sources + accumulation + length of time = adverse health effects
- EPA lists PFAS as “suggestive” from animal data
  - Consistent findings for humans
    - high cholesterol
  - Limited findings for humans
    - Low birth rates
    - Effects relating to the immune system
    - PFOA=cancer
    - PFOS=thyroid hormone disruption





Manufacturing

Rules  
Regulations & Compliance



# PFAS go around & around

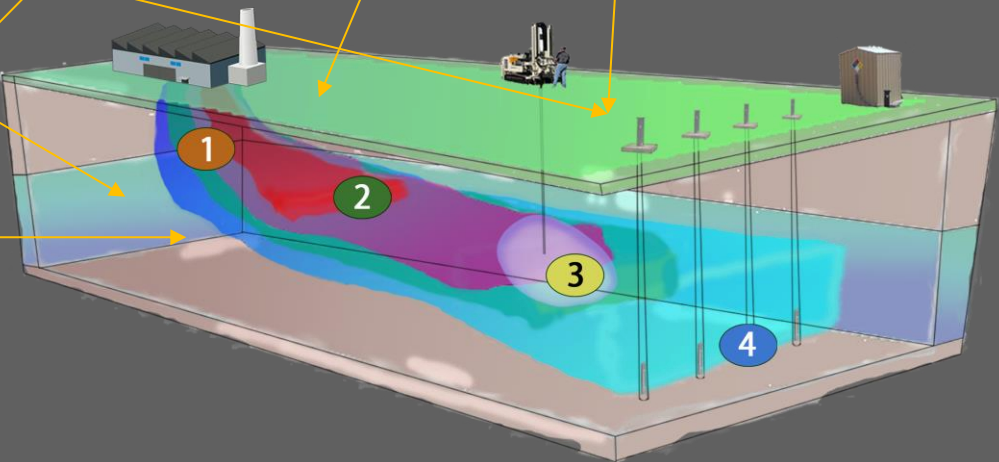
Increase in PFAS

Lower limits  
Increase studies



Alan Cressler

Improved  
Sampling &  
Remediation



# TIMELINE FOR PFAS

1930's-  
1950's

- Discovered & developed for manufacturing uses

1970

- Widespread use in the US

1999

- EPA investigates PFAS resulting from toxicity studies

2000

- 3M voluntary phases out PFAS, other manufacturers follow suit

2005

- EPA identifies PFOA as "suspected" carcinogen

2006

- Stewardship program emerges

# TIMELINE FOR PFAS

2009

- EPA sets advisory limits  
PFOA=.400ug/L  
PFOS=.200ug/L

2012

- EPA method 537 PFAS test method is developed and approved for UCMR 3 testing

2013-  
2016

- EPA includes PFOS in UCMR 3 water study of all Public Water Systems (10,000 plus consumers)

2016

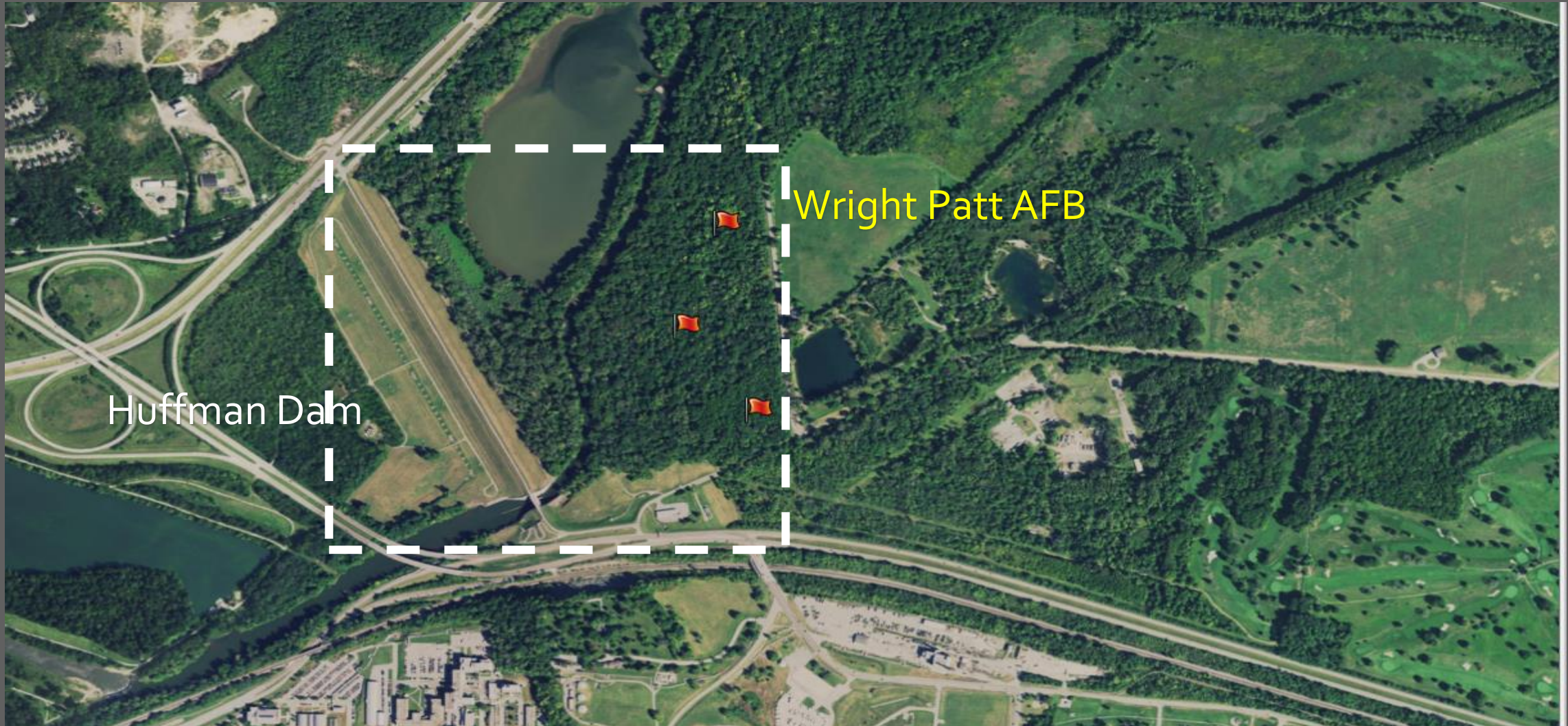
- EPA sets advisory levels at .070 ug/L

# CITY OF DAYTON INVOLVEMENT

- Wright Patt used PFAS fire retardant in air field operations
  - PFAS limit was lowered
  - Wright Patt wells exceeded limit
- COD wells are near Wright Patt boundaries
- Sampling Event was implemented to evaluate COD wells
  - Proactive
  - Precautionary

# City of Dayton's Involvement

- Area of Concern at Huffman Dam sits next





# COD ASSETS AT HUFFMAN DAM



- Water Resource for wellfield recharge
- Monitoring wells at Huffman Dam
- Huffman Dam Air Strippers
- Mad River Production Wells

# SAMPLING EVENT

- July 2016 Sampling Event took place at Huffman Dam
- EPA/COD contracted Tetra Tech to test for potential PFAS contamination of COD wells adjacent and downstream of Wright Patt AFB
- Using EPA approved Method 537
- Sampling Event included
  - Tetra Tech-Primary Samplers
  - COD Environmental Management-Assisted
  - COD WS&T-Assisted
  - Ohio EPA-Oversee
  - Wright Patt Staff-Oversee
- Sample Analysis performed by MASI

# PFAS SAMPLING REQUIREMENTS

- DON'TS- What not to wear for sampling
  - Personal Hygiene Products, Make-Up, Sunscreen, Insect Repellents
  - New Clothing
  - Fabric Softeners
  - Waterproof, water resistant, or stain resistant clothing
  - Waterproof, water resistant, or stain resistant boots
  - Handling Prepackaged food products prior to sampling



# PFAS SAMPLING REQUIREMENTS

- DO's-What to wear for Sampling
  - 100% cotton clothing- recommended washing 6x
  - DEET
  - Natural fiber clothing that is Well Washed without fabric softener
  - Boots without water resistant features
  - Powderless nitrile gloves
  - PFAS Free water source on hand

# PFAS SAMPLING REQUIREMENTS

- DON'TS- Equipment to avoid
  - No fluoropolymer (PTFE) bailers, pumps or bladders
    - Most Common PFTE product is Teflon
  - No fluoropolymer tubing or valves
  - Decon water from site
  - Glass containers
    - Loss of analytes as a result of adsorption
  - Waterproof field books
  - Sharpies/waterproof writing tools
  - Post-it notes
  - Ice packs



# PFAS SAMPLING REQUIREMENTS

- DO's-Equipment that must be used
  - PTFE free Disposable bailers or sampling apparatuses
  - Polyethylene or silicone based tubing
  - Decon sampling equipment in lab certified PFAS free water
  - Polypropylene or polyethylene sample bottles with screw cap
  - Ball point pens
  - Triple-rinse sampling tools and sampling equipment with distilled water following decontamination procedures
  - COLLECT BLANKS!
    - Specified by MASI
  - If your not sampling...stay back (30 plus feet)

# SAMPLING EVENT CHALLENGES

- Removal & Storage of COD's dedicated Samplers
  - COD's monitoring wells contain dedicated samplers with Teflon tubing
  - Had to figure out a plan to remove samplers safely and out of way
- Heavily wooded area with poison ivy, excessive bugs and direct sunlight
- Storage & Disposal of purged water
  - Tetra Tech was responsible for storage, transport & disposal of water
- Labels were difficult to write on with pen
- Tetra Tech sampler sole bailer
- Tense sampling atmosphere

# SAMPLING EVENT





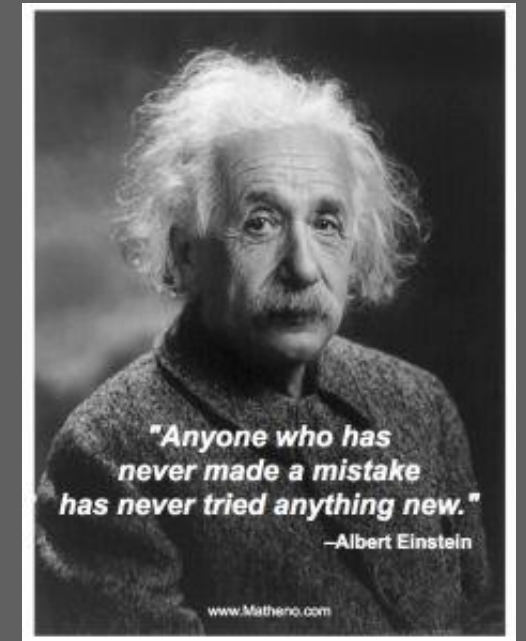
# RESULTS

COD found NO DETECT in the 4 monitoring wells that were sampled and analyzed for PFAS!



# WHAT WE LEARNED

- Sampling these contaminants can be CHALLENGING
  - Guidelines to follow are strict
  - Following method is extremely important
  - Lack of information and experienced samplers
  - PRESSURE is on!
- Sampling events NEVER go as planned
  - Utilizing various resources to solve and execute issues that arise
- Extensive planning is CRUCIAL!
  - Meeting of the minds with all parties involved
  - Next sampling event has been planned accordingly
- Quality of Sampling
  - Important to be able to provide quality samples
  - Sampling should be able to re-produced



# CONTINUED

- Evaluate Sampling environment prior, during and after event
- Always veer to the side of caution!!!
  - Research and evaluate before hand and when in doubt...don't use it!
- Find a reliable laboratory who specializes in analysis
  - Lab to Lab...Things can go wrong!
    - Trace levels can be detected
    - Lab glassware is a major concern
  - Efforts went into collecting samples, expect the same kind of quality and consistency

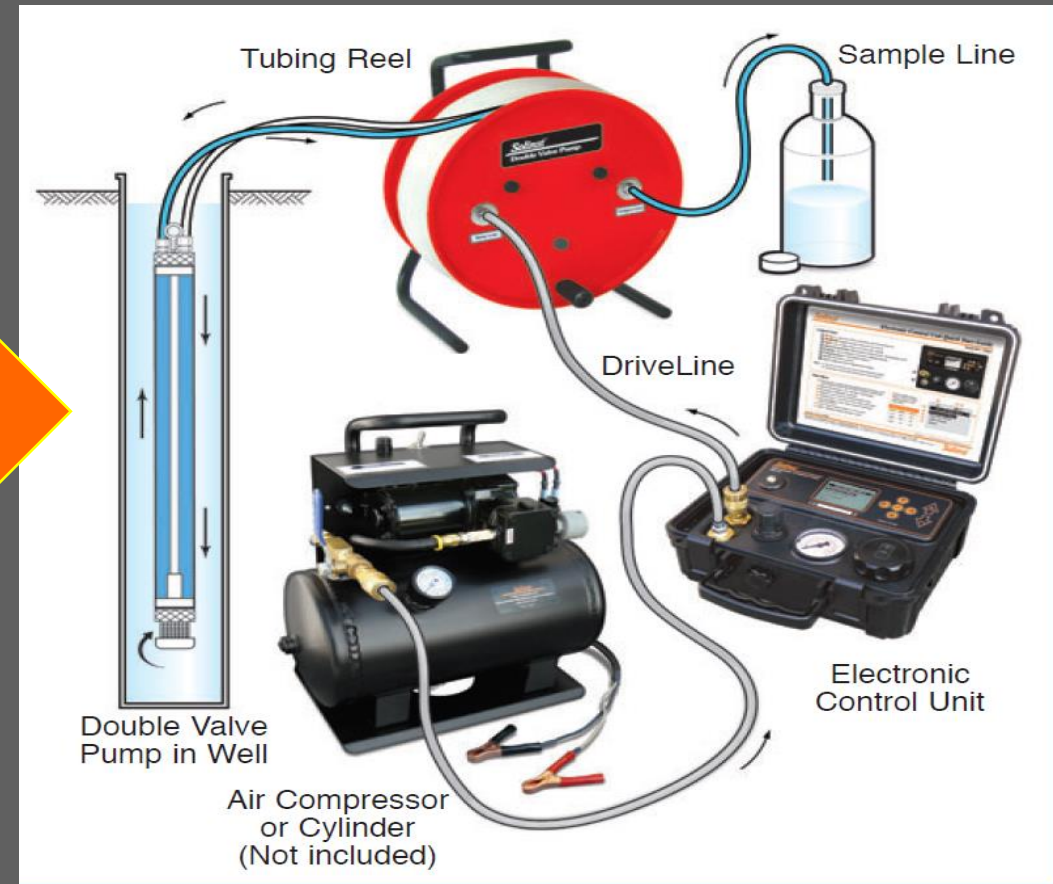
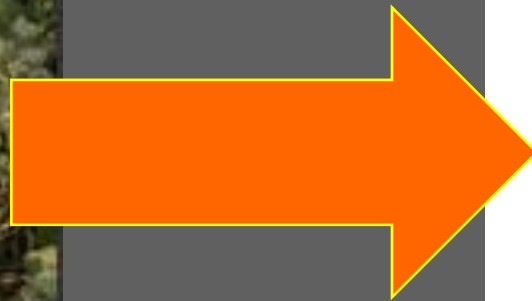


# WHAT'S NEXT?

- Sampling Event in May/June 2017
  - COD-Environmental Management/WS&T
  - Deciding on sampling plan
- Understood that we want
  - QUALITY
  - Patience
  - Consistency
  - High importance



# FUTURE SAMPLING



# BENEFITS

- Investing in new Equipment-Low flow sampling
  - Reduces sediment displacement
  - Allows COD to install TEFLON FREE
    - Dedicated samplers
    - Pumps & Fittings
  - Allows COD to amp up Quantity of wells without losing quality
  - Reduces exhausting field samplers...thank goodness😊

# CONCLUSION

- PFAS History
- PFAS FYI
- How it effects the City of Dayton
- PFAS sampling
- What was learned
- Future Sampling



# SOURCES

- "Per- and Polyfluoroalkyl Substances (PFASs) in Your Environment." *EPA*. Environmental Protection Agency, 16 Dec. 2016. Web. 10 May 2017. <<https://www.epa.gov/pfas>>.
- Auccoin, Michael. "Poly- and Perfluoroalkyl Substances (PFAS) Sampling and Analysis: Truths, Traps, and Consequences." Ed. Dr. Katherine Davis. AECOM, 15 June 2016. Web.
- "Health Effects of PFAS." *Centers for Disease Control and Prevention*. Centers for Disease Control and Prevention, 30 Aug. 2016. Web. 10 May 2017. <[https://www.atsdr.cdc.gov/pfc/health\\_effects\\_pfcs.html](https://www.atsdr.cdc.gov/pfc/health_effects_pfcs.html)>.
- Barrie Barber Staff Writer 7:43 p.m Friday, June 10, 2016 Local. "EPA 'displeased' Wright-Patterson missed deadline for water testing." *Daytondailynews*. N.p., n.d. Web. 10 May 2017. <<http://www.daytondailynews.com/news/local/epa-displeased-wright-patterson-missed-deadline-for-water-testing/AQoD498FSd9UPgROHYIhnL/>>.



**I MUSTACHE YOU**

**A QUESTION**