Micron in central NY

How will chip manufacturing affect our water and air?

Donald Hughes
March 31, 2025
SUNY - esf

Outline

1. Big picture: how big? timeframe, investments, subsidies, facility size

2. Site construction:

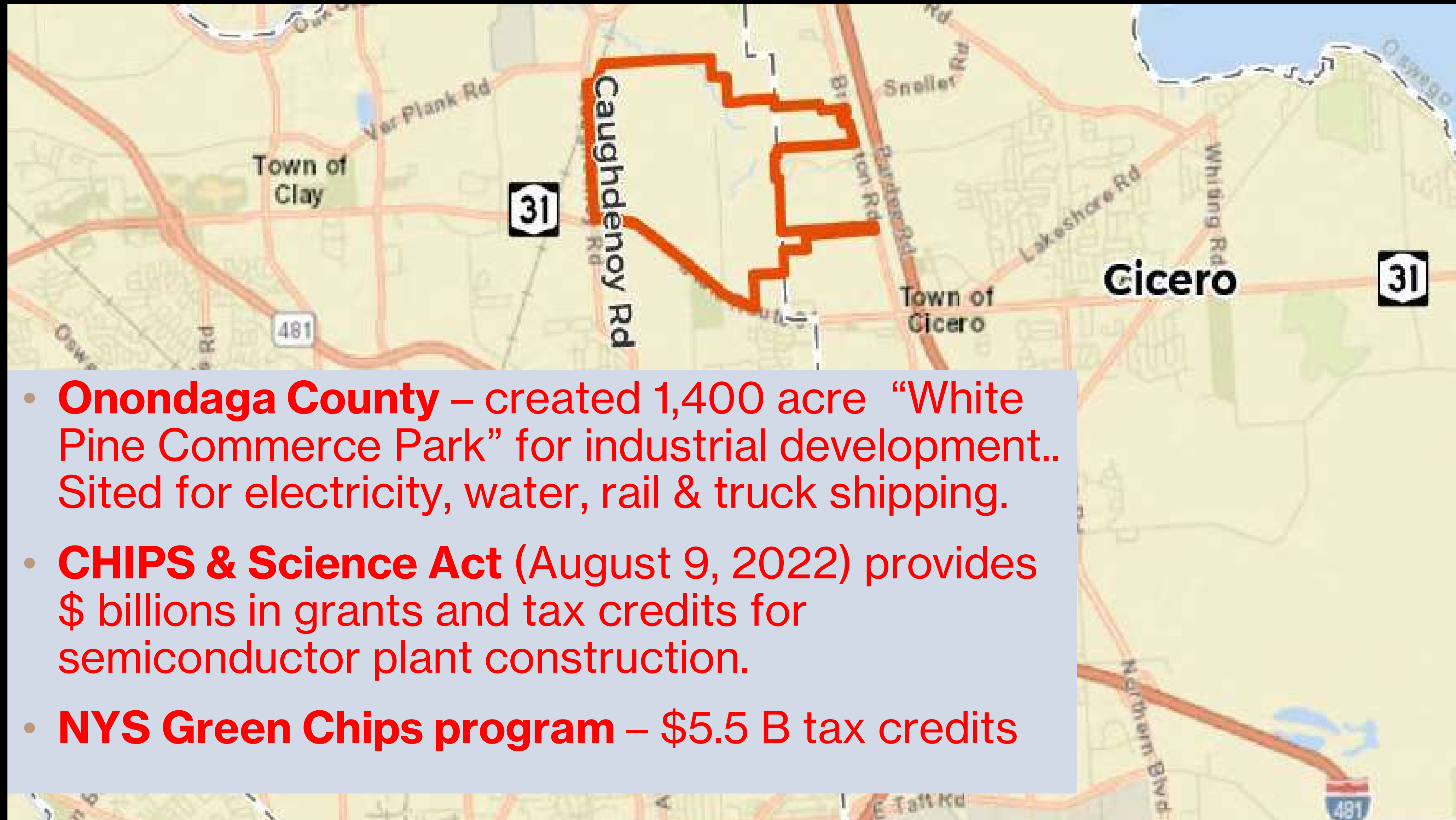
    ecological impacts

    carbon footprint

3. water pollution

4. air pollution

Why is Micron building here?



- **Onondaga County** – created 1,400 acre "White Pine Commerce Park" for industrial development.. Sited for electricity, water, rail & truck shipping.
- **CHIPS & Science Act** (August 9, 2022) provides $ billions in grants and tax credits for semiconductor plant construction.
- **NYS Green Chips program** – $5.5 B tax credits

Project Timeline

April – Sept 2025: EIS to be released, public comment, finalized.

Nov – Dec 2025: break ground?

2031

Fab 1 in operation and Fab 2 under construction. Water pipes, wastewater tmt, grid connection, RR spur complete.

2034

Evaluate traffic, air quality, noise, and construction impacts projected to be a peak of operations and construction employment.

2037

Fab 1 and Fab 2 operating and construction of Fab 3 underway;

2040

Representing completion of Fab 1 and Fab 2 will be used to reflect the larger amount of project completion at that time.

2041

All four Fabs in operation with on-going fit out of Fab 4.

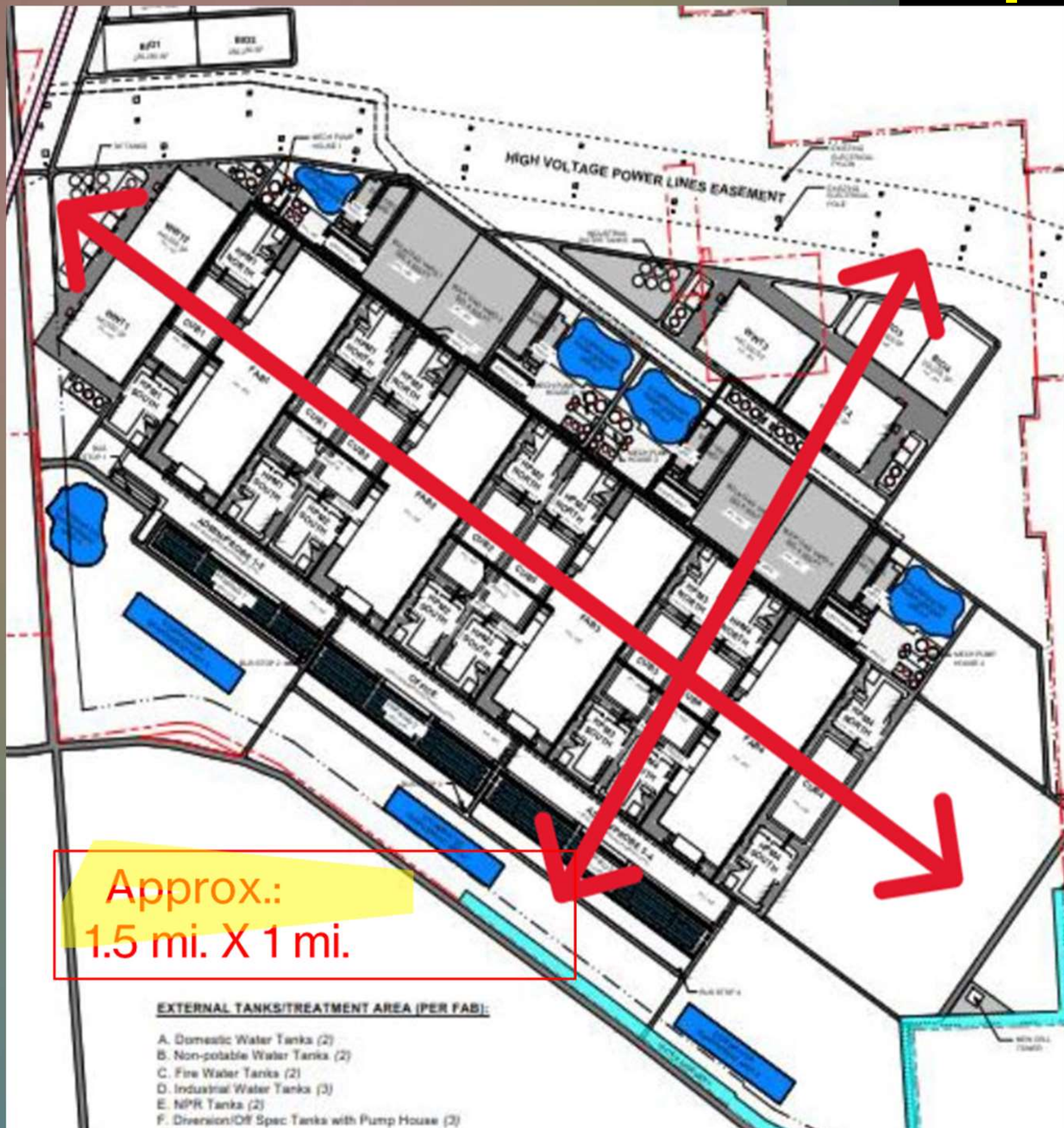
Sources of funding: Up to $27.6 billion subsidies –most of it taxpayer funded

- $4.6 billion in CHIPS Act grants
- $11 billion Federal Income Tax credits (20 yrs.)
- $5.5 billion NYS Income Tax credits (20 yrs.)

} 1st two fabs

- $284 million Onondaga County Property Tax abatement (49 yrs.)
- $244 million NYS (taxpayer) support for discounted utility rates (10 yrs.)
- $200 million Onondaga County (taxpayer) support for infrastructure improvements

Approximately 12.3 million SF of building space on a footprint of 1,400 acres

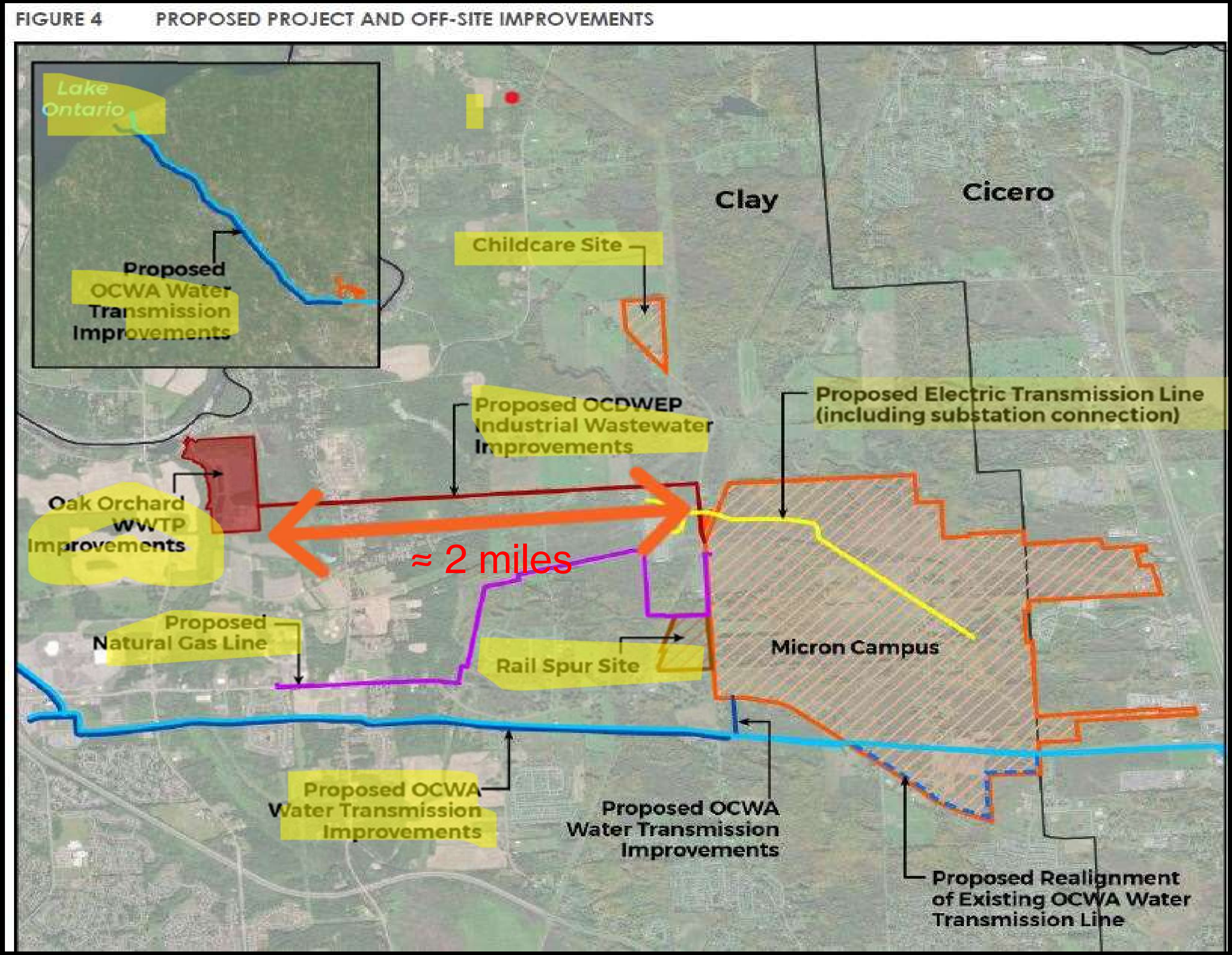


Each Fab:
1.2 million sf of land
600,000 sf cleanroom space
290,000 sf cleanroom support space
250,000 sf administrative space.

Each set of two Fabs:
470,000 sf of central utility buildings
3, 200,000 sf of warehouse space,
200,000 sf of product testing space housed in separate buildings.

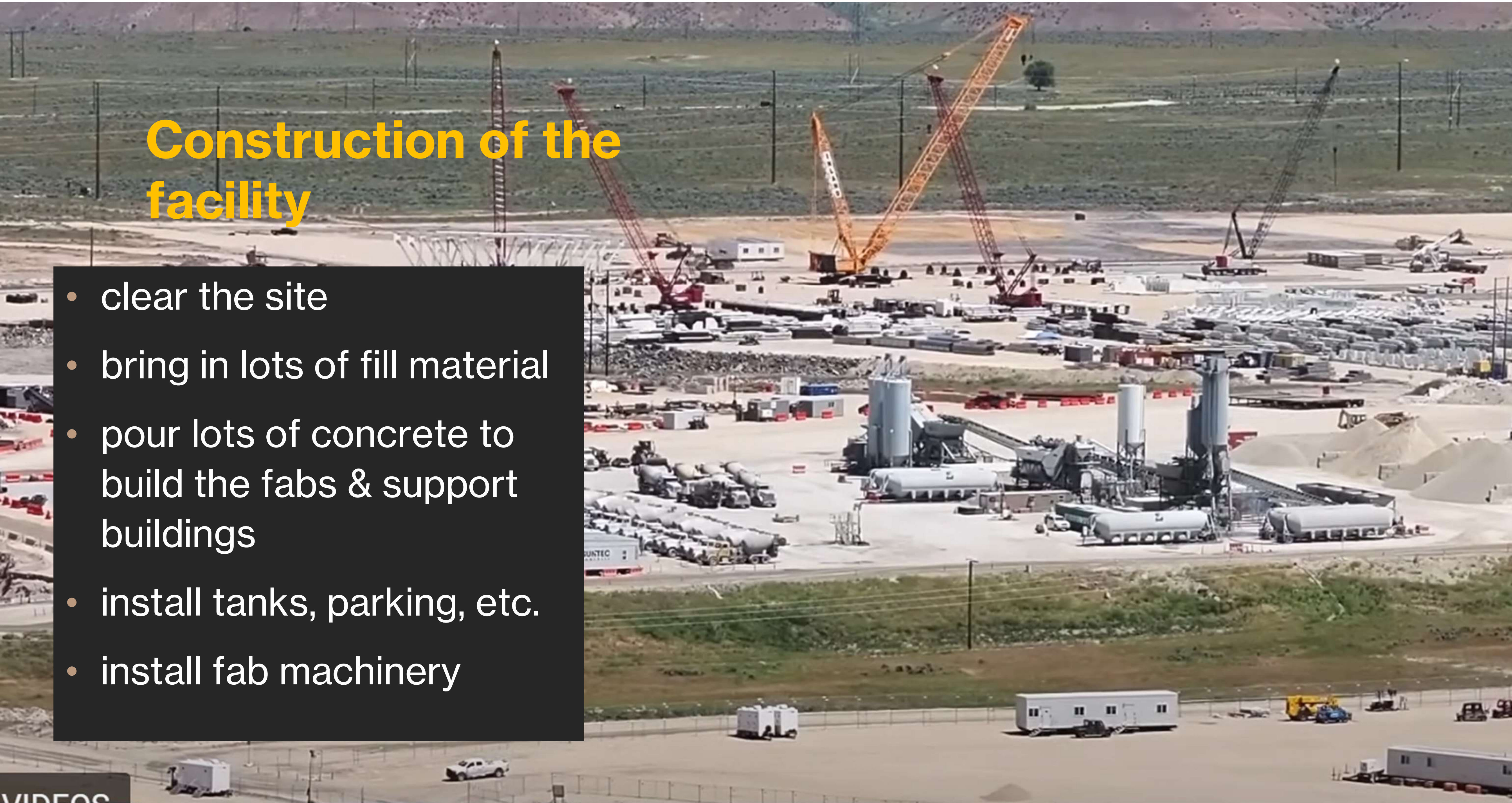
Entire Campus to encompass area equivalent to over 1,000 football fields and each Fab approx. 6 football fields long X 2 fields wide.

OTHER PROJECT COMPONENTS



Construction of the facility

- clear the site
- bring in lots of fill material
- pour lots of concrete to build the fabs & support buildings
- install tanks, parking, etc.
- install fab machinery



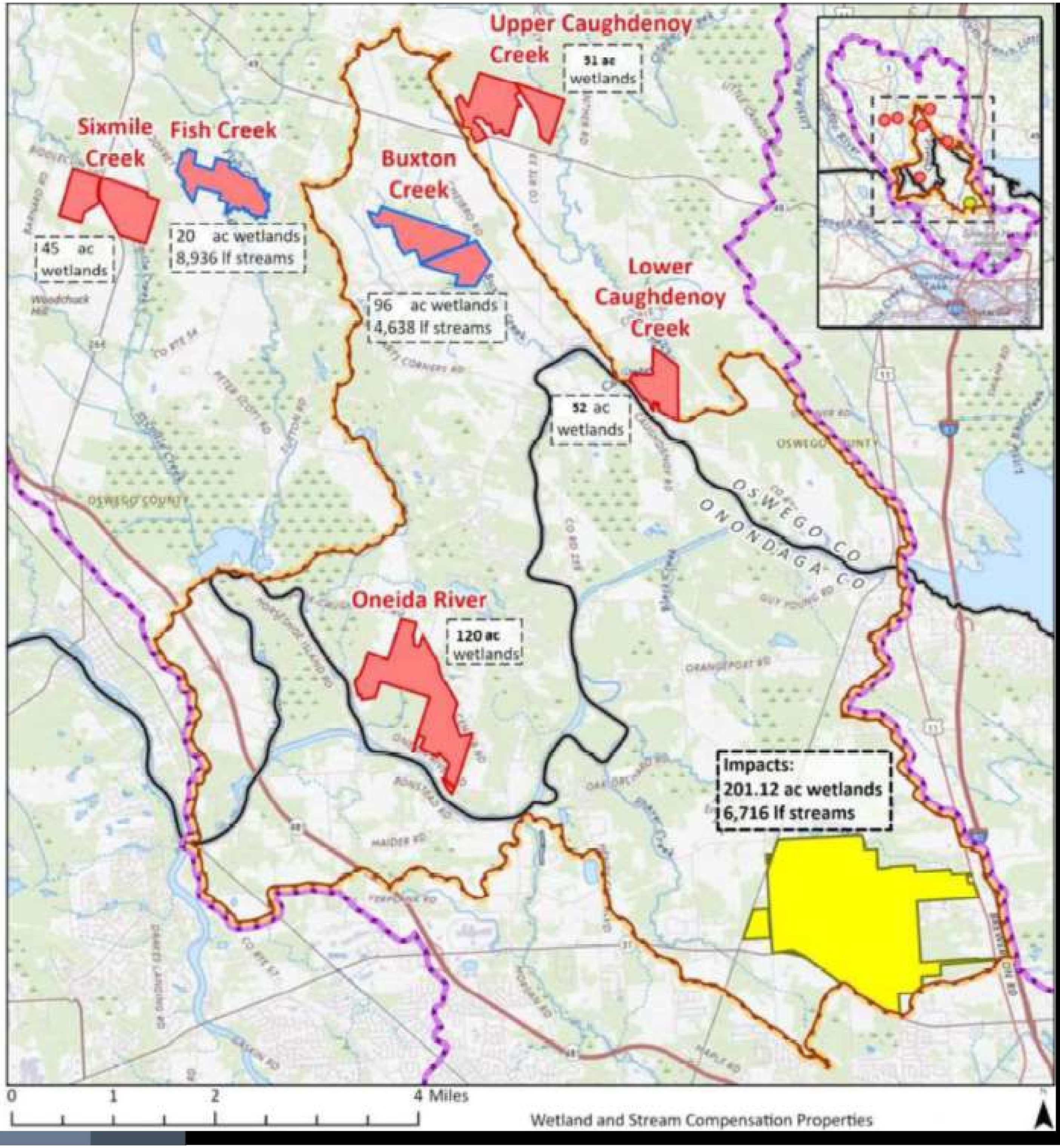
BoiseDev - Boise, Idaho business & growth https://www.youtube.com/watch?v=0hsAySzj4C0

- Boise, Idaho = 1 fab
- Clay, NY = 4 fabs

Ecological Communities, Wetlands and Wildlife

- 204 acres directly filled in
- surrounding wetlands will be affected
- ~300 acres forest to be cut
- Endangered bat colonies live in nearby forest
- habitat loss for amphibians, birds, insects, etc

2024 photo: Glenn Coin | gcoin@syracuse.com



Wetland and Stream Mitigation Site Location Overview

Filled in:

201-204 acres of wetland &

6,700 LF of streams

To Be Created:

- 384 acres new wetlands – mostly existing ag land
- 13,600 lineal feet streams to be created

3. Water &
4. Air pollution

- wide array of chemicals used
- gases & liquids, including:
  - PFAS = perfluorinated alkyl substances
  - PFC = perfluorinated compounds

Hazardous Materials & emissions

- Semiconductor manufacture uses hundreds of chemicals
- Key considerations:
  - safe handling
  - transport
  - storage
  - spill control
  - worker safety
  - emissions

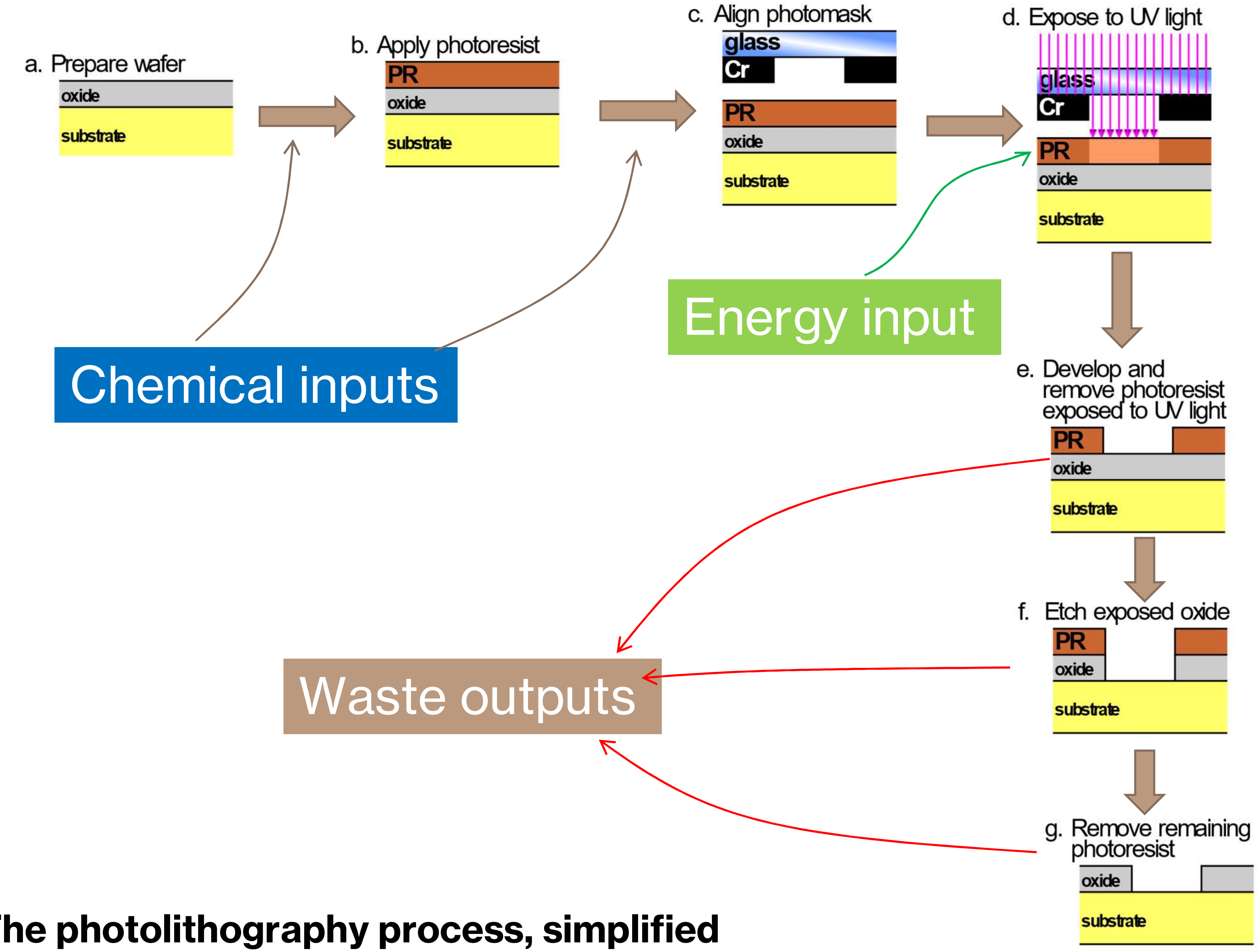
Comparison of two chips plants in Korea.
Factory A produces DRAM . Factory B produces NAND.

		Factory A		Factory B	
		Number	Amount (ton)	Number	Amount (ton)
Classification by phase	**Gas**	180	1,317	141	1,303
	Liquid	216	44,371	277	44,284
	Solid	1	1,163	10	40
Total		**397**	**46,850**	**428**	**45,628**

Source: Kim *et al. (2018)* "Chemical use in the semiconductor manufacturing industry" *INT'L J. OF OCCUPATIONAL AND ENVIRONMENTAL HEALTH.* VOL. 24, NOS. 3–4, 109–118

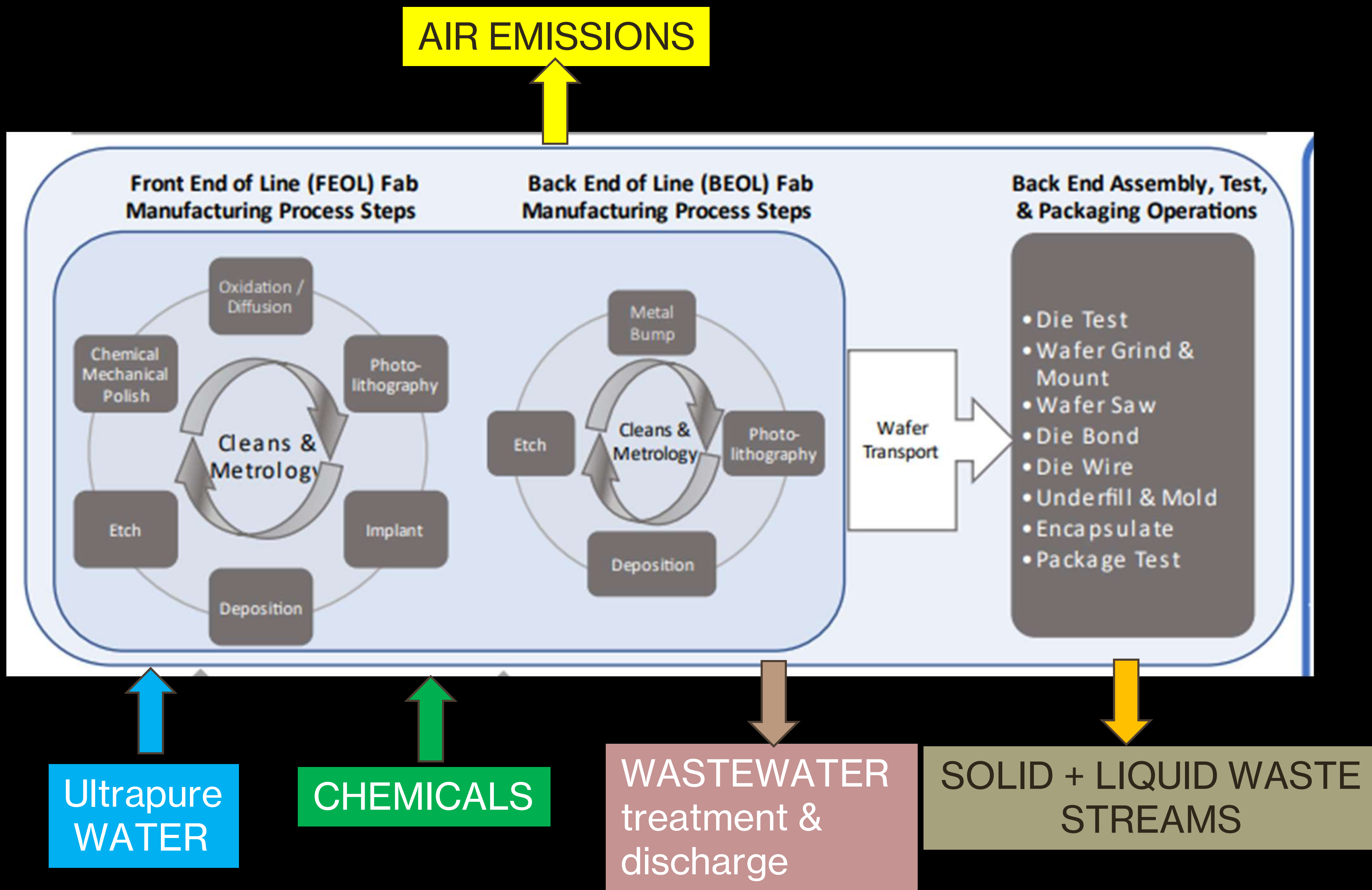
Types of Chemicals :

- 1) Heavy metals & compounds containing heavy metals
- incl. mercury and cadmium, and less-toxic metals like copper, zinc.
- 2) perfluorinated compounds (PFAS, PFCs)
- 3) inorganic acids & bases
- 5) organic solvents, photoresists, etc.
  - -alcohols
  - - amines and amides
  - - ethers, glycol ethers
  - - esters
  - - sulfoxides & related S-compounds
  - - chlorinated compounds
  - - polycyclic aromatic hydrocarbons (PAHs)
- 6) unique compounds such as carbon disulfide, arsine, and phosphine



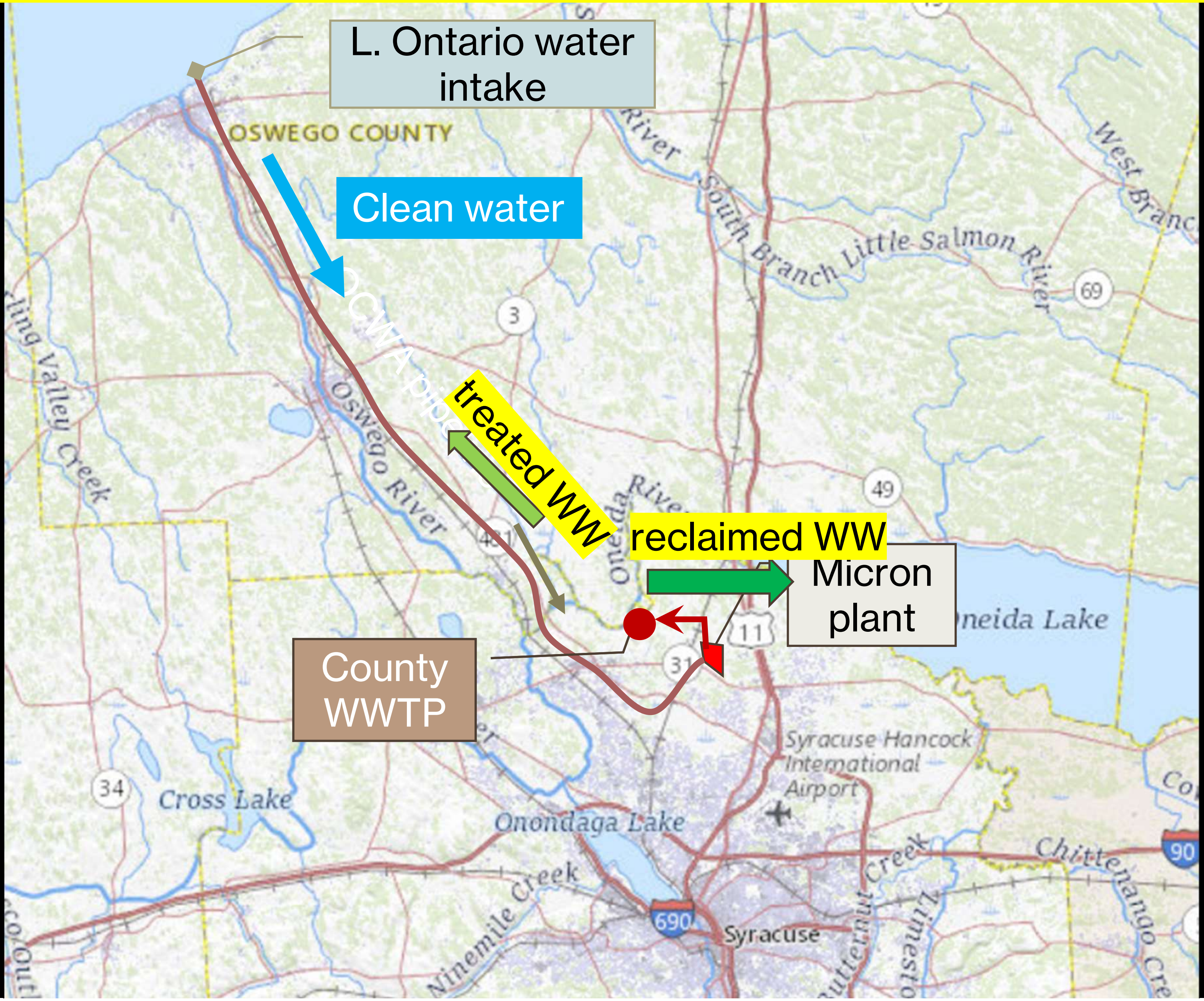
The photolithography process, simplified

Semiconductor manufacturing



Graphic:

Water & Wastewater : Micron chips fab, Clay NY



Water Resources, Utilities and Infrastructure

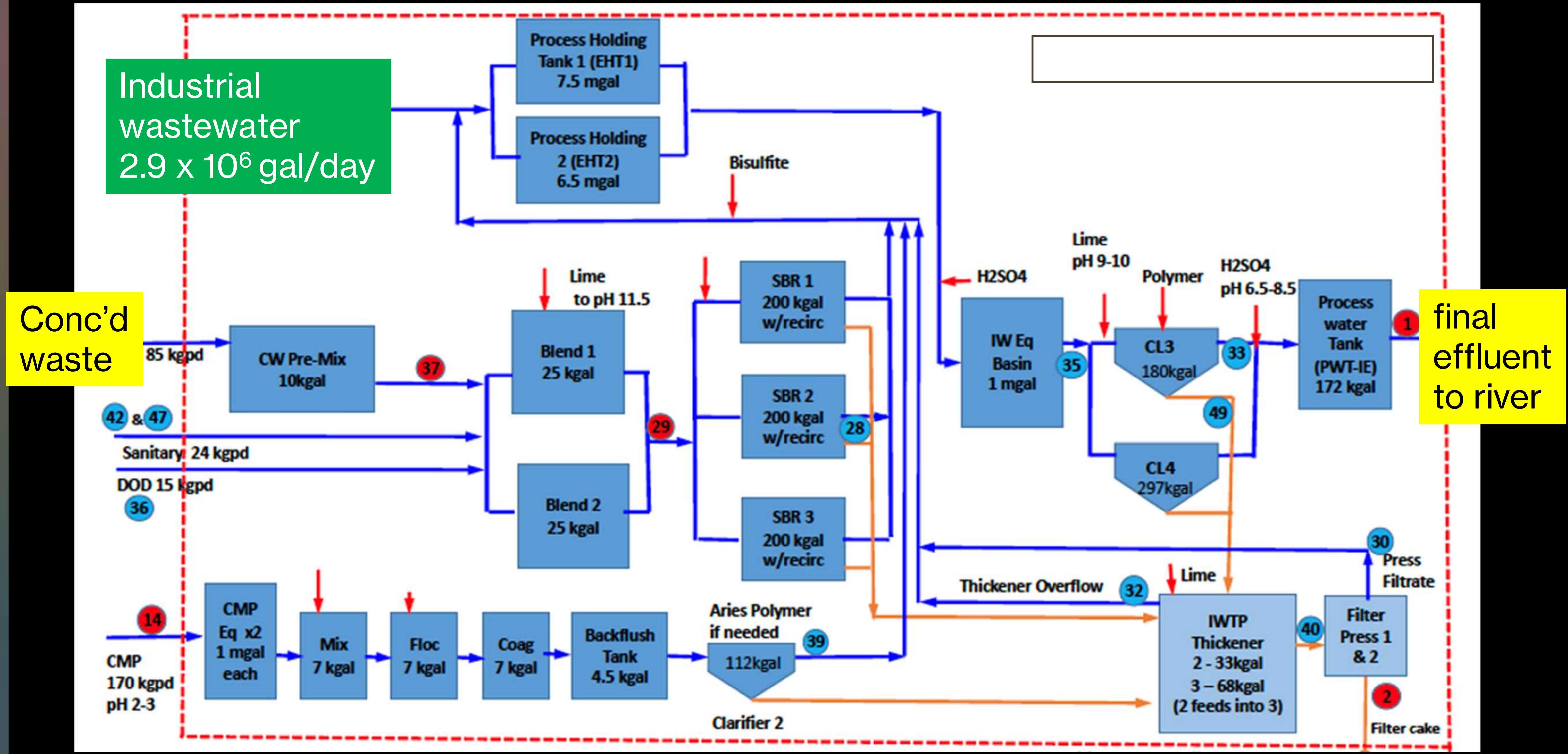
Water supply (L. Ontario):
12 MGD/fab x 4 fab = 48 MGD (million gal/day)

Wastewater treatment
- industrial pre-treatment
- conventional sewage tmt

Onon. County to **spend** ~ up to $**1** Billion to upgrade the Oak Orchard Wastewater Treatment Plant. Will bill Micron.

Micron to spend $200 million on road and infrastructure improvements

WW treatment example



WW Discharge permit – GF in VT

For treated wastewater from semi-conductor manufacturing, discharged to the Winooski River.

Monitor standard parameters for sewage treatment: BOD_5, NH_3, total N, total P.
Limits on Total P

Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Quantity	Quantity	Conc.	Conc.	Conc.
Flow; Effluent; Continuous	Year Round Daily	Monitor MGD Monthly Avg				
Flow; Annual Average; Calculated	12/01-12/31 Annual	8.0 MGD Annual Avg				
BOD, 5-Day; Effluent; 24 Hour Comp	06/01 – 10/31 Weekly	Monitor lbs/day Monthly Avg				
E. Coli; Effluent; Grab	Year Round Weekly					77 #/100 ml Instant Max
Nitrogen, Ammonia Total; Effluent; Grab	Year Round 2 per Month				Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Nitrite Plus Nitrate Total; Effluent; 24 Hour Comp	11/01 - 05/31 Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrite Plus Nitrate Total; Effluent; 24 Hour Comp	06/01 - 10/31 Weekly	Monitor lbs/day Monthly Avg	Monitor lbs/day Daily Max		Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Nitrogen, Kjeldahl Total; Effluent; 24 Hour Comp	11/01 - 05/31 Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrogen, Kjeldahl Total; Effluent; 24 Hour Comp	06/01 - 10/31 Weekly	Monitor lbs/day Monthly Avg	Monitor lbs/day Daily Max		Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Nitrogen, Total; Effluent; Calculated	11/01 - 05/31 Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrogen, Total; Effluent; Calculated	06/01 - 10/31 Weekly	Monitor lbs/day Monthly Avg	Monitor lbs/day Daily Max		Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Phosphorus, Total; Effluent; 24 Hour Comp	Year Round Weekly				0.8 mg/l Monthly Avg	
Phosphorus, Total; Effluent; Calculated	Year Round Monthly	Monitor lbs Annual Total	Monitor lbs Monthly Total		Monitor % Monthly Total	
Phosphorus, Total; Annual Average; Calculated	12/01 - 12/31 Annual	4872.0 lbs/yr Annual Total				

WW permit, p.3

limits on 7 heavy metals & fluoride, cyanide, O&G

Total toxic organics: >100 compounds. VOCs, pesticides, PCBs, PAHs, phenols, etc.

Table continued						
Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Quantity	Quantity	Conc.	Conc.	Conc.
Suspended Solids, Total; Effluent; 24 Hour Comp	Year Round Weekly		437.0 lbs/day Daily Max			10.5 mg/l Daily Max
Ultimate Oxygen Demand; Effluent; Calculated	06/01 - 10/31 Weekly		2300.0 lbs/day Daily Max			
Cadmium, Total; Effluent; 24 Hour Comp	02/01 – 02/28 Semi-Annual	0.42 lbs/day Monthly Avg	0.62 lbs/day Daily Max		0.07 mg/l Monthly Avg	0.11 mg/l Daily Max
Cadmium, Total; Effluent; 24 Hour Comp	07/01 – 07/31 Semi-Annual	0.42 lbs/day Monthly Avg	0.62 lbs/day Daily Max		0.07 mg/l Monthly Avg	0.11 mg/l Daily Max
Chromium, Trivalent; Effluent; 24 Hour Comp	02/01 – 02/28 Semi-Annual	45.7 lbs/day Monthly Avg	66.7 lbs/day Daily Max		1.71 mg/l Monthly Avg	2.77 mg/l Daily Max
Chromium, Trivalent; Effluent; 24 Hour Comp	07/01 – 07/31 Semi-Annual	45.7 lbs/day Monthly Avg	66.7 lbs/day Daily Max		1.71 mg/l Monthly Avg	2.77 mg/l Daily Max
Copper, Total; Effluent; 24 Hour Comp	Year Round 2 per Month	2.6 lbs/day Monthly Avg	3.5 lbs/day Daily Max		2.07 mg/l Monthly Avg	3.38 mg/l Daily Max
Iron, Total; Effluent; 24 Hour Comp	Year Round Monthly				Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Lead, Total; Effluent; 24 Hour Comp	Year Round 2 per Month	1.05 lbs/day Monthly Avg	1.81 lbs/day Daily Max		0.43 mg/l Monthly Avg	0.69 mg/l Daily Max
Nickel, Total; Effluent; 24 Hour Comp	Year Round 2 per Month	22.95 lbs/day Monthly Avg	39.66 lbs/day Daily Max		2.38 mg/l Monthly Avg	3.98 mg/l Daily Max
Silver, Total; Effluent; 24 Hour Comp	02/01 – 02/28 Semi-Annual	0.66 lbs/day Monthly Avg	0.97 lbs/day Daily Max		0.24 mg/l Monthly Avg	0.43 mg/l Daily Max
Silver, Total; Effluent; 24 Hour Comp	07/01 – 07/31 Semi-Annual	0.66 lbs/day Monthly Avg	0.97 lbs/day Daily Max		0.24 mg/l Monthly Avg	0.43 mg/l Daily Max
Zinc, Total; Effluent; 24 Hour Comp	Year Round 2 per Month	37.97 lbs/day Monthly Avg	52.68 lbs/day Daily Max		1.48 mg/l Monthly Avg	2.61 mg/l Daily Max
Cynide, free (amen. To chlorination) Effluent; Grab	Year Round Monthly	4.77 lbs/day Monthly Avg	6.97 lbs/day Daily Max		0.65 mg/l Monthly Avg	1.2 mg/l Daily Max
Fluoride; Effluent; 24 Hour Comp	Year Round 2 per Month				17.4 mg/l Monthly Avg	28.0 mg/l Daily Max
Hydrogen Peroxide; Effluent; 24 Hour Comp	Year Round Weekly				10.0 mg/l Monthly Avg	15.0 mg/l Daily Max
Oil and Grease; Effluent; Grab	02/01 – 02/28 Semi-Annual	1734.72 lbs/day Monthly Avg	3469.44 lbs/day Daily Max		26.0 mg/l Monthly Avg	52.0 mg/l Daily Max
Oil and Grease; Effluent; Grab	07/01 – 07/31 Semi-Annual	1734.72 lbs/day Monthly Avg	3469.44 lbs/day Daily Max		26.0 mg/l Monthly Avg	52.0 mg/l Daily Max
pH; Effluent; Grab	Year Round Daily				6.5 s.u. Min	8.5 s.u. Max
Total Toxic Organics; Effluent; Grab	01/01 – 3/31 Quarterly					1.37 mg/l Daily Max

WW permit, p. 3: PFAS

The Permittee shall monitor the effluent from the treatment systems for the **five regulated per- and polyfluoroalkyl substances (PFAS) substances** ... at a minimum frequency of once per quarter within the first 12 months from the permit effective date. After the first year, monitoring shall be conducted annually.

- Perfluoro-1-hexanesulfonic acid (PFHxS)
- Perfluoro-1-octanesulfonic acid (PFOS)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorooctanoic acid (PFOA)
- Perfluorononanoic acid (PFNA)

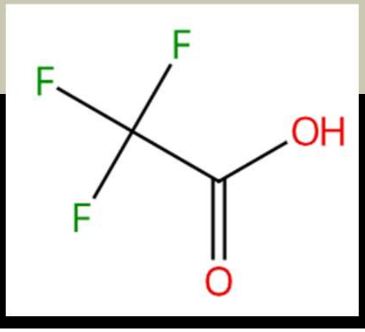
Micron: Final Treatment @ enlarged Oak Orchard sewage plant

- PFAS will not breakdown in a sewage treatment plant.
- **PFAS have been found at elevated levels in sewage sludge – NY state, Maine, MN, TX, others**

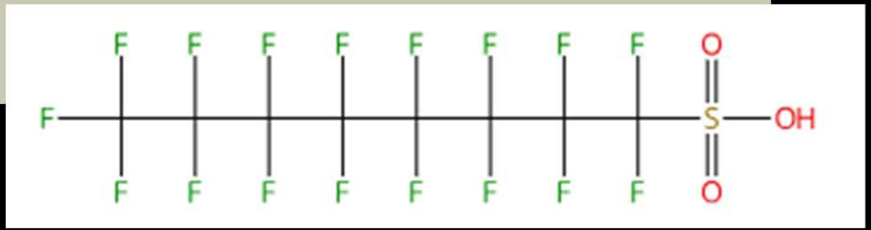
- **PFAS that do not partition to sludge will either:**
  - **be discharged into local waterway**
  - **be emitted into the air**

PFAS = PerFluoro and PolyFluoro Alkyl Substances

- Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) are a family of thousands of human-made compounds known as the "Forever Chemicals" because they are **very** persistent
- ***a class of chemicals containing at least one fully fluorinated carbon atom***

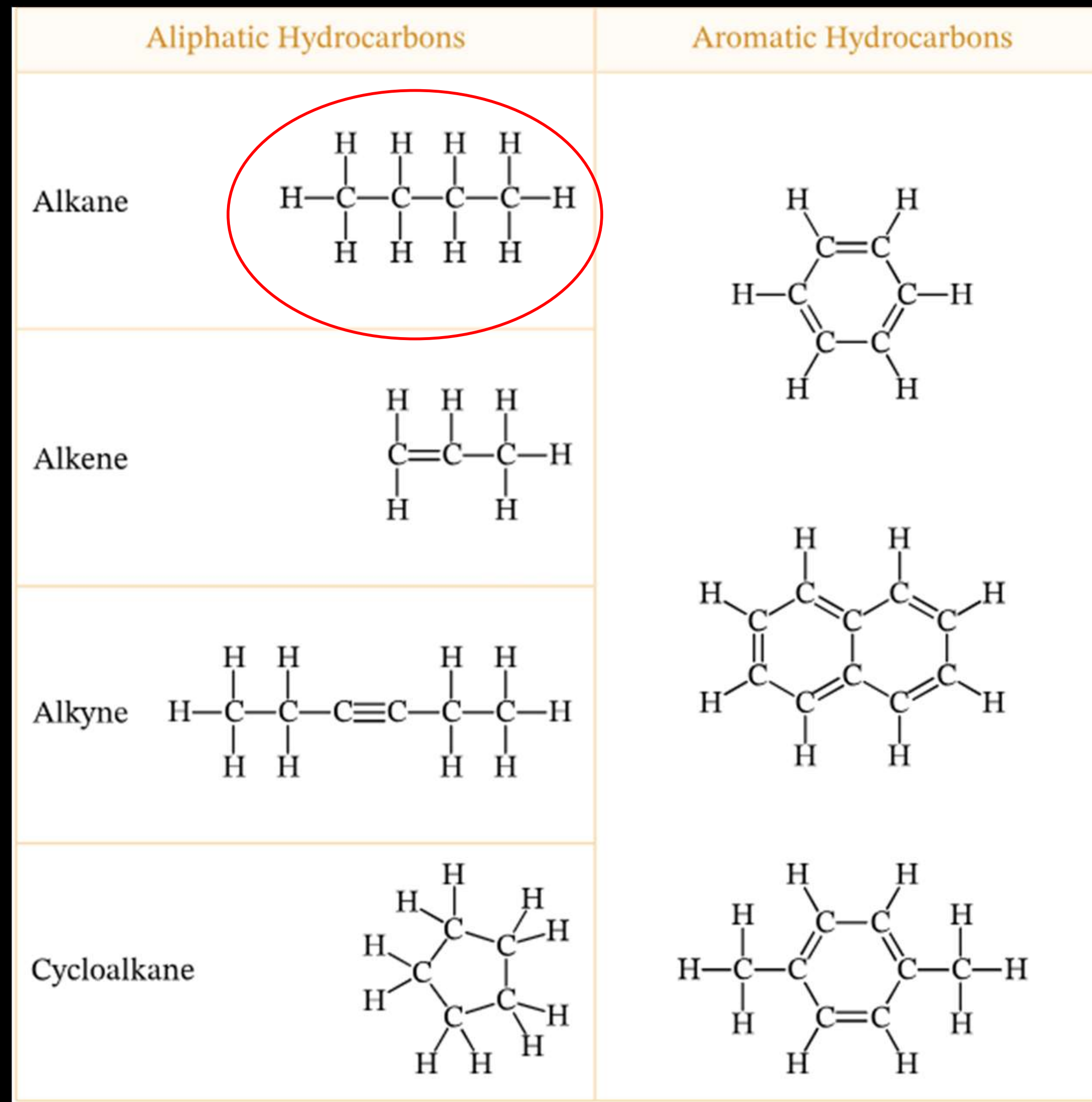


Trifluoroacetic acid (TFA)

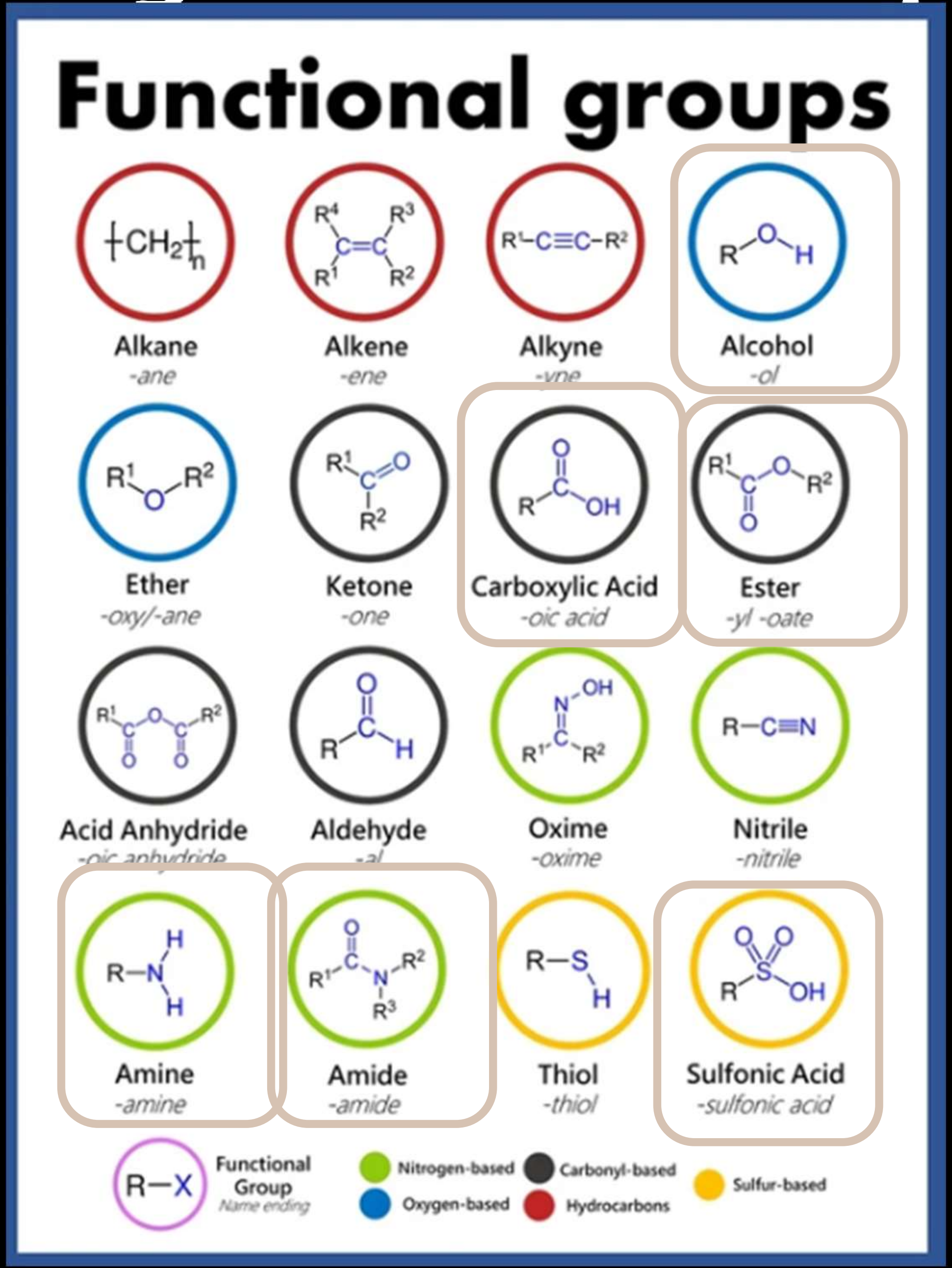


Perfluorooctanesulfonic acid (PFOS)

organic chemistry 101: hydrocarbons



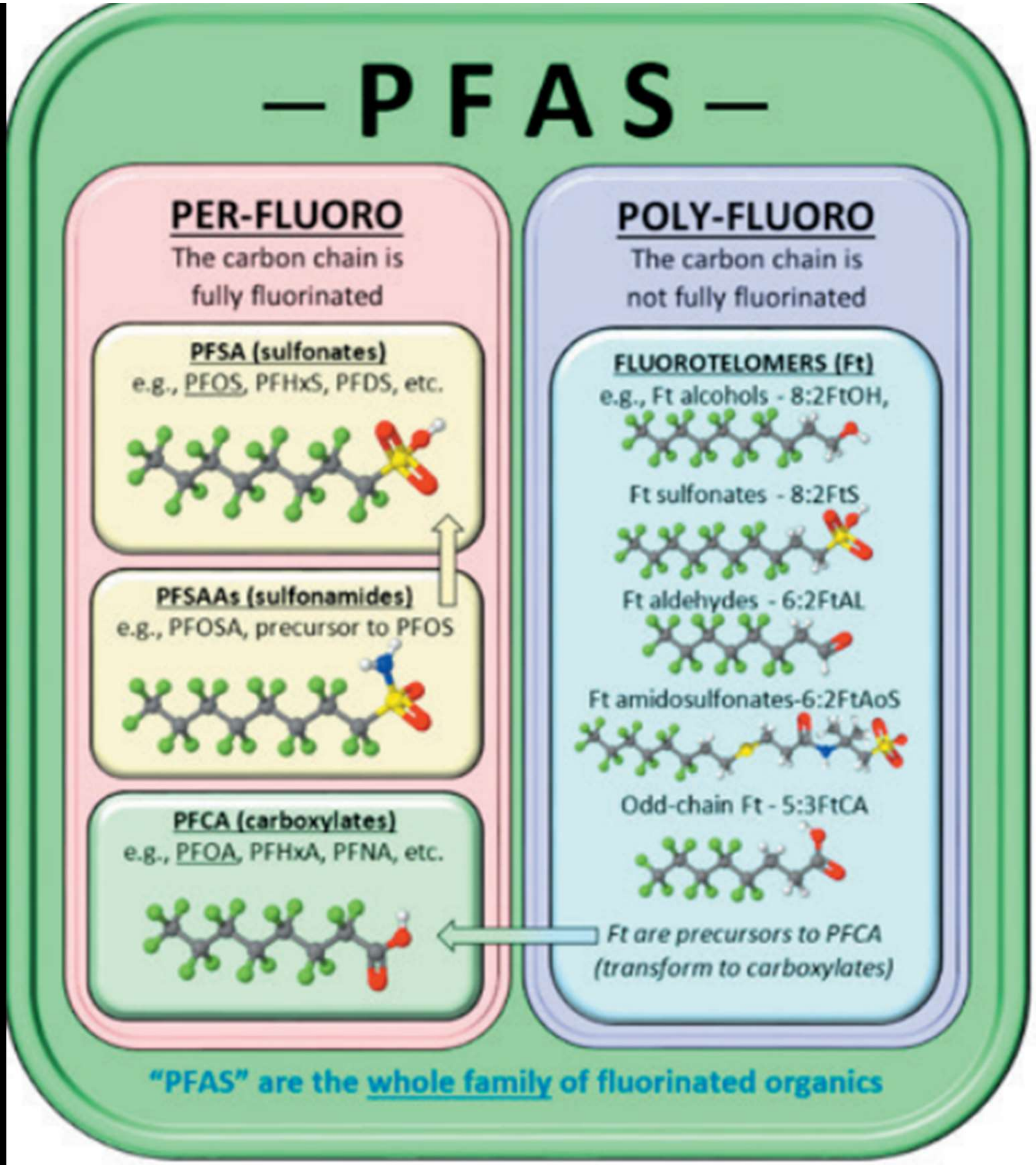
organic chemistry 102:



6 major groups in PFAS

the two acids are very acidic

Get a poster! available for only $11.80 on www.redbubble.com



Source: The Global PFAS Problem: Fluorine-Free Alternatives as Solutions (April-May 2019)
https://ipen.org/sites/default/files/documents/the_global_pfas_problem-v1_5_final_18_april.pdf

The C-F bond is very strong and stable, so PFAS hard to break down

Pathways to Chemistry

***Bond Energies, *D*, (kJ/mol)**

Single Bonds

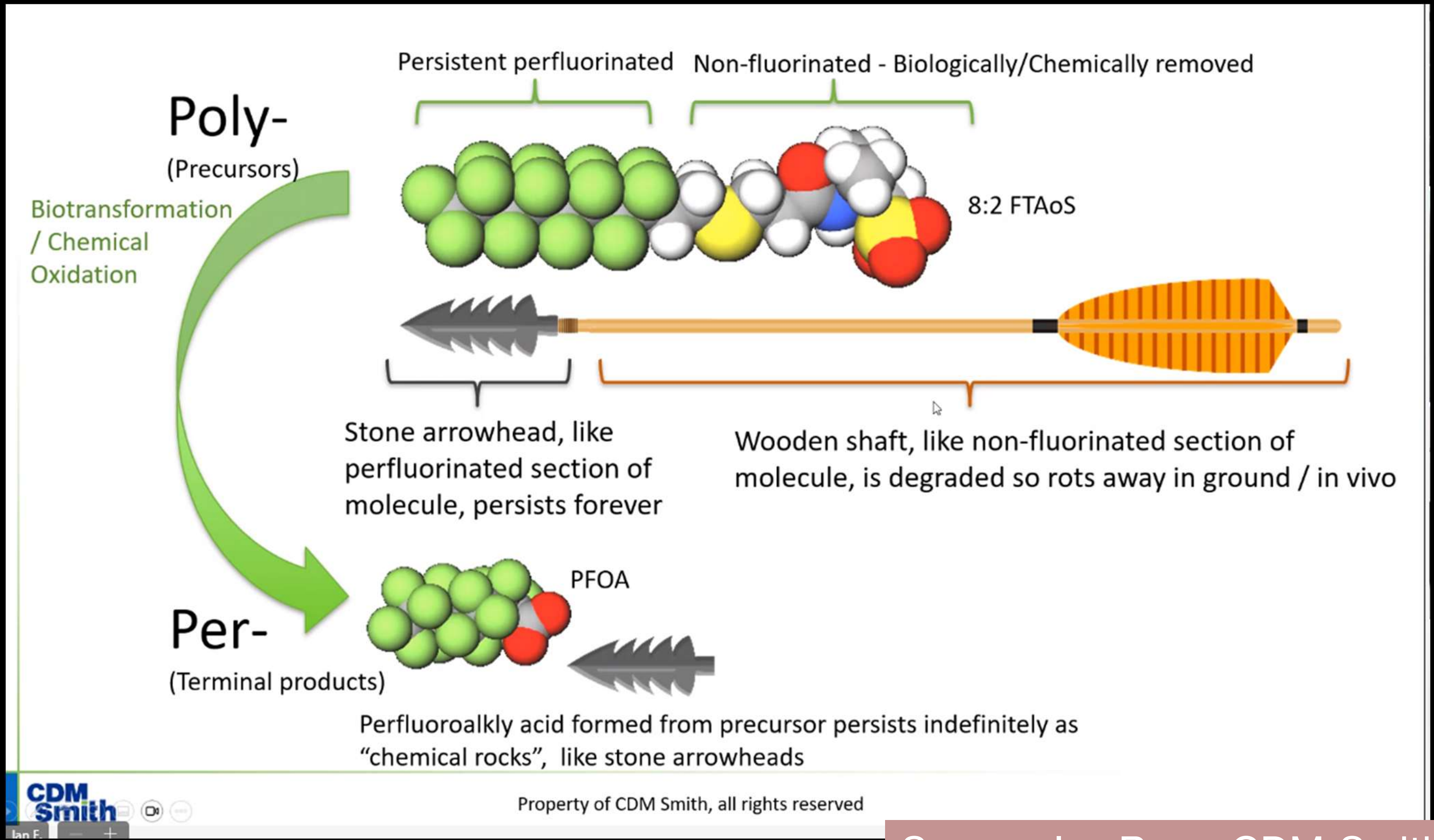
C—H	414	N—H	389	O—H	463
C—C	348	N—N	163	O—O	146
C—N	293	N—O	201	O—F	190
C—O	351	N—F	272	O—Cl	203
C—F	439	N—Cl	200	O—I	234
C—Cl	328	N—Br	243		
C—Br	276			S—H	339
C—I	238	H—H	436	S—F	327
C—S	259	H—F	569	S—Cl	251
		H—Cl	431	S—Br	218
		H—Br	368	S—S	266
		H—I	297		

many varieties of PFAS !

- a few examples:

IDENTIFICATION		
Formula	Abbrev Name	Name
C15H19F13N2O4 S	6:2 FTAB	[Dimethyl(3-{[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino}propyl)ammonio]acetate
C8H5F13O3S	6:2 FTS	6:2 Fluorinated telomer sulfonate
C16H23F13N2O6S2	N-HOEAmP-FHxSAPS	3-({3-[(2-Hydroxyethyl)(dimethyl)ammonio]propyl}[(tridecafluorohexyl)sulfonyl]amino)-1-propanesulfonate
C8H6F13NO2S	N-EtFHSA	3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluoro-1-octanesulfonamide
C10H5F17O3S	8:2 FTS	8:2 Fluorinated telomer sulfonate
C15H18F13NO4S2	FS SAMSA-6A	2-Methyl-2-({3-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfanyl]propanoyl}amino)-1-propanesulfonic acid
C6HF11O2	PFHxA	Perfluorohexanoic acid
C15H18F13NO5S2	6:2 FtSOAoS	6:2 Fluorotelomer sulfinyl amido sulfonic acid
C11H3F17O2	Perfluorooctyl acrylate	Vinyl heptadecafluorononanoate
C5HF9O2	PFPeA	Perfluoropentanoic acid
C4HF7O2	PFBA	Perfluorobutanoic acid
C17H19F17N2O4S	8:2 FTAB	[(3-{[(3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-Heptadecafluorodecyl)sulfonyl]amino}propyl)(dimethyl)ammonio]acetate
C15H21F13N2O6S2	Am-SA-PFSM n=6	perfluorohexanesulfonamido amine sulfonic acid, n=6
C7HF13O2	PFHpA	Perfluoroheptanoic acid
C8HF15O2	PFOA	Perfluorooctanoic acid
C12H5F21O3S	10:2 FTS	10:2 Fluorinated telomer sulfonate
C8H6F13NO3S	FHxSE	1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluoro-N-(2-hydroxyethyl)hexane-1-sulfonamide
C8HF17O3S	PFOS	Perfluorooctane sulfonate
C9HF17O2	PFNA	Perfluorononanoic acid
C10HF19O2	PFDA	Perfluorodecanoic acid

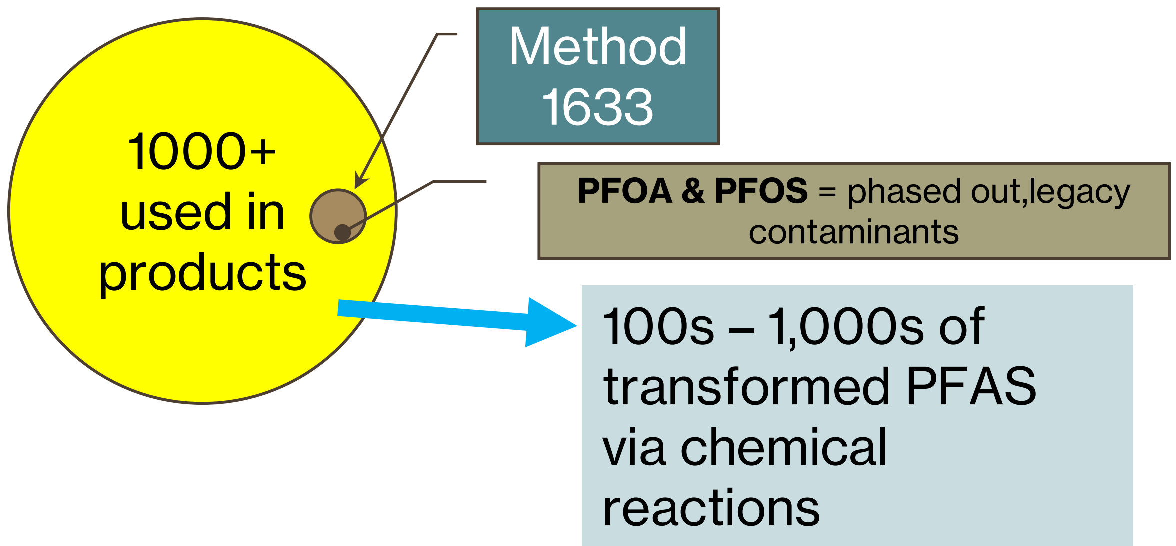
Transformations of PFAS



Source: Ian Ross, CDM-Smith

the PFAS universe

>12,000 known PFAS

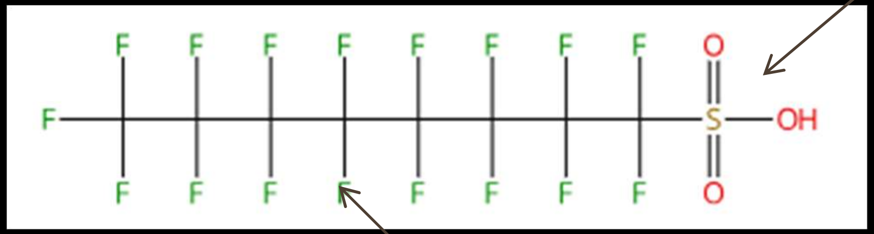


How to measure all these compounds?

- TOPs
- Total Organic F

to summarize...

1. hundreds of different PFAS compounds have been manufactured since 1930s
2. all are resistant to degradation, but *transformations* can occur
3. all possess a fluorinated chain & at least one functional group



Properties of PFAS

- **Persistence:** Highly persistent in any environment. Perfluorinated part **does not break down.**
- **Mobility:** Very mobile in the environment since many forms are soluble in water
- **Act as surfactants:** Stick to surfaces and interfaces
- **Bioaccumulation:** Many PFAS bioaccumulate and biomagnify = increase conc up the food chain
  - Accumulate in humans via renal absorption. Retained in the body for years.
- **Toxicity:** Long-chain PFAS toxic at part-per-trillion level.

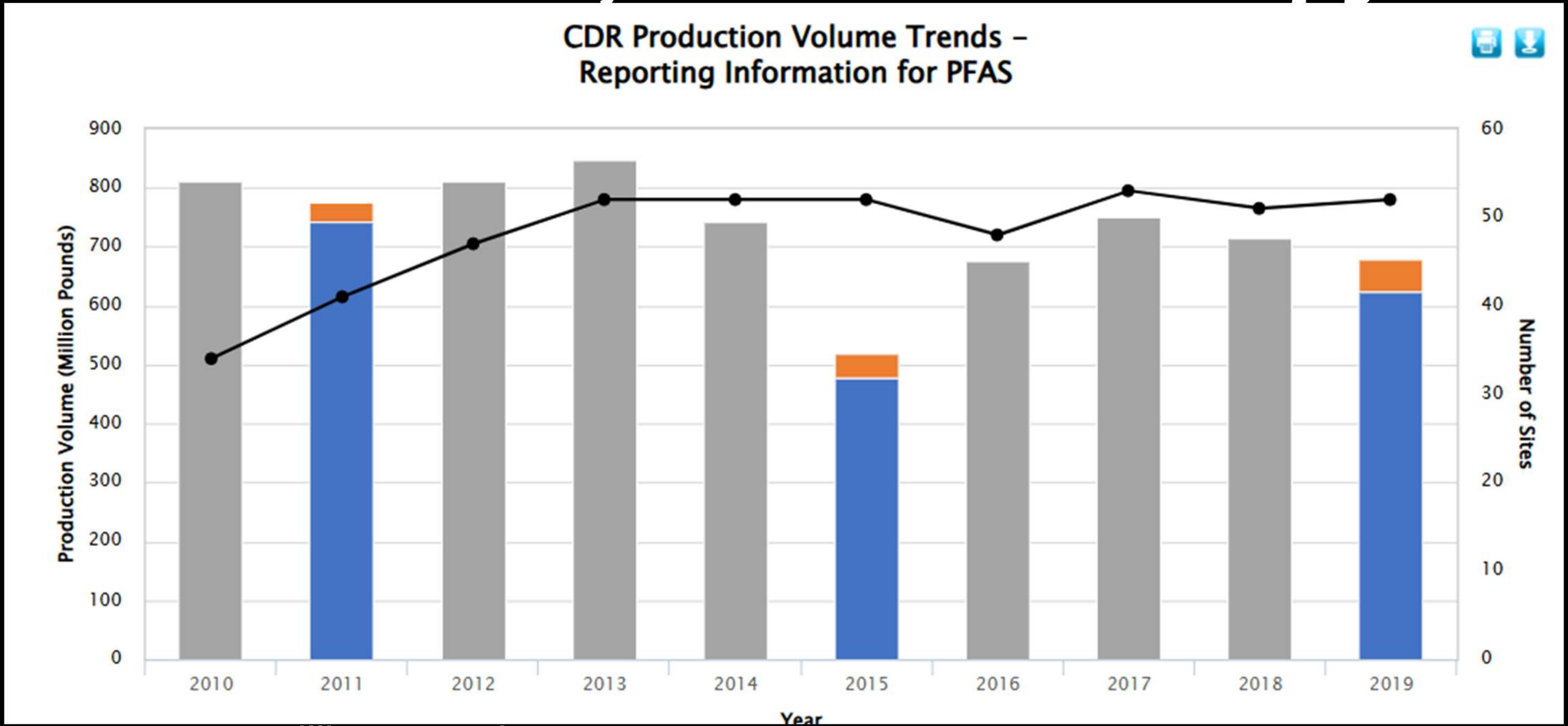
Desirable characteristics of PFAS

- STAIN REPELLENTS: Fluorocarbons are both lipophobic and hydrophobic, repelling both oil and water. Their lipophobicity results from the relative lack of London dispersion forces compared to hydrocarbons, a consequence of fluorine's large electronegativity and small bond length.
- FIRE FIGHTING: Nonflammable. adheres to the interface between fuel and air, fuel and water
- SEMICONDUCTORS: Plasma etching, super acids, heat transfer
- LUBRICANTS: Reduces friction.

Sources: The Global PFAS Problem: Fluorine-Free Alternatives as Solutions (April-May 2019) https://ipen.org/sites/default/files/documents/the_global_pfas_problem-v1_5_final_18_april.pdf and https://en.wikipedia.org/wiki/Per-_and_polyfluoroalkyl_substances

Made in the U.S.A. 

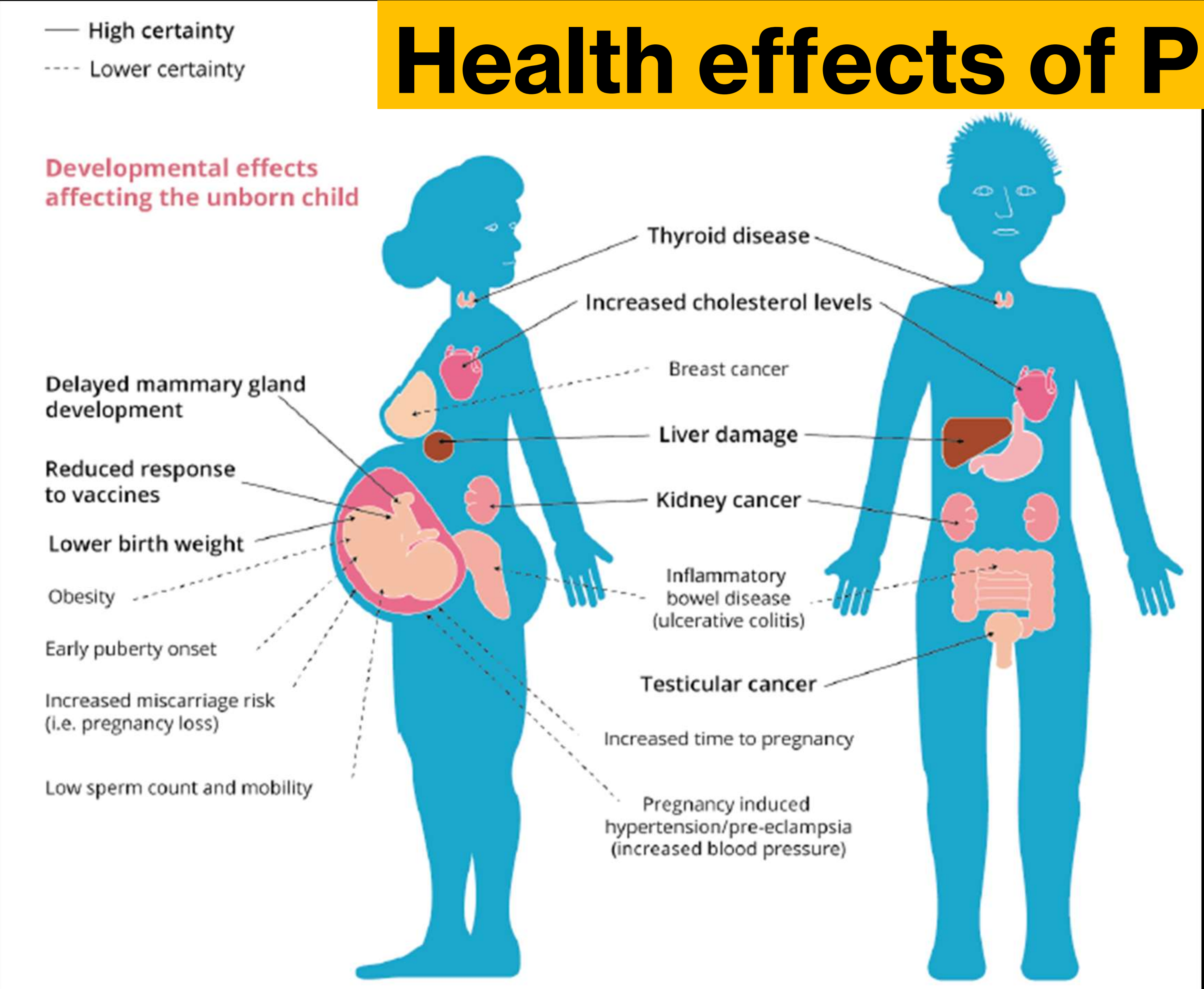
~ 300,000 ton PFAS/year



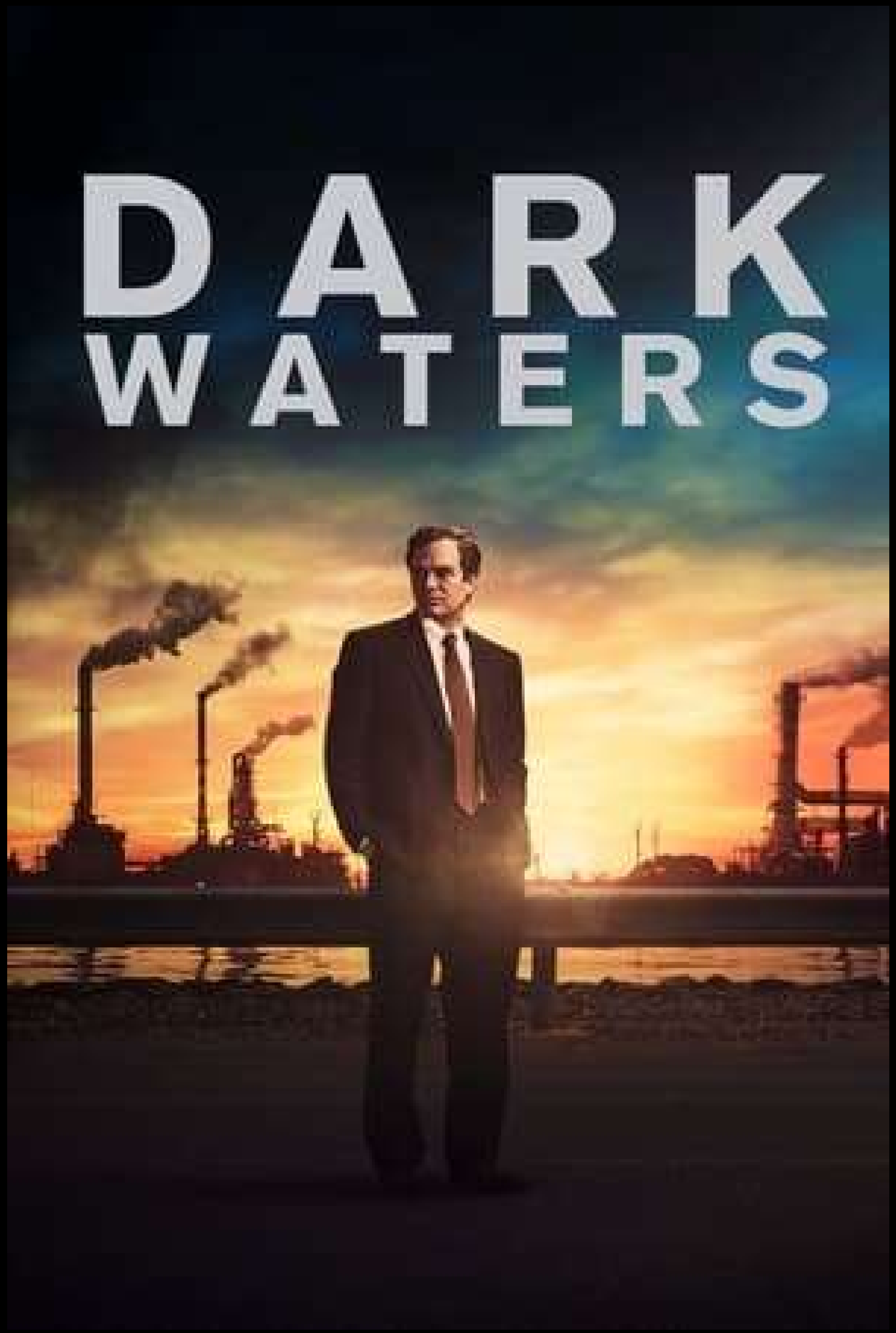
200 million pounds = 100,000 tons

Source: Chemical Data Reporting, USEPA, last updated in 2020.
https://www.epa.gov/chemical-data-reporting/trends

Health effects of PFAS



Source: "Effects of PFAS on Human Health," European Environmental Agency infographic on PFAS, September 19, 2022, https://www.eea.europa.eu/signals/signals-2020/infographics/effects-of-pfas-on-human-health/view.



- DuPont chemical plant in Parkersburg, W.Va
- perfluorooctanoic acid (C8)
- Lawsuits – death of cattle (1999)
- $600+M settlement
- 70,000 citizens participate in PFAS blood study
- PFOA linked with kidney cancer, testicular cancer, thyroid disease, high cholesterol, pre-eclampsia and ulcerative colitis.

Drinking water standards

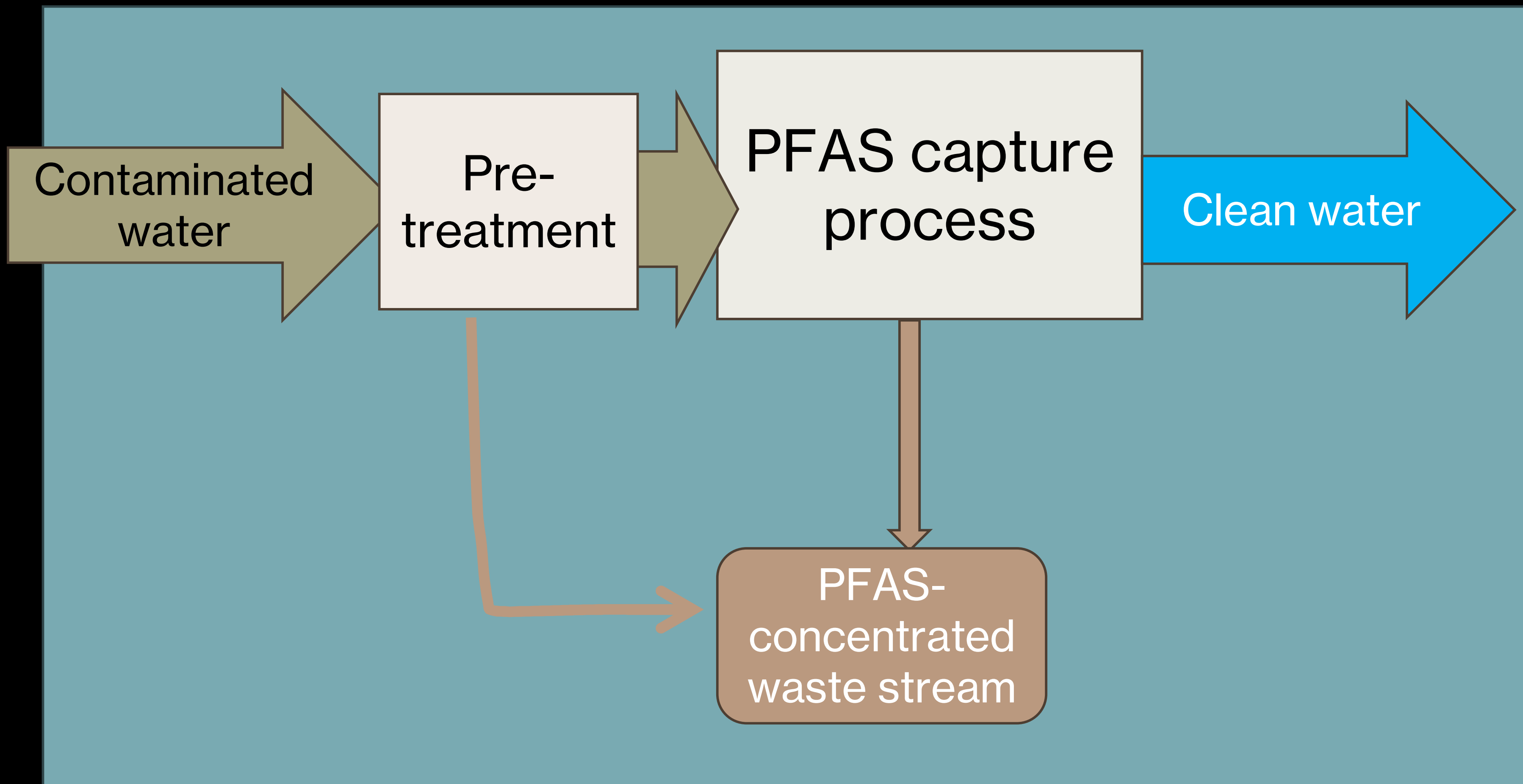
New York State:

current:	**10 ppt limit for PFOA, PFOS**
proposed in 2022:	10 ppt for GenX 30-100 ppt for 19 additional PFAS

Federal (US EPA): new MCLs released April 2024

- **2024 – 27 Complete initial monitoring**
- **2027 – 29 Notify public of monitoring results/ compliance with standards (MCLs)**
- **2029 – on Achieve compliance with all standards. Notify public of violations**

How do you treat PFAS in water?

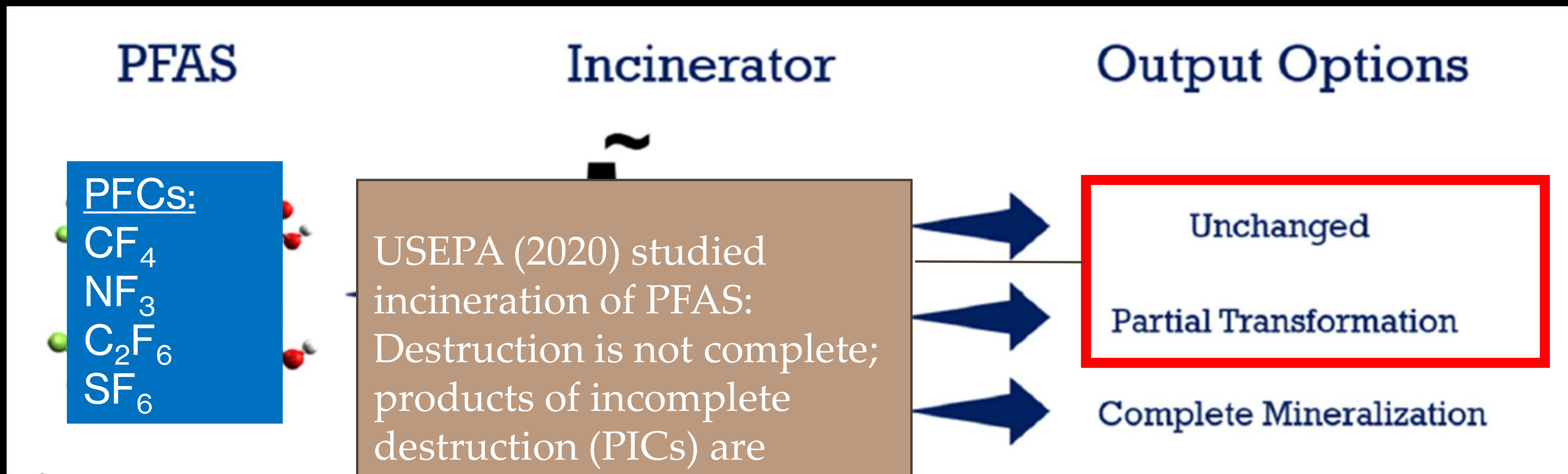


Destruction technologies: PFAS

	efficacy	Environmental impact	Capital cost	Operating cost	Tmt. Time (hours)	Current status
Electrochemical oxidation	70 – 99+%	toxic by-products	High	High	8-120	Lab & pilot scale
Nonthermal Plasma	99+%	Moderatly low	??	High	0.03 - 4	small-scale (4L) reactors
Photocatalysis	Variable (30 – 99%)	toxic reaction products	Low	Low?	1-4	Lab scale
Sonolysis	Typ. 99+%	low	??	High energy	1-4	Lab scale
Supercritical water oxidation	Typ. 99+%	Low, but creates acids	High	V.High energy	~2	Lab & pilot scale

Source: **A Review of PFAS Destruction Technologies**
Jay N. Meegoda *et al.* *International J. Environ. Research and Public Health*

How do you treat PFCs in stack emissions?



PFCs:
CF_4
NF_3
C_2F_6
SF_6

USEPA (2020) studied incineration of PFAS: Destruction is not complete; products of incomplete destruction (PICs) are formed; some PFAS concentrations increased.

Incineration = Semiconductor Industry standard

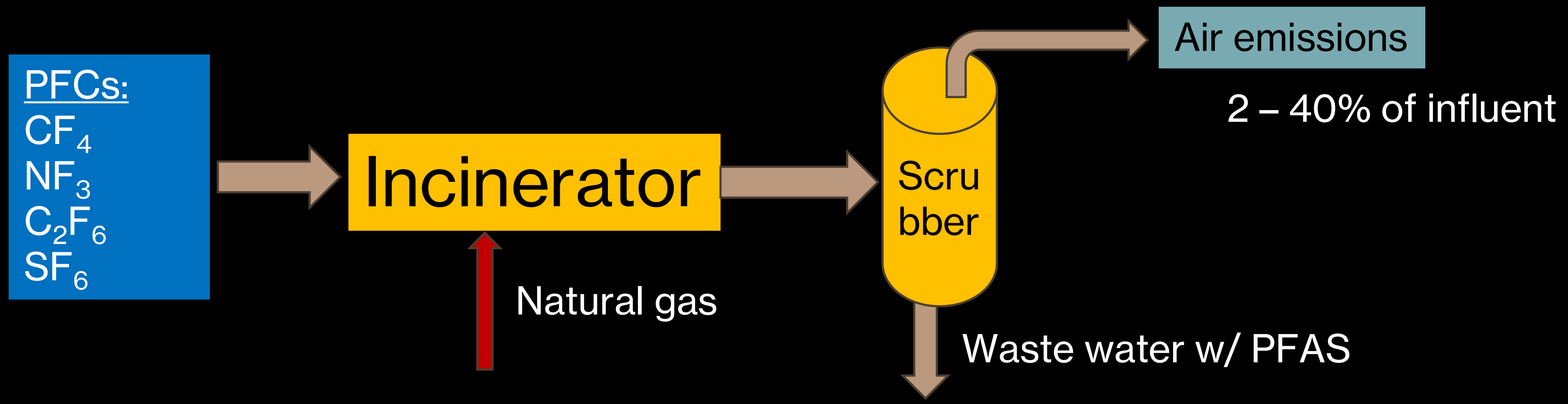
- 2020 Case study: Incinerator in Cohoes, NY
- PFAS found downwind of the plant in low-income neighborhood

Defense Department hits the brakes on PFAS incineration

By E.A. Crunden | 05/04/2022 04:17 PM EDT

The Pentagon issued a ban on incinerating PFAS-laden items, with particular emphasis on aqueous film-forming foam, which has left bases and nearby communities deeply polluted. The ongoing hunt for viable alternatives to AFFF, meanwhile, remains in limbo.

- Fabrication GHG emissions are mitigated using point-of-use (POU) abatement systems. These systems capture fluorinated and process GHGs and control the emissions through a process of thermal oxidation and wet scrubbing. This process results in conversion of emissions to lower global warming potential (GWP) GHGs associated with natural gas combustion rather than direct emissions of high-GWP process GHGs. Micron Boise currently estimates that its POU abatement systems achieve DRE factors between 60 and 98 percent based on the individual chemical and the ability of the POU abatement system to control each species of process gas.



NYS Green CHIPS

1. ELECTRICITY – RENEWABLE SOURCES

Green CHIPS participants will be required to utilize 100% energy generated from renewable energy systems, for electricity in their operations and maintain the 100% level of renewable energy for electricity supply for the duration of the project.

2. GHG EMISSIONS

Green CHIPS participants will be required to agree to GHG emissions standards specific to the project that are reasonable and achievable given the state of technology advancements, and to create a plan to mitigate overall facility GHG emissions and to significantly improve the level of such mitigation over the life of the project.

Electricity demand is enormous!

<u>sources:</u>

- ○ Niagara Falls
- ○ St. Lawrence R.
- ○ on-site solar
- ○ RECs

- <u>Fabs 1 & 2</u>: 480 MW (power ~500,000 homes)
- <u>Fabs 3 & 4</u>: 480 MW (power ~500,000 homes)
- Total = 16 billion kilowatt-hours of electricity per year.
- Micron will increase demand in NY state by 11%.

Renewable Electricity

- Solar: Need 3 square miles of PV collectors + battery storage (summer)
- Wind: Need > 1,000 3MW wind turbines (winter)
- Hydropower: good luck!

Nuclear power:

- Ninemile point 1: 613 MY (operational Dec. 1969)
- Ninemile point 2: 1,277 MY (operational March 1988)
- Gov. Hochul wants to build ***new nuclear power plants***

in summary…major concerns

Site construction

- destruction of 200+ ac wetlands
- destruction of habitat for endangered bats
- consumption of resources: rock, concrete, steel
- enormous carbon footprint

Wastewater discharge

- needs to address metals, solvents, etc.
- PFAS of particular concern – v. difficult to treat

...major concerns, cont'd

PFAS

- extremely diverse class of compounds
- integral to semiconductor manufacture
- significant human health and environmental risks
- potent GHGs
- poorly regulated

Electric requirements

- Micron = 11% increase electric demand in NYS
- renewable commitment – v. difficult to attain

Resource List

- Chris Miller, *Chip War: The Fight for the World's Most Critical Technology.* New York: Scribner, 2022.
- CNY Solidarity Coalition's Micron project webpage: **https://www.cnysolidarity.org/micron/**
- OCIDA's Micron project webpages: **https://www.ongoved.com/micron/micron-documents/**
- NYS Empire State Development Micron project webpage: **https://esd.ny.gov/micron**

For more about PFAS

- National Institute of Environmental Health Sciences: https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm#:~:text=PFAS%20are%20a%20group%20of,Bioaccumulation
- US EPA PFAS webpages: https://www.epa.gov/pfas

State Environmental Quality Review

Onondaga County Industrial Development Agency--Lead Agency

New York State
Dept Environ. Conservation
Empire State Development
Dept Transportation
NY Power Authority, NYSERDA

Onondaga County
Dept of Water Enviro Protection
Syracuse Metropolitan Transportation Council (SMTC)
Onondaga County Department of Planning
Onondaga County Water Authority

Local agencies: Town of Cicero, Clay; City of Syracuse

NEPA

US Dept. of Commerce --Lead Agency
US Army Corps of Engineers (USACE)
Federal Highway Administration
U.S. Environmental Protection Agency
U.S. Department of Interior, Office of Environ Policy and Compliance
U.S. Fish & Wildlife Service

Tribal nations
Onondaga Nation
Oneida Nation

What's Next?

Join one of SustainCNY's Work Groups to assist, and join with others, to review the DEIS and prepare comments. Or, submit personal comments when the public comment period is open.

Call, write or visit your elected Federal, State or Local elected officials

Join anyone of the SustainCNY member organizations and participate as much as you can with your time and financial support.

SustainCNY: Sustainability Coalition

https://sustaincny.org/

Climate Change Awareness & Action

CNY Solidarity Coalition

AGREE Alliance for a Green Economy

Sierra Club Central-Northern NY Group

Greening USA

Energy in the 21st Century

Skaneateles Lake Association CLEAR LAKE. PURE WATER.

Moving People Transportation Coalition

Neighbors of the Onondaga Nation

NYCLU ACLU of New York