



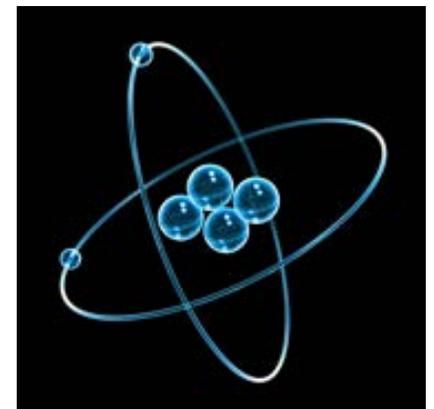
How Ohio Became a Leader in Drinking Water Quality

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Oberlin City Club

Oberlin, OH

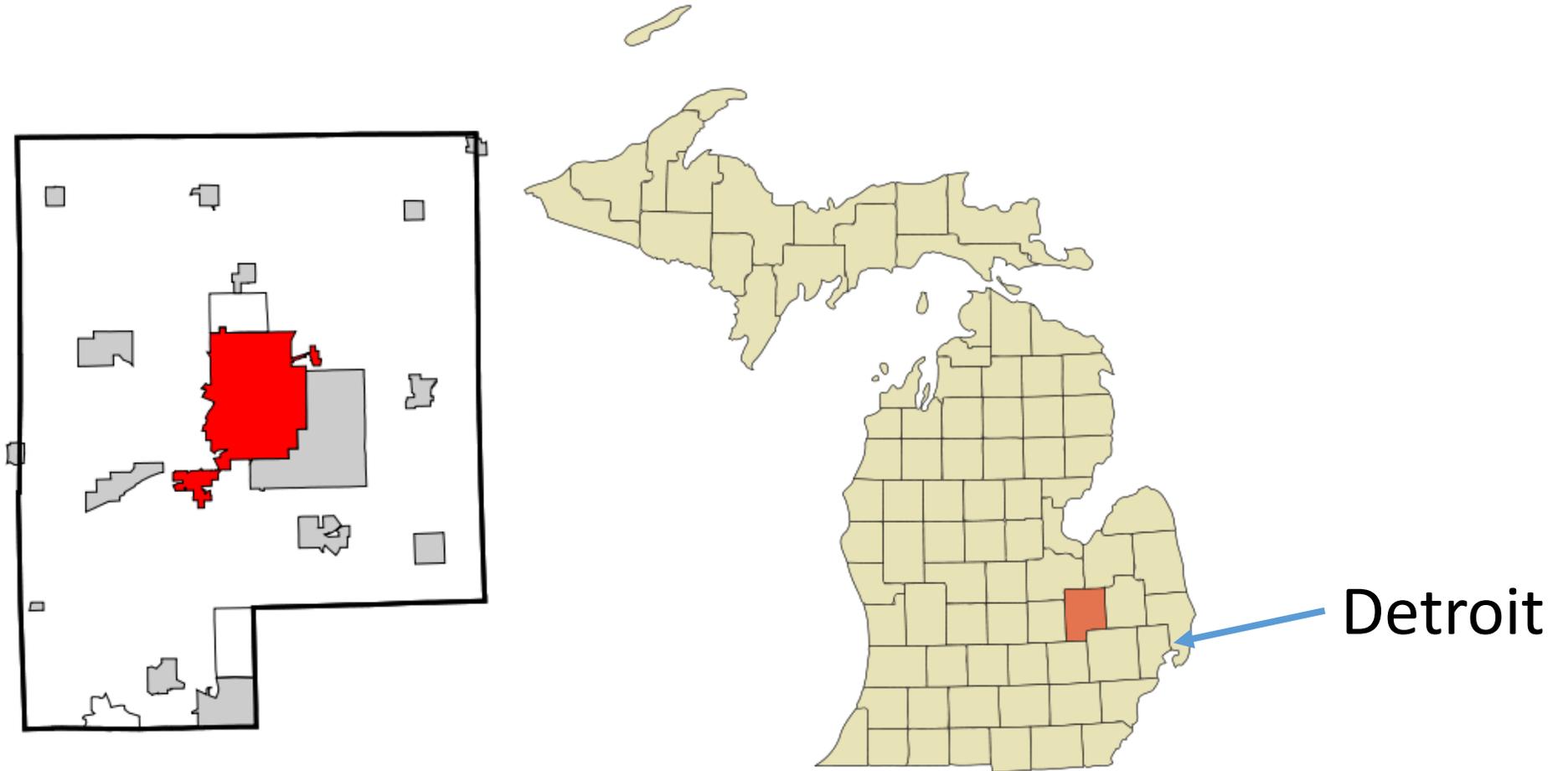
November 21, 2016



Topics

- Understand causes of the Flint, MI water crisis.
- Understand the background of Sebring, OH water issue.
- Follow the development of drinking water laws and regulations in Ohio.

Genesee County and Flint, MI.



GM and Chevrolet began in Flint, MI



...and the United Auto Workers union.

Buick City, Flint, MI



1960:

Flint pop. 200,000

80,000 auto workers

Flint River fed the Flint water system



1950's plant sized
for 300,000 people
plus the industrial plants.

Buick City (1980's to today)



Effects on Flint of GM Plant Closings

- **Number of auto workers decreased by 90%, to about 8,000.**
- **Flint population decreased by 50%, to about 100,000.**
 - **Genesee County population stays the same.**
- **High unemployment.**
- **Diminished tax collections.**



Reaction of Flint to GM Plant Closings

- **No outreach from Flint to Genesee County.**
- **Ongoing search for Silver Bullets.**



Flint savings on water



Switched to Detroit Water to save money.

- Flint Water Plant pumped Detroit Water directly into its distribution system.

Flint Financial Situation Worsens



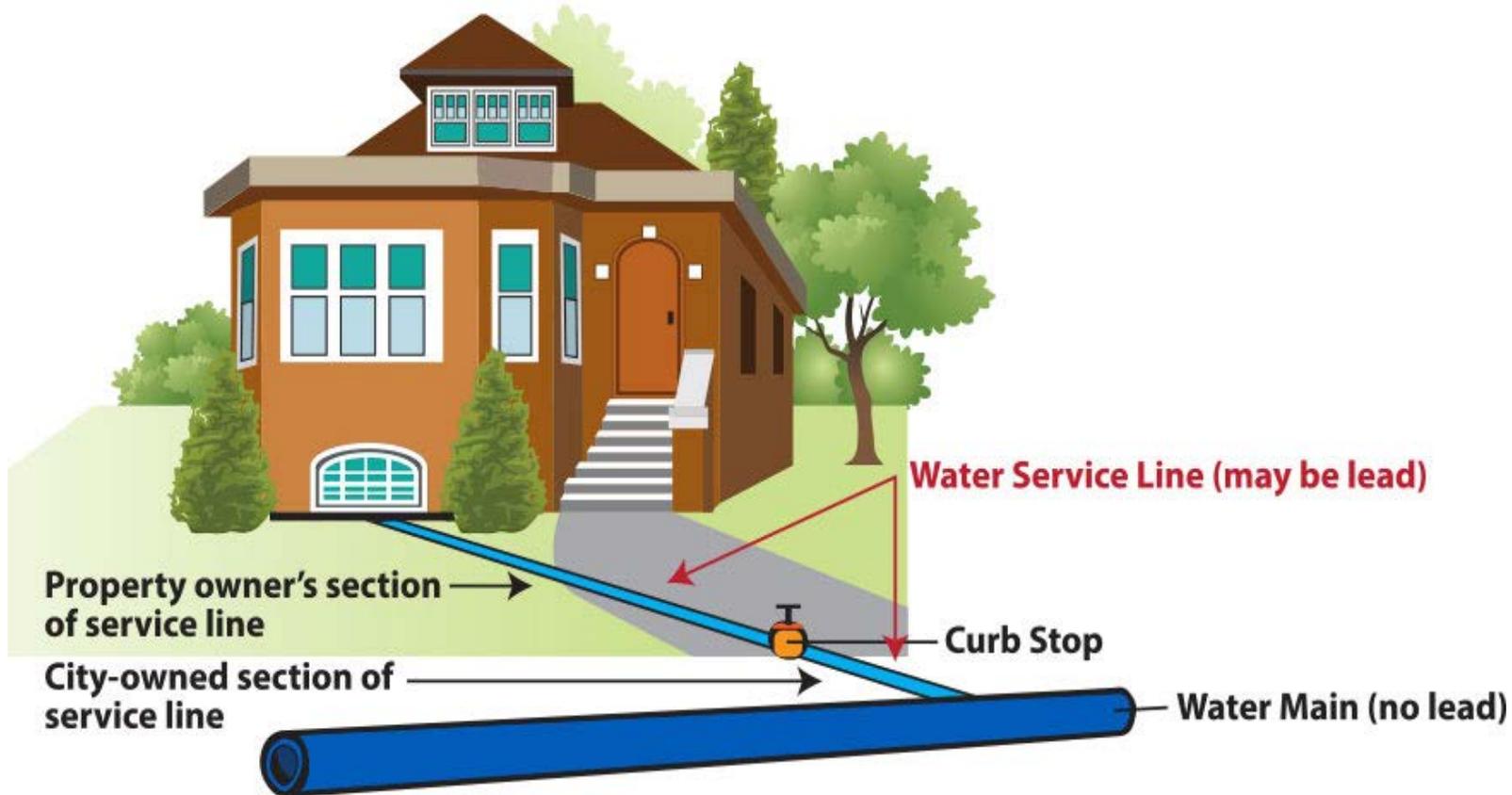
- **2013: Flint (mayor, city council and then State Emergency Manager) decide to switch from Detroit Water to Karegnondi Water Authority to save money.**
- **2014: Flint decides not to continue with Detroit Water until Karegnondi starts its system.**
- **May 2014: Flint decides to restart its water plant with Flint River Water, against recommendations of its water plant managers and State of Michigan officials.**

Flint, MI Waterworks Operation

- Chlorine (disinfectant) and iron chloride (neutralize acid) added.
- Decision by the State-appointed emergency manager for Flint not to add orthophosphate as corrosion inhibitor to save \$100 per day.
- Acidic Flint River water and iron chloride interact with existing phosphate coating on water mains, service lines and indoor metal plumbing, leading to leaching of lead and other metals.



Drinking Water Distribution Piping



NOTE: Old brass and solder (for copper tubing) inside the house can also contain lead.

Example of Coating inside a Lead Service Line



USEPA **Lead and Copper Rule** (1990):

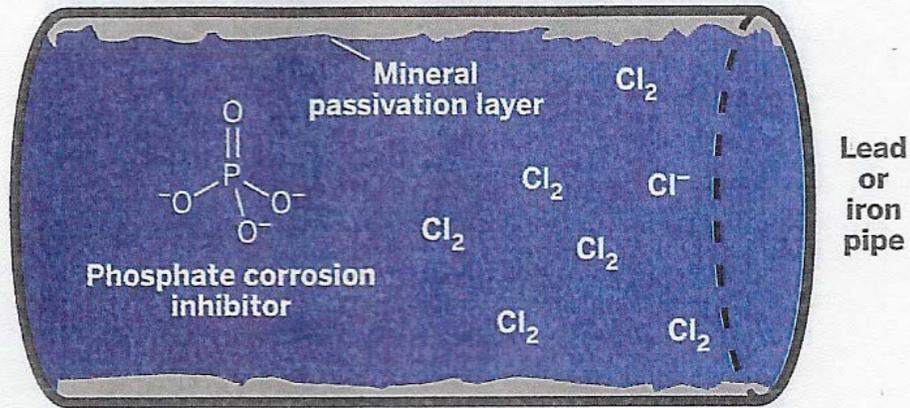
National drinking water limit for lead is **15 ppb** (parts per billion).

This is an engineering-based limit, not a health-based limit.

Flint Water Chemistry

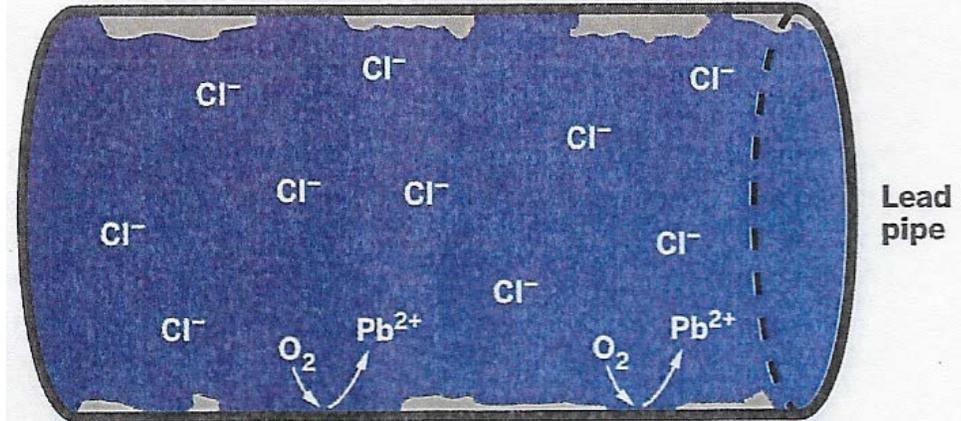
Before: Treated Detroit water

Phosphate corrosion inhibitor helps maintain a mineral passivation layer on the inside of Flint's pipes, protecting them from corrosion. With little corrosion, chlorine disinfectant levels remain stable.

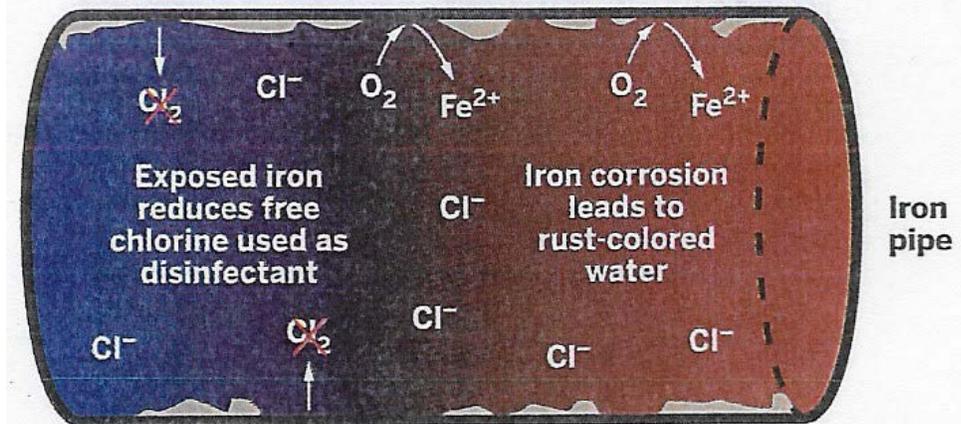


After: Treated Flint River water

Lack of a corrosion inhibitor, high chloride levels, and other factors cause the passivation layer to dissolve and fall off, leading to increased corrosion in Flint's pipes. As the pipes corrode, chlorine disinfectant breaks down.



Oxidants such as dissolved O_2 corrode pipes and leach soluble metal.



Flint Water becomes a crisis

Summer 2014: Flint residents complain to Flint City Council, State of Michigan and the media about orange or red, foul-smelling tap water. Children become sick.



Flint 2015



- **Michigan officials (Health Department, Department of Environmental Quality, Flint city council and emergency manager) deny citizens' complaints regarding drinking water quality and alleged health effects.**
- **City of Flint measures 100 pbb Lead in a resident's house.**
- **Flint water violates organic chemical and bacterial limits.**
- **Consulting company report to City of Flint recommends adding corrosion control chemicals.**



Flint 2015-2016

- **USEPA Region 5 (Chicago) and Virginia Tech investigate Flint's drinking water issues. One house measures 13,000 ppb lead at the faucet. NO metal pipe or fittings inside the house. NO chlorine measured at some taps.**
- **Spike in *Legionnaire's Disease* in and around Flint. Eight fatalities.**
- **Genesee County Health Department reports elevated blood Lead levels in Flint children, confirming a pediatrician's earlier reports.**
- **USEPA and US HHS station personnel in Flint to oversee drinking water quality and health issues.**
- **Flint reverts to Detroit for its drinking water source.**

Flint 2016-2017



- **State of Michigan provides bottled water to Flint City Hall and residents.**
- **Michigan DEQ supervises Flint's replacement of lead service lines.**
- ***Shigellosis* (GI bacteria infection) affects Flint residents reluctant to wash themselves.**
- **Several state and local officials indicted on criminal charges.**
- **Flint Water plant adds chlorine and zinc orthophosphate to boost disinfection and corrosion control in Detroit water.**
- **Lead in drinking water dropped to about 12 ppb early 2017, and then to about 9 ppb late 2017.**
- **Flint replaced about 1000 service lines in 2016, about 5000 in 2017, out of 29,000 total.**

Flint 2017 and beyond

- Mayor Karen Weaver avoids recall and is re-elected.
- USEPA is pulling back most of its staff from Flint in 2017.
- US HHS staff be in Flint for the next 20 years, until the youngest affected children turn 21.
- State of Michigan helps with nutrition choices that lower blood lead levels.
- Dr. Mona Hanna-Attisha goes from outcast by peers for reporting blood lead levels to local hero.
- Rick Synder is still Michigan Governor.
- Michigan is working on new rules for drinking water.



Flint today

Any lessons learned?

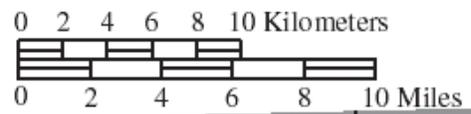


Was the Flint water crisis preventable?

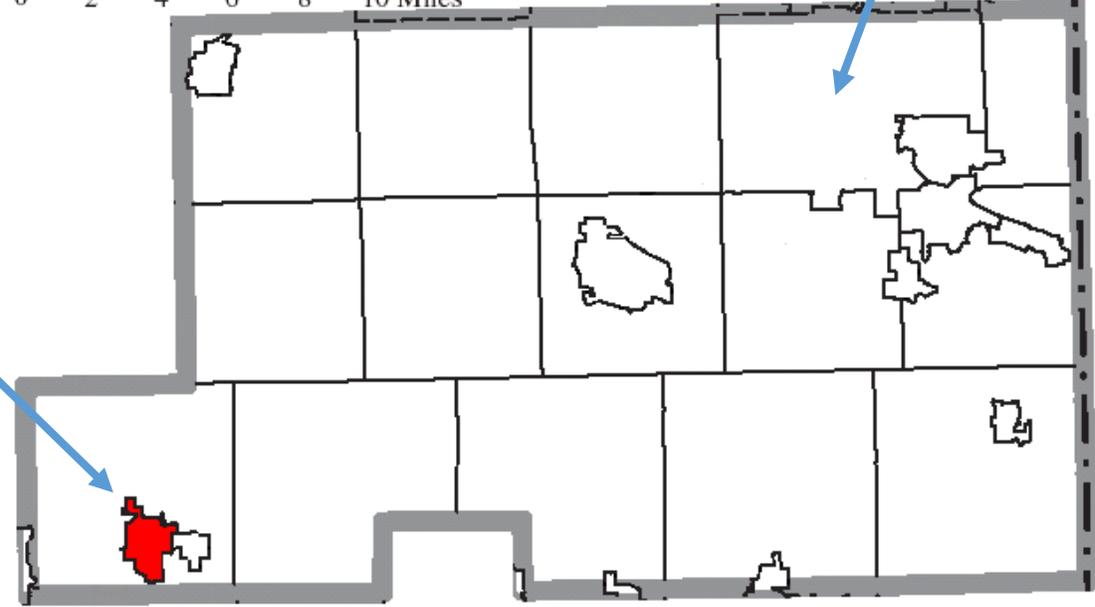
Sebring, OH



Sebring



Youngstown



Mahoning County

Sebring (Platted 1899, pop. 4420 in 2010)



Sebring, OH 2015



- **Sebring drinking water purveyor is a sole proprietor.**
- **Operator maintains six drinking water systems.**
- **Drinking water source is the the Mahoning River (since 1904) with no reservoir. => Variable source water.**
- **Based upon corrosion within the water works, or economics, purveyor stopped adding orthophosphate for corrosion control.**
- **Lead began leaching from lead service lines, lead solder and brass fittings, based on lab results from home faucet samples.**

Sebring, OH 2015-2016



- **Late 2015, lead results showed 100 to 150 ppb in some homes.**
- **Feb. 2016 OH EPA issues set of orders (19 pages) against Sebring, including water testing on demand, bottled water, blood testing for lead, and addition of drinking water treatment chemicals.**
- **Feb. 2016 lead results drop below 15 ppb.**
- **June 2016, Gov. Kasich signs House Bill 512, in a school in Sebring, which mandates many of the responses to Sebring.**

How could things move so fast?

New Hampshire, Feb. 2016



Two Paths, John Kasich, 2016

2016 HB 512 – Drinking Water Main Provisions



- **Requires immediate notification of lead results to homeowners.**
 - **USEPA (Lead and Copper Rule) allows up to 6 months at the testing lab, then 30 days reporting to water supplier, then 30 days reporting to homeowners.**
 - **OH EPA now requires lab testing within 30 days and reporting to homeowners within 2 business days.**
- **Requires OH EPA to inform homeowners of lead levels and actions required for high lead levels (bottled water, blood lead levels, etc.) if water system operator fails to do so.**

2016 HB 512 – Drinking Water Main Provisions (2)



- **Requires mapping of lead pipes.**
 - **OH EPA required submission of maps showing lead lines by all 4500 public water supplies by October 2016. All but 12 complied by the deadline, and the others complied shortly thereafter. Maps available on OH EPA website.**
 - **Mapping must be updated in 2021.**
- **Aligns OH restrictions on lead in plumbing and joining materials with USEPA.**
- **Add purposes to the Drinking Water Assistance Fund for revolving loans.**

2017 SB 2 – Drinking Water Main Provisions



- **Brings mobile home parks under OH EPA authority.**
 - **OH has 1100 mobile home parks with 900,000 people.**
 - **Separately, the Mobile Home Commission was moved under the Dept. of Commerce, Industrial Division.**
- **Allows OH EPA to petition a court to appoint a receiver for a small water system (less than 500 connections) with conditions affecting public health.**
- **Restricts dumping of dredge materials into Lake Erie.**

2017 SB 2 – Drinking Water Main Provisions (2)

- **Requires all water systems to develop Asset Management Plans.**
- **Requires demonstration of Managerial Capability.**
- **Requires financial forecast.**



Asset Management Plans



At least have a set of picture of major pieces of equipment.



HB 512 and SB 2 make Ohio the leader for lead control and drinking water quality.



Lessons learned from Sebring?

Challenges?

Oberlin City Water



CITY OF OBERLIN

• Live • Learn • Lead •

Drinking Water Source: West Branch of the Black River (since 1887).

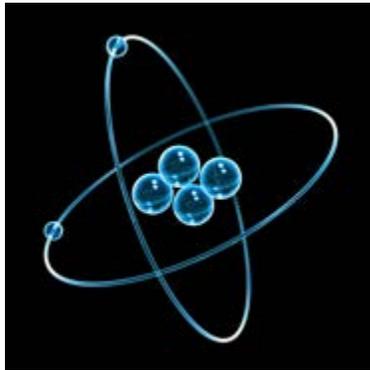
No violations reported in 2016.



Available on-line from Oberlin Water Dept.:

Drinking Water Consumer Confidence Report
(Data Collected During the 2016 Calendar Year)

Thank you for your attention!



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