

Flint Activities Recap



OTCO WATER WORKSHOP

MARCH 7TH, 2018

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Review the original Lead and Copper Rule



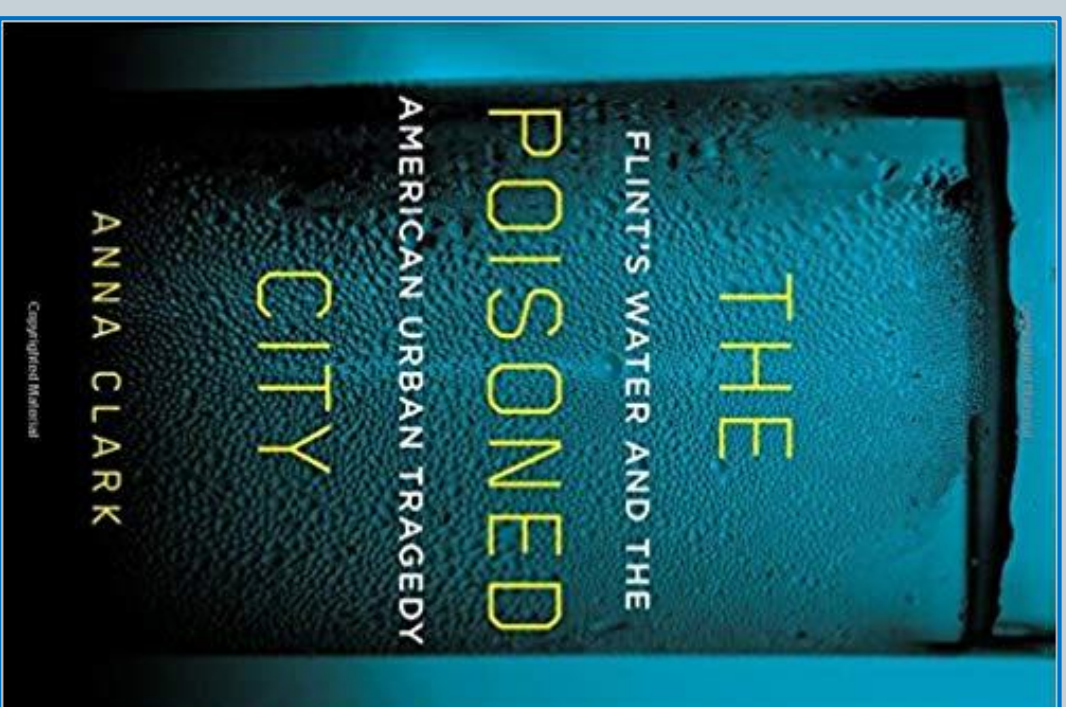
- **Was poorly designed from the start**
 - Critics say it allowed utilities to “game” the system
 - Told people to flush the tap the night before
 - Told people to take off the aerator
 - Did not require Utilities to tell people in a timely fashion that their Lead sample was high
 - Did not require sampling in schools where there are humans more likely to be injured due to age and small bodies
- **When Flint hit the news, critics used these issues to allege that some Utilities were taking advantage of the weaknesses of the Rule**

New Michigan Lead and Copper Rule



- These are some of the requirements that went into effect last month:
 - Utilities SHALL replace 5% of all of the Lead service lines each year at Utility expense
 - ✦ And SHALL continue 18 inches into the home
 - New 90%-tile AL is 12 ug/L in 2025
 - No more reduced monitoring if Lead 90th is over 5 ug/L
 - Two samples required for Tier 1 sites:
 - ✦ 1st draw, then the fifth Liter
 - You SHALL not pre-flush and you SHALL not take off the aerator

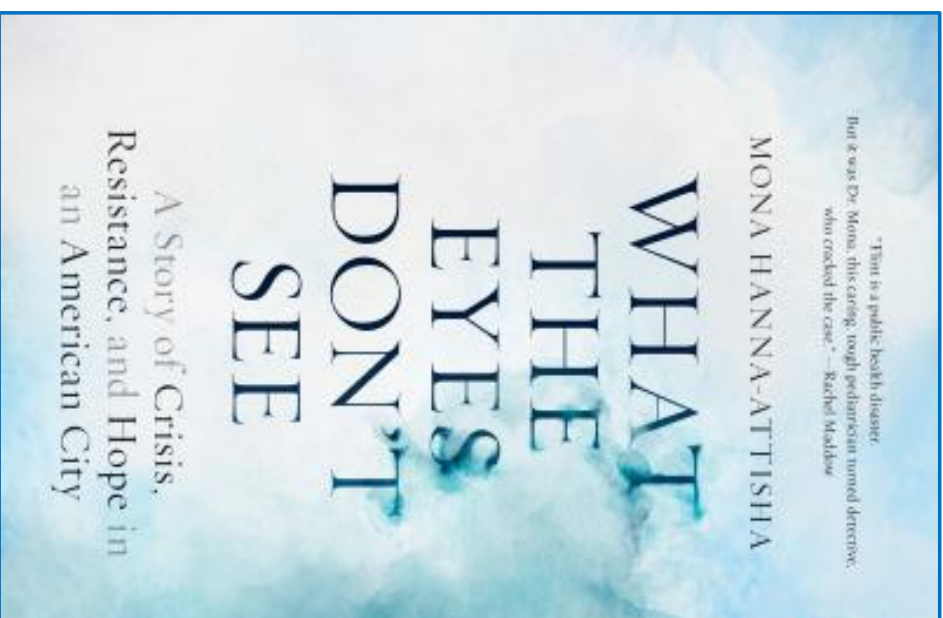
Two new books about Flint Crisis





If you haven't read
this book yet, you
might consider
doing so

You might assume
that many of your
customers will
It speaks about
drinking water
systems and the
culture of cover-up

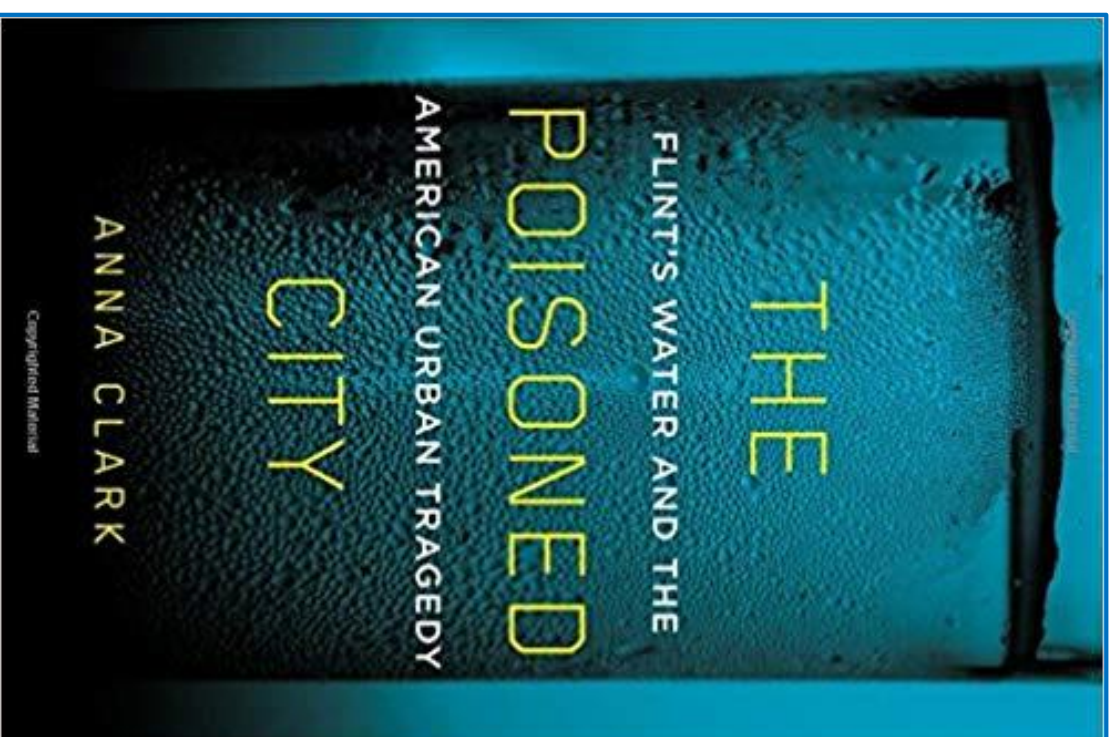


**Borrowing excerpts from the new
book by Dr. Mona Hanna-Attisha**



This book is also a good read, filled with technical information about the crisis

This book makes a good case by sifting through the politics and governmental failures that is causing so much of the problem



Borrowing excerpts from the new book by Anna Clark, a journalist for NY Times and WAPO

What Flint is*



- Flint is a story of a man-made environmental and public health disaster – probably the most significant of our time
- It is a story of government failure – of the poisoning of citizens by the very people who were supposed to take care of them
 - ..and then lying about it
- It is the story of what happened when these people cared more about money and power than about public safety

*“What The Eyes Don’t See” – Hanna-Attisha, Mona; *Random House Publishers*, 2018

What Flint is*



- A crisis brought on by a City poisoned by it's own drinking water
- It is a story brought on – not by natural disaster, or simple negligence, or because of some cost-cutting private company blinded by profit ...
- Instead, it was brought on by the disastrous choice to break a crucial environmental law, and then by trying to hide it for 18 months

What Flint is*



- A crisis which has future issues yet to unfold ...
- “It will be years before we can fully assess the effect of Lead exposure on a whole generation of children”
- “We must wait for them to grow up and see....”

*“The Poisoned City”, Clark, Anna; Henry Holt & Co., 2018

What Flint is*



- A story of racism, inequality, greed, anti-intellectualism, and laissez-faire neoliberal capitalism
 - “These are powerful forces that most of us don’t notice, and don’t want to”
 - For example: is the governor of Ohio a neo-capitalist?
 - ✦ Consider his track record of creating public-private partnerships
 - ✦ In Michigan, the Governor has done similar things – and – has downsized the regulatory body (DEQ)
 - ✦ Michigan has the largest number of community water systems to regulate
 - ✦ The Conservative Government often cries “States Rights” – but then downsizes the regulatory body that was supposed to oversee Flint Water and protect the citizens

*“What The Eyes Don’t See” – Hanna-Attisha, Mona; *Random House Publishers*, 2018

What Flint **ALSO** is*



- Flint is a story of a people who came together to fight back against governmental inequities and indifference
- Flint is a story of the resilience of a community
- Flint is a story of the huge importance that drinking water plays in the overall health of a community
 - It tells drinking water professionals that they are in the disease-prevention business

Why do we neglect our water infrastructure*



- “Whether a city is well-to-do, struggling, or somewhere in between, there are a thousand reasons for local officials to delay maintaining or replacing old pipes”
- For reasons such as this and others, we’ve let our water infrastructure decay for decades
 - Flint’s mains were sized for a population of 200,000
 - Current population is about 93,000
- The average age of a Flint water main was 80 years, and the water rates were the highest around

*“The Poisoned City”, Clark, Anna; Henry Holt & Co., 2018

What happened to cause these problems in Flint?



BRIEF TIMELINE OF EVENTS



Causative events



- In April of 2014, the City of Flint stopped buying finished water from the Detroit water system
 - The Detroit water source is Lake Huron
 - Flint had been using this water since the 1960's
 - It was treated with orthophosphates since the 1990's
- Flint starts up its water plant and delivers the water into the distribution system
 - Flint WTP used the Flint River as its source
 - Flint River is high in chlorides – and they used Ferric Chloride at WTP
 - Flint did not treat with orthophosphate

Consequences



- The treated Flint River water begins to dissolve the insides of the distribution pipes and residents' home plumbing
- Lead levels in samples from homes skyrocket
 - Children's blood Lead levels double in many cases
- Taste and odor complaints are coming from all over the system
 - Yellow to brown colored water found in thousands of homes
- Tests for coliforms show many positive results
- An outbreak of Legionnaire's Disease kills at least 12 people

Long path to recovery



- After 18 months of denial, the Flint system stops treating river water and re-connects to the Detroit system
- USEPA brings an emergency order forcing Flint to add additional phosphates to supplement that which is in Detroit water
 - Flint is ordered to replace all Lead service lines
 - Flint is given 14 other requirements to follow
 - The order is still in place
 - Progress is slow but is showing measurable milestones

Is the water in Flint safe to drink?



**THERE IS NO SIMPLE “YES” OR “NO”
ANSWER TO THIS OFTEN-ASKED
QUESTION ABOUT FLINT**

Is the problem fixed yet?



- The process of putting overly-corrosive water (without orthophosphate and with high chlorides) into the Flint distribution system ended in 2015
 - Flint no longer treats its own raw source water at the plant
- But the damage that was done persists and it will take more time to thoroughly overcome
 - The process of who was to blame and who should pay for it is still being debated

Does LCR Compliance assure safety?



- The 90% - tile calculation for the latest rounds of sampling was 7 then 6 and again 6 ug/L

.... But

- There are still thousands of homes with Lead service lines that need to be replaced – many of which still show high Lead levels ...
 - The State of Michigan stopped providing free bottled water to Flint residents once it was shown that the 90%-tile Lead level was below the 15 µg/L AL

Difference that two years makes



Lead and Copper Report Jan 1 thru June 30, 2016

Contaminant	AL (ppb)	MCLG	90 th percentile Value	Number of samples above AL
Lead	15	0	20	88
Copper	1,300	1,300	170	7

Lead and Copper Report Jan 1 thru June 30, 2018

Contaminant	AL (ppb)	MCLG	90 th percentile Value	Number of samples above AL
Lead	15	0	6	10
Copper	1,300	1,300	90	2

May 16th, 2018 letter to USEPA



- The City of Flint Director of Public Works states in his letter to USEPA concerning Lead service line removal:
 - Flint is relying on hydro-excavation to update its service line inventory
 - ✦ (they've now halted that procedure – political call many believe)
 - Flint has 30,000 metered accounts – with poor records
 - 28,400 of which are residential
 - 8,843 homes have undergone hydro-excavation
 - 6,256 Lead or galvanized steel lines have been identified and replaced
 - That calculates to a 30% of lines not needing to be replaced
 - Based on that, there are approximately 14,000 lines left to be replaced

Safe to drink Flint water?



- It depends on where you live and what shape your plumbing system is in
- For some – it will be a long time yet before they can drink the water coming from their home faucets

The inevitability of the Flint crisis



- From a political perspective, it's easy to see how the Flint water crisis was brought on by corrupt leadership
- Historical hubris of professional politicians from both parties have created this mess
 - The divisiveness we see on the National scale can be seen in Michigan by looking back many years and studying events

Michigan's Emergency Manager Law – a political tool



- This law – passed in 1990 – allows State government to usurp control of cities that are in danger of fiscal disaster
 - By 2013, over half of Michigan African-Americans are living under an emergency manager, and so do not have representation of their elected official
- In 2011, the Governor of Michigan beefed up the law, only to see it voted down by referendum by the citizens of Michigan
 - **But the Governor, ignoring the citizenry, pushed it through again by executive order**
- In 2011, the State of Michigan took away the democracy of Flint by installing an emergency manager
 - An **autocracy*** was created – an emergency manager with complete control
 - The people of Flint lost the power to make their own decisions regarding local government
- In 2014, the emergency manager, against the objections of Flint city council, decided to change water sources
 - The people of Flint begin to notice that their drinking water is nearly unusable

* **Government by one person with complete control**

Recent changes to Emergency Manager Law



- A feature that was added to the current law is that local governments are now given four choices of how they want to proceed once the governor has declared them an “emergency” situation
- The communities can choose between:
 1. a consent agreement, which keeps local officials in charge but with constraints,
 2. neutral evaluation which is like a pre-bankruptcy process,
 3. filing for bankruptcy directly,
 4. or having an emergency manager appointed

Flint Crisis in Perspective



- As of July 2018, Flint Michigan is more than 4 years into their water crisis
 - The problem is more than just about Lead:
 - ✦ There are now proven indications about Legionella and coliform outbreaks
 - ✦ There are financial problems still not fully settled
 - ✦ There are ongoing efforts to replace service lines, to hire personnel, and to re-size the distribution system which are only partially finished
 - ✦ Politics is causing problems

Flint and Legionnaire's – from published studies*



- Most of the more than 90 Legionnaires' disease cases during the deadly 2014-15 outbreak in the Flint area were caused by changes in the city's water supply
- The risk of acquiring Legionnaires' disease increased more than six-fold across the Flint water distribution system after the city switched sources
- The increase in Legionnaires' cases – which killed at least 12 people and sickened another 79 individuals over two years – “was consistent with a system-wide proliferation of Legionella bacteria”

Legalities: Four Plea Bargains in Court



- Four former government employees have taken plea deals and have promised to give the prosecutor information about the case:
 - May 2016, former water plant operator Mike Glasgow accepted a plea deal
 - September 2016, Corrinne Miller, retired director of the State Department of Health and Human Services' Bureau of Epidemiology, pleaded no contest
 - Nov. 28th, 2017, Daugherty (Duff) Johnson, Flint's former utilities administrator, pleaded no contest
 - On December 20th, 2017, Adam Rosenthal - A water quality analyst for the Michigan Department of Environmental Quality agreed to a plea deal

Flint has been working under the USEPA Emergency Order

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE
WASHINGTON, D.C.

IN THE MATTER OF: : Proceedings Pursuant To
City of Flint, Michigan; Michigan : Section 1431 of the Safe Drinking
Department of Environmental : Water Act, 42 U.S.C. § 300i
Quality; and the State of Michigan, : EMERGENCY
Respondents. : ADMINISTRATIVE ORDER

1/21/16

Date



CYNTHIA GILES
Assistant Administrator
Office of Enforcement and Compliance Assurance
United States Environmental Protection Agency
William Jefferson Clinton South Building
1200 Pennsylvania Avenue N.W.
Washington, DC 20460

The Emergency Order



- Contains 15 separate requirements that Flint and the State of Michigan and the DEQ must comply with in an ongoing basis
 - The emergency order has 15 “musts” spelled out that are required of these entities
 - Some of them are: begin sampling and reporting WQ parameters in the system; inventory of homes with Lead service lines; show proof that operators are capable of treating water; add orthophosphates so that water has about 3.5 mg/L; add chlorine so that water has a specified amount; engage a panel of nationally recognized experts to advise on water treatment; and more
- Reports of significant compliance data or milestones achieved are reported weekly on a public website

CURRENT WQP REQUIREMENTS

PER DEQ LETTER DATED 12/13/2017

Water Treatment Facility

Parameter	Target	90 Percent Range	100 Percent Range
pH (s.u.)	7.5	7.3 - 7.8	7.2 - 7.9
Orthophosphate residual (mg/L)	3.6	3.3 - 4.0	3.2 - 4.5
Free chlorine residual (mg/L)	1.5 - 1.8	1.4 - 1.9	1.3 - 2.0

Distribution System (EWD Sampling Stations)

Parameter	Target	100 Percent Range
pH (s.u.)	7.5	7.2 - 7.9
Orthophosphate residual (mg/L)	3.3	3.1 - 4.5

Note: All daily values must fall within 100% range, excluding 9 days of allowed non-compliance per 6 months



Flint began replacing Lead service lines in the system, and has made a statement that their goal was to replace all of the 16,000 lines in three years

The old Flint records don't always have reliable information in them

Nevertheless, Flint has made the correct decision to locate Lead service lines, and handle all of the cost to replace them when they are found

Summary of Michigan Department of Environmental Quality Actions

In Response to the

United States Environmental Protection Agency Emergency Administrative Order

Updated: 11/14/2017

EXECUTIVE SUMMARY:

The United State Environmental Protection Agency (EPA) Emergency Administrative Order contains 15 overall items to be addressed by the Michigan Department of Environmental Quality (MDEQ). This update includes status only on items for which progress was made in the last week. It is anticipated that the next update to this summary will be provided on Monday, November 20, 2017.

DETAILED INFORMATION:

Paragraph 54: Inventory of homes with lead service lines.

- As of 11/14/2017, the City of Flint has replaced 5,587 service lines and identified 1,132 copper-to-copper lines.

Progress on the replacement of Lead service lines is good, but there are issues along the way

Example of a Recent Response from DEQ to USEPA

From: 11/27/2017



- Summary of MDEQ Actions In Response to the USEPA Emergency Administrative Order
 - Paragraph 54: Inventory of homes with lead service lines.
 - ✦ As of 11/20/2017, the City of Flint had replaced 5,752 service lines and identified 1,185 copper-to-copper lines.
 - Paragraph 60: Long-term water source.
 - ✦ On 11/22/2017, the City Council approved a 30-year contract with the Great Lakes Water Authority (GLWA) to serve as the City's primary water source, and utilize Genesee County as a backup water source.

Flint Water Advisory Task Force



**FLINT WATER ADVISORY TASK
FORCE (FWATF) FINDINGS
BLAMES THE STATE AND CITY
GOVERNMENTS FOR THE FLINT
CRISIS**

Creation and Findings of the Flint Water Advisory Task Force



- In Fall 2015, the governor of MI creates the Task Force to investigate what happened - and why - and to make recommendations
- In March 2016, the report is offered by the Task Force to:
 - “Fulfill our charge of determining the causes of the Flint water crisis”,
 - “Identify remedial measures for the Flint community”,
 - “Safeguard Michigan residents”
- From the **Executive Summary** of that report:
 - “The Flint water crisis is a story of government failure, intransigence, unpreparedness, delay, inaction, and environmental injustice”

A Gray Area



- Choices made by Utilities and Regulators regarding the Lead and Copper Rule are seldom “black and white” or well delineated
- Let’s examine how:
 - MDEQ interpreted the Lead and Copper Rule compliance for Flint
 - the choice was made to choose which Lead samples for reporting in Flint which resulted in the indictment of Glasgow, Busch and Prysby....
- Do you think these three people deliberately altered the results of the report in order to keep the Lead issues from the public?

Data Difference – 60 samples were required, **but** 72 samples were taken
90%-tile of 72 means that 7 samples can be >15 µg/L, but not 8



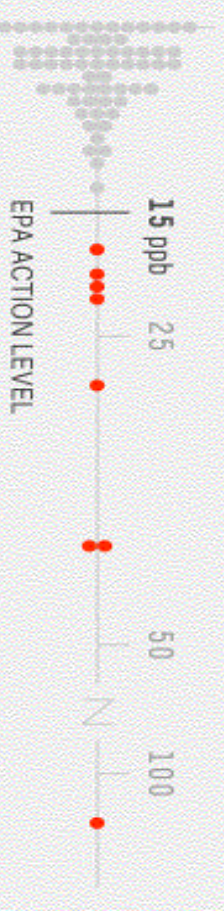
The difference two data points can make

The Michigan Department of Environmental Quality's analysis of Flint's water supply

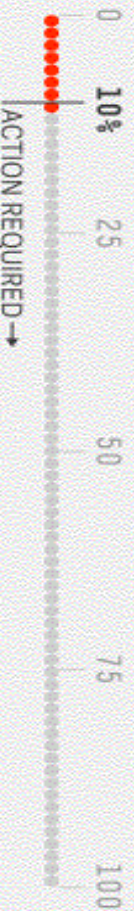
If the DEQ had **included all of the water samples it took**,
federal law would have demanded further steps ...

LEAD LEVELS IN WATER SAMPLES

NOT
DETECTABLE



PERCENTAGE OF SAMPLES EXCEEDING 15 PPB



... but the **exclusion of two high-lead samples** put the city's
water supply below the threshold for mandatory action.

NOT
DETECTABLE



Service lines in Flint



- The city records show that Flint water customers are served through
≈ 30,000 service lines
- The records indicate that over 15,000 of them are Lead
 - There is some conjecture that a number of those are simply services with a Lead gooseneck
 - As of the end of 2017 – the City had replaced about 6,000 Lead service lines
 - ✦ The City has accelerated its efforts now that Federal funding has been allocated
 - The City stated it will take perhaps three years to replace all the service lines



Researchers estimate lead released from Flint water pipes

“Lack of orthophosphate corrosion control contributed to city’s water crisis, according to new analysis”

“Flint’s mineral lining was depleted in lead and phosphate, indicating selective release of lead phosphates after pipe corrosion.”

The study looked at the 300- μm -thick mineral layer that lines the pipe interior



They determined that the pipes released about 2.7 g of lead per meter of service line over the course of the 1.5-year-long crisis, meaning that a lead pipe delivering water to a single Flint household would have released approximately 18 g of the neurotoxic metal (Environ. Sci. Technol. Lett. 2017, DOI: 10.1021/acs.estlett.7b00226). Credit: Courtesy of Terese Olson

Lead service lines in this Country



- According to a recent national estimate, a total of 6.1 million LSLs—either full or partial—are in place today in US community water systems (CWSs)
 - Providing water to an estimated 15 million to 22 million people (Cornwell et al. 2016)*.
- Lead is present in private plumbing systems, primarily in housing stock developed before 1986 when the use of Lead pipe was banned.

*Cornwell, D.A.; Brown, R.A.; & Via, S.H., 2016. National Survey of Lead Service Line Occurrence. Journal AWWA, 108:4:E182.

<http://dx.doi.org/10.5942/jawwwa.2016>

What issues still need to be settled?



- The State of Michigan, trying to separate themselves from the City, has written an Administrative Consent Order (ACO) that they want Flint to agree with in writing
 - It uses the findings of a 2017 sanitary survey in which the City was found to be deficient in several areas of their operation
- Mayor of Flint does not want to sign it
- The political “us vs. them” is in play here

The ACO



- Contains dates for the completion of actions to bring the City's water system into compliance with the Michigan SDWA

- “This document results from allegations by the Department of Environmental Quality (DEQ) Drinking water and Municipal Assistance Division”
- “The ACO stipulates that (from here it goes on to quote parts of the Michigan SDWA)

Findings of the ACCO



- On 8/7/2017, DEQ performed a sanitary survey of the Flint water system
- On 8/11/2017, the DEQ issued a Significant Deficiency Violation Notice (SDVN)
 - It lists significant and minor deficiencies, and makes recommendations applicable to the system
 - It says that the City of Flint must complete the 14 deficiencies

Final Thoughts



- **Back in time to the early 1990's**
 - American Water Works Association argued against Lead service line replacement by Utilities
 - ✦ It lobbied the political establishment, stating:
 - The cost would be prohibitive to customers
 - Service line ownership is a confused jumble of rules that differ from one Utility to another – no “one size fits all”
 - The technology existed (orthophosphates) to passivate the Lead in service lines rendering them harmless
 - We now know of the dangers of interruption of phosphate feed and danger of fluctuating DIC levels, and so AWWA has changed its policy

Final thoughts



- **Nationwide, there are aggressive efforts**
 - there are law firms looking at the practices of utilities to see if there is the potential to bring a lawsuit
 - ✦ They look for clues: population concentration of low-income families, old neighborhoods likely to have Lead plumbing, Lead and Copper reports that show a pattern for several years
 - There are companies that manufacture Lead testing kits, and they are talking directly to your customers to try to get them to take samples and mail them in
 - ✦ They look for clues: CCR, source water chemistry, Lead and Copper reports that show a pattern for several years
- **Commonality? – they use the fears of the public to divide and conquer**