

A LOOK AT MICHIGAN'S "ALTERNATE" ELECTORS [UPDATE-1]

There are several interesting tidbits about the slate of "alternate" electors who on December 14, 2020 signed a false certification of election fraudulently awarding Michigan's 16 electoral votes to loser Donald Trump.

YET ANOTHER WARNING FROM MICHIGAN: FBI BUSTED PLOT TO KIDNAP "THAT WOMAN"

Timing of the seditious terror plot against Michigan's Gov. Whitmer and events which may have inspired this idiocy don't seem to correlate well. This wasn't about emergency orders related to COVID-19.

MICHIGAN'S MILITIA- LIKE MORONS CAN'T MATH [UPDATE]

At this rate we'll be under some form of quarantine all damned summer because these spoiled, stupid wretches can't make the connection between their bad behavior and Michiganders' deaths.

#FLINTWATERCRISIS: I DON'T THINK THAT REPORT SAID WHAT YOU THINK IT SAID, GOV

Today's House Oversight Committee hearing into the Flint Water Crisis was a joke. It was partisan – more so than the previous two hearings – because Republicans finally clued in that a Republican state governor's crisis doesn't make them look good if they don't kick up a stink and draw fire away from their role in the mess.

And yes, Congress' GOP members are directly responsible for what happened in Flint, because they are also responsible for neutering the Environmental Protection Agency. Congress is the one entity which failed to take any responsibility for what happened in Flint – and what happened in Flint had already happened in Washington DC. Congress ensured that the EPA would be subordinate to the states, relying on states to act with inadequate recourse to step in and intervene. See Primacy Enforcement Responsibility for Public Water Systems (pdf) and note the obligations the states have to ensure safe drinking water under these laws:

- Safe Drinking Water Act, 1974, as amended in 1986 and 1996
- Primacy Regulations 40 CFR Part 142, Subpart B, 1976, as amended in 1986
- Revisions to Primacy Requirements (1998), 63 FR 23362 codified at 40 CFR

Part 142

These are Congress' purview; as part of the Executive Branch, the EPA does not make law. Only Congress does.

Equally annoying today is the tendency by the Republican representatives to go easy on Michigan's Governor Snyder, who tried to make it sound like he was doing everything he could to fix Flint and be open and transparent. You know this is bull hockey if you've looked at batches of emails released to date.

You know it's also nonsense if you look at documents produced by the Snyder administration, intended to assist the public with understanding what happened.

One example is a timeline of the Flint water crisis laid out in a two-page presentation, with bubbles containing descriptions of events. A bubble marking March 12, 2015, appears in the upper right of the first page, denoting the submission of a report by Veolia Water. The firm had been hired by Flint's emergency manager as water quality consultant to review and evaluate the water treatment process and distribution system.

Veolia completed and submitted their report to the city on March 12, but the report does not actually say what the state's timeline document says. Veolia wrote,

“Although a review of water quality records for the time period under our study indicates compliance with State and Federal water quality regulations, Veolia, as an operator and manager of comparable utilities, recommends a variety of actions to address improvements in water quality and related aesthetics including: operational changes and improvements; changes in water treatment processes, procedures and chemical dosing; adjustments in how current technologies

are being used; increased maintenance and capital program activities; increased training; and, an enhanced customer communications program.”

Veolia relied on what previous water quality records said; they did not actually conduct tests themselves, or audit how the previous records and reports were prepared.

But the timeline published by the governor’s office reads,

“Flint water consultant Veolia, issues report that water meets state and federal standards. Does not report specifically on lead.”

The second sentence is correct, the first a misrepresentation. That’s not what Veolia’s report said.

The second sentence may be factually correct, but the company was not hired by Flint’s emergency manager to evaluate lead levels specifically, based on the supporting documentation accompanying the resolution authorizing the contract with Veolia.

If one entry on the timeline prepared by the state is this iffy, what about the rest of the timeline?

If this timeline is this iffy, what about everything else generated by officials from the governor’s office on down?

THURSDAY MORNING: A LITTLE GREEN AROUND

THE GILLS

Happy St. Patrick's Day to those of you who observe this opportunity to drink beer (tinted green or otherwise) and eat boiled dinner and wear green! We'll know the hardcore among you tomorrow by your hangovers.

Folks overseas don't understand how St. Patrick's Day blew up to the same proportions as other holidays like Halloween, blaming it on American commercialization. But the holiday as observed in the U.S., like Halloween, has roots in immigration. Four to five million Irish immigrated to the U.S.; their descendants here are nearly 40 million today, roughly seven times the number of actual Irish in Ireland now. With this many Irish-Americans, even a tepid observation of St. Patrick's Day here would be visible abroad.

In addition to all things green, we'll be watching this week's second #FlintWaterCrisis hearing. Representatives Chaffetz and Cummings can go all shouty on Michigan's OneLawyeredUpNerd Governor Rick Snyder and EPA's Gina McCarthy though I have my doubts anything new will emerge. (And you'll see me get really angry if Rep. SlackerForMichigan Tim Walberg shows up to merely make face on camera. Useless helicoptering.)

Unlike Tuesday, I hope like hell somebody brings up Legionnaire's cases and deaths in Flint after the cut-over of Flint's water to Flint River. Thousands of children may have been permanently poisoned by lead, but people sickened and died because of this complete failure of government-as-a-business.

I can't stress this enough: There were fatalities in Flint because of the water.

Hearing details – set a reminder now:

Thursday 17-MAR – 9:00 AM – Gov. Snyder (R-MI) & EPA Head McCarthy: House Hearing on Flint, MI Water Crisis (est 3 hours, on C-

SPAN3) Link to House Oversight Committee calendar entry

You can find my timeline on Flint's water here – as noted Tuesday, it's a work in progress and still needs more entries.

Moving on...

Apple leaves Amazon for Google's cloud service
Wait, what?! File under 'Wow, I didn't know!' because I really though Apple housed all its cloud services under its own roof. I mean, I've written about data farms before, pointed to a new Apple location. I didn't know Apple had outsourced some of its iCloud to Amazon.

Which makes Senator Ron Wyden's remarks about asking the NSA with regard to the San Bernardino shooter's iPhone even more interesting.

No wonder Apple is moving to Google, considering Amazon's relationship with certain government agencies as a cloud service provider. Some of Apple's data will remain with Amazon for now; we might wonder if this is content like iTunes versus users' data. Keep your eyes open for future Apple cloud migrations.

US Navy sailors' electronic devices combed for data by Iran

Gee, encrypted devices and communications sure are handy when members of the military are taken into custody by other countries. Too bad the Navy's devices weren't as secure as desired when Iran's navy detained an American vessel in January this year. To be fair, we don't know what all was obtained, if any of the data was usable. But if the devices were fully encrypted, Iran probably wouldn't have said anything.

American Express' customers' data breached – in 2013

Looks like a select number of AmEx customers will receive a data breach notice with this explanation:

█ We became aware that a third party service provider engaged by numerous

merchants experienced unauthorized access to its system. Account information of some of our Card Members, including some of your account information, may have been involved. It is important to note that American Express owned or controlled systems were not compromised by this incident, and we are providing this notice to you as a precautionary measure.

The breach happened on December 7, 2013, well into the Christmas shopping season, but we're just finding out now? "Third party service" means "not our fault" – which may explain why AmEx shareholders (NASDAQ:AXP) haven't been notified of a potential risk to stock value as yet. Who/what was the third party service? Where's their notification to public and shareholders?

I need to brew some coffee and limber up before the hearing on Flint, track down my foam footballs and baseballs to throw at the TV while Gov. Snyder goes on about how sorry he is and how he's going to fix Flint's water crisis. Oh, and find an emesis basin. See you here tomorrow morning!

TUESDAY MORNING: #FLINTWATERCRISIS HEARING TODAY

This is a semi-special morning roundup edition due to this morning's Congressional hearing on #FlintWaterCrisis. Details:

Tuesday 15-MAR – 10:00 AM – Hearing on Flint, Michigan Water Contamination (est 3 hours, on C-SPAN3)
Former Flint, Michigan Mayor Dayne Walling,

former Emergency Manager Darnell Earley, EPA Region 5 Administrator Susan Hedman, and Virginia Tech University's Marc Edwards testify at a House Oversight Committee hearing on water contamination in Flint. [Link to House Oversight Committee calendar entry](#)

If you don't catch today's hearing, there will be another on Thursday morning:

Thursday 17-MAR – 9:00 AM – Gov. Snyder (R-MI) & EPA Head McCarthy: House Hearing on Flint, MI Water Crisis (est 3 hours, on C-SPAN3) [Link to House Oversight Committee calendar entry](#)

You can find my timeline on Flint's water here – it still needs a number of new entries.* Of particular note today will be the first half of 2014 when the decision to cut over from Detroit's water (DWSO) to the Flint River was finalized and enacted, under then-Emergency Manager Darnell Earley. Earley was the third EM appointed to Flint after December 2011; he had been preceded by Michael Brown (twice) and Ed Kurtz (once).

You'll recall that Michigan implemented an emergency manager law in 2011, allowing the state to appoint an administrator for insolvent municipalities. The EM law eliminated the powers of democratically elected municipal officials, vesting those powers and more in the appointee.

Reports this morning based on initial assessments of Darnell Earley's written statement for the hearing today indicate Earley was overwhelmed by the demands of the EM role in Flint, and he regrets not having pushed back more firmly on decisions about the water cut-over.

However, the timeline reveals that in early 2013 a previous EM Ed Kurtz actually signed the decision to buy water from the Karegnondi Water Authority (KWA) when it completed construction. Kurtz also notified the DWSO that Flint would leave in one year's time, in spite of a last-

minute emailed offer on April 15, 2013 from DWSD offering a rate far cheaper than the rate Flint was paying in 2013, and possibly cheaper altogether than the KWA rate.

Did EM Ed Kurtz see this email? If he did, why was it ignored? If he didn't, why not?

Ditto for Darnell Earley – did he know there was an offer from DWSD making the KWA potentially irrelevant or redundant?

Why wasn't Flint able to accept the DWSD's cheaper rate from 2013 through to cut-over to the KWA upon the pipeline's completion as a stop-gap, avoiding the debacle cutting over to the Flint River created?

Why was there so much pressure on development and implementation of the KWA, to the point that cheaper water from DWSD was ignored?

Michigan blogger Mark Maynard asked whether the KWA was really established to serve fracking wells in counties through which the pipeline ran from Lake Huron to Flint (see here and here). I would love to know if anybody has FOIA'd documents from the state, Flint, and the KWA regarding containing any of the search terms [fracking, hydraulic fracturing, wells, oil, natural gas, injection, energy].

We already know the state wasn't paying much attention (ahem) to fracking in northern Michigan; did they turn a blind eye to both bid rigging up north, and the development of water resources in eastern Michigan?

Get your popcorn maker out and ready for 10:00 a.m. EST. You know what I'll be doing – join me.

UPDATE – 8:25 a.m. EST –

I do have one more question I'd ask Darnell Earley about early 2014. Knowing the city's water would be cut over from DWSD to KWA in April, were there any tests conducted prior to the date DWSD was cut off as a source? In other words, did Flint River water enter the Flint water system anytime BEFORE the end of the

contract with DWSD? Or was the city simply supposed to assume the cut over would work without fail?

I'd like to see when Genesee County Health Department first noticed changes in health services required, along with any anonymized health service data from hospitals serving Flint residents. Would the health data show illness in sync with the official cut-over to river water – or earlier?

UPDATE – 2:20 p.m. EST –

Drive-by impressions after hearing:

- Didn't get answers to my questions. Also, Earley should have been asked whether Snyder, as his boss, 1) asked him to limit contact with public for feedback, or 2) if it was clear going into EM role that public feedback should be limited, and 3) if it had been made clear by governor to Earley that financial concerns overrode all others in performance of EM duties.
- Susan Hedman's testimony helter-skelter, did not improve impression of her ability as a regulator. She's still on the hot seat. Email cited in hearing from EPA's Region 5 Water Division Branch Chief Debbie Baltazar which said, "I'm not so sure Flint is the community we want to go out on a limb for" did not help

Hedman's case whatsoever.

- Do not recall any mention of Legionnaire's cases during questioning, though contamination was mentioned. Not good – lot of important focus on lead poisoning, but to forget about deaths due to this crisis?
- C-SPAN cameras caught Dr. Marc Edwards giving interviews after hearing ended; he told interviewers Flint's water was safe for bathing (non-consumption hygiene purposes), but could not say when Flint's water was safe to drink because of testing still underway across Flint.

Ugh. Thursday's hearing will be must-see TV.

** Sorry, harpie, I still have to follow up with the additional links you've shared recently.*

[WORK IN PROGRESS] TIMELINE: FLINT'S WATER CRISIS

This is a work in progress. Not all dates and events between the end of 2015 and current date have been added as of publication. This timeline will be updated periodically, as events unfold and as key information is revealed about Flint's ongoing water crisis. Some information is

incomplete or in need of validation. Links to sources will be added over time. If you have content you believe is relevant and should be added, please share in comments.

1974-2002

XX-DEC-1974 – The federal Safe Drinking Water Act (SDWA) enacted to ensure safe drinking water for the public; the Environmental Protection Agency (EPA) is responsible for setting safety standards, monitoring, compliance and enforcement of the same under the SDWA.

07-JUN-1991 – EPA issued the Lead and Copper Rule (LCR) limiting the amount of lead and copper in public drinking water, as well limiting the permissible amount of pipe corrosion occurring due to the water itself.

XX-JUL-1998 – The federal Environmental Protection Agency required all large public water systems maintain a program to monitor and control lead in drinking water due to piping corrosion under the Lead and Copper Rule (LCR). Cities like Flint must have a state-approved plan to maintain water to regulatory limits for pH, alkalinity, corrosion inhibitor chemicals.

XX-XXX-2002 – [DATE TBD] Genesee County purchased 326 acres of property with 300 feet of Lake Huron waterfront via auction from Detroit Edison, for \$2.7 million ***How did this purchase affect the city of Flint's 2002-2004 financial crisis?*

2009

28-AUG-2009 – Michigan Department of Environmental Quality (MDEQ) issued a permit to Genesee County Drain Commission for water withdrawal from Lake Huron (Permit 2009-001), up to 85 million gallons per day. MDEQ director at the time is Steven Chester.

2011

10-MAY-2011 – DTE Energy expressed interest in acquiring 3 million gallons of water from Lake Huron intake for use at the Greenwood electricity generation plant.

07-SEP-2011 – Report to Flint City Council by Rowe Professional Services determined buying water from Karegnondi Water Authority (KWA) cheaper than continuing to purchase from Detroit Water and Sewerage Department (DWSD), or using Flint River water as upgrades to Flint treatment equipment required would cost \$50 million.

XX-SEP-2011 – (confirm date) City of Flint increase water and sewer rates 35%. Higher water costs due in part to higher-than-expected unmetered water losses. This is the second double-digit rate hike in 2011. The city's water system once served ~200K residents, now serves half that number and a much smaller manufacturing base.

29-NOV-2011 – Emergency Manager Michael Brown appointed by Gov. Rick Snyder to take over management of the city of Flint effective 01-DEC-2011. Democratically elected offices are now subordinate to the EM.

XX-DEC-2011 – (confirm date) Report showed the City of Flint leaking 30 to 40% of its water, well above more typical 15-20 percent loss of unmetered water.

14-DEC-2011 – EM Michael Brown appointed Howard Croft as Director of Infrastructure and Development. Croft's role has oversight of Parks and Recreation department, Street Maintenance, Water and Sewer, Sanitation, Planning, Fleet and Community and Economic Development. Jerry Ambrose named financial advisor, with oversight of finance, budget and treasury departments; Gary Bates named director of human resources and labor relations. Bates's role was temporary, lasting 90 days, at time of appointment.

20-DEC-2011 – The City of Detroit sells \$500,675,000 in bonds for Water Supply System Revenue funding (pdf). The offering prospectus notes Flint's desire to migrate to the KWA, but

that it might be seven years out before the move. 6% of DWSO water is supplied to Flint.

2012

XX-FEB-2012 – (confirm date) Emergency Manager's team audited Flint's water system to identify current rate of unmetered water loss.

23-APR-2012 – EM Michael Brown proposed budget plan includes a 25% average increase in water and sewer rates, with water rates projected to increase 12.5% and sewer 45%. City personnel cuts were also proposed. Water and sewer are the single largest expenditure in the budget. (Proposed budget, PDF) ***Did any of the personnel cuts made affect staffing of water and sewer maintenance?*

XX-AUG-2012 – [DATE TBD] Emergency Manager Ed Kurtz appointed by Gov. Rick Snyder after Brown steps down. Kurtz has previous experience working in Flint during the 2002-2004 financial emergency.

XX-DEC-2012 – [DATE TBD] Michigan Treasury officials met with Flint city officials to discuss drinking water alternatives, including Flint River. Only two options – remaining on DWSO, or development/switch to new KWA – would be studied.

2013

25-MAR-2013 – Flint City Council voted to join KWA. This vote is non-binding since EM holds all power to authorize/contract.

26-MAR-2013 – [EMAIL] MDEQ Office of Drinking Water and Management Assistance district director Stephen Busch emailed a draft assessment to Dan Wyant concerning Flint's water system and alternative sources. The draft outlined concerns about the health risks and increased expenses expected with a switch to Flint River water. (A copy of the mail was not public until released by Gov. Snyder's office on

12-FEB-2016.) ***Note remarks in email regarding economic development—were these obscured as part of decision-making, elevated above public health concerns?*

29-MAR-2013 – EM Ed Kurtz signs resolution authorizing Flint to enter into a contract with KWA to purchase water.

11-APR-2013 – Andy Dillon, MI-Treasurer, told EM Ed Kurtz state approved city of Flint's entry into agreement with KWA effective 16-APR-2016 pending review of DWSD offer expected on 15-APR-2013

15-APR-2013 – [EMAIL] DWSD offered rate 48% lower than the current rate, saving 20% over 30 years compared to KWA. ***Where is documentation of this offer to Flint EM and/or state??*

16-APR-2013 – Genesee County Drain Commissioner's Office issued a Joint Statement from commissioner Jeff Wright and Flint EM Ed Kurtz regarding Detroit's Final Offer on Water Service. Excerpt:

After reviewing the proposal, both Ed Kurtz and Jeff Wright were in agreement, the Karegnondi Pipeline is still the best option for our residents, saving them the most money both in the short and long term. The offer from Detroit, even on its surface, will cost residents more money than KWA.

Wright is also the CEO of KWA. ***Is Wright's role as both Drain Commissioner and KWA's CEO a conflict of interest?*

16-APR-2013 – EM Ed Kurtz signed an agreement with KWA though KWA cannot supply water for another 2.5 years.

17-APR-2013 – Certified letter received by Flint City Clerk from DWSD, notifying termination of water contract in one year. Flint EMs and MI state officials treat this notice as "cut off."

01-MAY-2013 – Genesee County Drain

Commissioner's Office Communications Director Kevin Sylvester published a letter to All Interested Parties, including attachments supporting the decision to purchase Flint's drinking water from KWA. The letter indicates the decision has been vetted by MDEQ, MI-Treasury, MI-Agriculture.

29-MAY-2013 – EM Ed Kurtz tendered notice of resignation. He will work through the first week of July.

21-JUN-2013 – EM Ed Kurtz presented a resolution to enter into a professional engineering services contract for implementation of placing the Flint Water Plant into Operation. The contract is sole source with Lockwood, Andrews & Newman, Inc. engineers.

26-JUN-2013 – With the approval of Flint's CLO Bade and Finance Director Ambrose, EM Ed Kurtz hired Lockwood, Andrews & Newnam, Inc. engineers (LAN) on a sole-source contract to plan switch-over to Flint River through Flint Water Plant. Fee: \$171,000. LAN is a subsidiary of national consulting firm Leo A. Daly, based in Texas. ***Why was LAN hired versus any other in-state engineering firm?*

28-JUN-2013 – KWA broke ground on the pipeline project near Lake Huron.

30-JUN-2013 – EM Ed Kurtz left his role as of the end of fiscal year.

18-JUL-2013 – The City of Detroit declared bankruptcy. KWA bond financing put on hold.

08-JUL-2013 – Michael Brown appointed Flint's EM a second time.

XX-SEP-2013 – [DATE TBD] Genesee County sold \$35 million in bonds based on a 5.04% interest rate to finance the launch of KWA construction.

11-SEP-2013 – Michael Brown resigned as EM.

01-OCT-2013 – Darnell Earley appointed EM. He served Flint previously in 2002 as mayor.

2014

07-MAR-2014 – EM Darnell Earley rejected an offer to continue purchasing water from DWSD. Earley discloses in a letter that Flint will take water from Flint River.

26-MAR-2014 – Credit rating agencies Moody's and Standard & Poors offered A2 (upper-middle-grade) and A-plus (with stable outlook) credit ratings respectively on \$220 million bonds to be sold by KWA. Loan rate based on these ratings was expected to be at or below 5%.

09-APR-2014 – MDEQ approved permits allowing Flint to switch to Flint River

14-APR-2014 – [EMAIL] City of Flint's Laboratory & Water Quality Supervisor Mike Glasgow emailed MDEQ (name/contact TBD):

"I have people above me making plans to distribute water ASAP [...] I was reluctant before, but after looking at the monitoring schedule and our current staffing, I do not anticipate giving the OK to begin sending water out anytime soon [...] If water is distributed from this plant in the next couple weeks, it will be against my direction. [...] I need time to adequately train additional staff and to update our monitoring plans before I will feel we are ready. I will reiterate this to management above me, but they seem to have their own agenda."

This email was not public until released by Gov. Snyder's office 12-FEB-2015.

25-APR-2014 – Flint's water system was switched over to Flint River ***Were there ever any tests prior to this date during which river water entered water system?*

01-JUN-2014 – Complaints swelled from residents about the smell/taste/color of water; some residents claim it has made them ill.

14-AUG-2014 – Flint water tested positive for *E.*

coli bacteria. Boil Water advisories were issued 2 days later.

05-SEP-2014 – A second Boil Water advisory issued, including a new portion of the city.

09-SEP-2014 – Boil Water advisories ended.

XX-SEP-2014 – [DATE TBD] Children's blood lead levels test unusually high for period July-August-September. The data appears in Michigan Department of Human Health Services' records.

13-OCT-2014 – General Motors said it will buy water from Flint Township as chlorine added to Flint City water can cause corrosion in its engines.

17-OCT-2014 – Government official(s) or employees aware of possible link between Legionnaires Disease cases and the city's switch to Flint River as water source. Data will show Genesee county experienced a tapering of a first outbreak at this point. (Government's awareness not made public until January 2016; report by The Flint Journal does not specify who exactly from GCHD and Flint water system were first aware.)

XX-OCT-2014 – [DATE TBD] Gov. Snyder requests a briefing on Flint water situation from MDEQ. Aging pipes prone to corrosion are blamed for *E. coli* bacteria and subsequent Boil Water advisories. Lead levels are not mentioned.

XX-NOV-2014 – (confirm date) [EMAIL] Dick Posthumus, senior advisor to the governor, asks Snyder if he will support a bill to allow Flint to boost its income tax from 1 percent to 1.5 percent (a rate some other cities have). No definitive response received.

XX-DEC-2014 – (confirm date) [EMAIL] Snyder's Deputy Director of Legislative Affairs Sally Durfee wrote to Executive Director to the Governor Allison Scott and Posthumus that [*an income tax rate increase – confirm*] would raise \$6.5 million per year, has the support of the Flint emergency manager and the state Treasury

Department. But State Rep. Jeff Farrington (R-Utica) said, "he would take up this bill over his dead body."

2015

01-JAN-2015 – MDEQ began a second six-month Flint monitoring period under Lead and Copper Rule. First testing period showed a 90th percentile reading of six parts per billion of lead in Flint tap water.

02-JAN-2015 – MDEQ reports levels of total trihalomethanes (TTHM) are unacceptable. TTHM in water resulted from chlorination to treat for *E. coli*. Water is in violation of federal Safe Drinking Water Act; the city mailed a notice to its customers saying it is in violation due to the TTHM.

06-JAN-2015 – Flint mayor Dayne Walling said water is safe, he and his family use it.

09-JAN-2015 – University of Michigan-Flint water tests revealed high lead levels in two locations on campus. Some water fountains are turned off.

11-JAN-2015 – EM Darnell Earley rejected city council members plea to stop using Flint River water. Water treatment consultants will be hired instead as the cost of switching back to DWSD could cost \$12 million-plus.

12-JAN-2015 – (confirm date) DWSD offered EM Earley a waiver of a \$4 million reconnection fee to switch back to Detroit Water.

13-JAN-2015 – Flint's Department of Public Works published a letter including questions from the public about Flint's water system and the city's response. The letter is signed by Howard Croft, Dayne Walling, and Jerry Ambrose. The letter does not include any questions or answers about lead levels or *Legionella* contamination.

13-JAN-2015 – EM Darnell Earley left to become EM of Detroit Public Schools. Gov. Snyder appoints Jerry Ambrose as new EM for Flint.

22-JAN-2015 – (confirm source) Snyder Admin's Dick Posthumus wrote, "[W]e have two meetings coming up on this next week" including Snyder Director of Strategy John Walsh, top urban affairs aide Harvey Hollins, and numerous others in the administration. "Later that day we are meeting with several people from Flint, including the EM, Mayor, and Senator Ananich."

27-JAN-2015 – "An internal email from a Health Department supervisor on Jan. 27, 2015, says employees at Flint's water treatment plant had not responded in months to 'multiple written and verbal requests' for information, slowing progress on the probe. In the same month that the email was written, two new cases of Legionnaires' were reported in the county." – Excerpt, 16-JAN-2016 article by The Flint Journal. GCHD supervisor not named, nor is a copy of the email published.

04-FEB-2015 – EM Jerry Ambrose signed a resolution authorizing Flint to contract Veolia Water as water quality consultant to review and evaluate the water treatment process and distribution system. The water plant consultant was to provide recommendations to remain compliant with State and Federal agencies. The resolution indicates Veolia was the sole bidder; the resolution does not mention specific water problems to date like lead, TTHM, or biological agent contamination. ***Why Veolia was the sole bidder?*

25-FEB-2015 – Mike Glasgow with the City of Flint discovered high lead in water samples from Flint resident Lee Anne Walters' home – 104 parts per billion.

XX-FEB-2015 – (Confirm date) Lee Anne Walters forwarded results of lead tests to EPA-Region 5 office.

XX-FEB-2015 – (Confirm date) [EMAIL] EPA-Region 5 office forward Walters' test results to MDEQ's Stephen Busch and Mike Prysby. Subject: "HIGH LEAD: FLINT Water testing Results."

XX-FEB-2015 – (Confirm date) [EMAIL] EPA-Region

5 Lead-in-Water expert Miguel Del Toral asked MDEQ via EPA employee (confirm identity): "Miguel was wondering if Flint is feeding Phosphates. Flint must have Optimal Corrosion Control Treatment-is it Phosphates?"

27-FEB-2015 – [EMAIL] MDEQ's Stephen Busch replied to EPA in bulleted points: "The City of Flint...Has an Optimized Corrosion Control Program"; "Conducts quarterly Water Quality Parameter monitoring at 25 sites and has not had any unusual results"; "has never had a 90th percentile lead AL exceedance." However, Flint was not adding phosphates or other anti-corrosion chemicals.

XX-FEB-2015 – (Confirm date) [EMAIL] EPA'S Del Toral responds to MDEQ, "If I remember correctly, Detroit is feeding P04 for the LCR, but since Flint is no longer part of that interconnection, I was wondering what their was. They are required to have in place which is why I was asking what they were using."

10-MAR-2015 – [EMAIL] James Henry, Genesee County Environmental Health supervisor wrote to Flint and MDEQ officials in regard to an uptick in Legionnaires Disease, "The increase of the illnesses closely corresponds with the timeframe of the switch to the Flint River Water. The majority of the cases reside or have an association with the city...This situation has been explicitly explained to the MDEQ and many of the city's officials. I want to make sure in writing that there are no misunderstandings regarding this significant and urgent public health issue."

12-MAR-2015 – Veolia Water submits their report. Excerpt (emphasis added):

"Although a review of water quality records for the time period under our study indicates compliance with State and Federal water quality regulations, Veolia, as an operator and manager of comparable utilities, recommends a variety of actions to address

improvements in water quality and related aesthetics including: operational changes and improvements; changes in water treatment processes, procedures and chemical dosing; adjustments in how current technologies are being used; increased maintenance and capital program activities; increased training; and, an enhanced customer communications program.”

18-MAR-2015 – Lee Anne Walters’ home retested after plumbing flushed thoroughly. Results are worse – 397 ppb. The test results do not make sense as Walters’ plumbing had been replaced by plastic, lead-free plumbing as all copper plumbing had been stripped from the home prior to its purchase.

XX-MAR-2015 – (confirm date) EPA-Region 5 forwarded Walters’ test results to MDEQ, asking, “Any thoughts on how to respond to her? I’m running out of ideas.”

19-MAR-2015 – [VOICEMAIL] MDEQ responds to EPA’s Del Toral, saying that “MDEQ had investigated and found Ms. Walters’ high lead was due to lead sources in her plumbing.”

23-MAR-2015 – Flint’s city council votes 7-1 to reconnect with DWSD. The vote is non-binding as the city remains under the control of an emergency manager.

27-MAR-2015 – Lee Anne Walters’ son tested for blood lead level. Results were high, above the Center for Disease Control’s 5 ug/dL ‘threshold of concern.’

XX-XXX-2015 – [DATE TBD – may be duplicate] Lee Anne Walters’ child diagnosed with lead poisoning, the source of which is Walters’ household connection to Flint water system. Walters’ water service has been disconnected and reconnected to a neighbor’s water by a garden hose.

XX-MAR-2015 – [DATE TBD] Lee Anne Walters called

the City of Flint to confirm the existence of an "Optimized Corrosion Control Program." City officials advised her there was no such program.

XX-MAR-2015 – [DATE TBD] Walters contacted EPA's Del Toral, advising the lack of corrosion control program.

13-APR-2015 – City Administrator Natasha Henderson and Department of Public Works Director Howard Croft told Flint City Council that a new carbon filtration system to remove TTHM wouldn't be needed after the city switches to KWA. The filter was scheduled for implementation in July 2015.

23-APR-2015 – [EMAIL] EPA's Del Toral emails MDEQ, asking what corrosion control program was used in Flint.

XX-APR-2015 – [DATE TBD] MDEQ'S (confirm identity) replies to EPA's Del Toral, acknowledging Flint had no corrosion control program.

27-APR-2015 – [EMAIL] EPA's Del Toral emails EPA-Region 5: "Flint has not been operating any corrosion control treatment, which is very concerning given the likelihood of LSLs in the City."

27-APR-2015 – EPA's Del Toral stops at Lee Anne Walters' house, inspects household plumbing, finds it is plastic and lead-free. Del Toral also leaves sample bottles and leaves contact information for VA-Tech's Marc Edwards if she wants an analysis.

28-APR-2015 – VA-Tech's Marc Edwards spoke with Lee Anne Walters and explained how to collect a 30-bottle sample.

29-APR-2015 – EM Jerry Ambrose leaves office as the city's financial emergency is declared over. Oversight of the city council and mayor's office are now under "Receivership Transition Advisory Board."

XX-MAY-2015 – Data will later reveal a second months' long outbreak of Legionnaires Disease

begins in Genesee County during this month.

XX-MAY-2015 – [DATE TBD] Lee Anne Walters' samples were sent to VA-Tech for analysis. The average lead level was "2,429 ppb lead, the high was 13,200 ppb, and even after 25 minutes flushing the water never dropped below 200 ppb."

XX-MAY-2015 – [DATE TBD] Walters tells EPA's Del Toral about the high lead results.

XX-MAY-2015 – [DATE TBD] EPA's Del Toral arrives at Walters' home in Flint, arrives in time to find City of Flint replacing the service line to Walters' home. The pipe, which Del Toral sampled, was pure lead.

01-JUN-2015 – Flint's water tested lower in May for TTHM, below federal guidelines, but the average of tests over the last year meant Flint's water was still in violation of the Safe Drinking Water Act.

05-JUN-2015 – The Coalition for Clean Water, whose members include Flint Concerned Pastors for Social Action, the Democracy Defense League, and Flint City Councilman Eric Mays, filed suit against the city of Flint to force the water system to be reconnected to DWS.

16-JUN-2015 – The City of Flint filed to move CCW's lawsuit to federal court.

23-JUN-2015 – U.S. District Judge Stephen Murphy denied the Coalition for Clean Water's motion for an injunction against the City of Flint. Murphy decision said he was "unable to determine the coalition's legal theory, or even whether the court has the power to grant the requested relief."

24-JUN-2015 – A memo written by Miguel Del Toral of EPA was leaked. The memo addresses Lee Anne Walters' household water tests reporting high lead levels.

24-JUN-2015 – [May be a duplicate of above entry] EPA's Del Toral sent a follow-up memo to both Lee Anne Walters and VA-Tech's Marc Edwards, outlining concerns about Flint's lead

corrosion problem. Del Toral included a “included a clear recommendation that the USEPA investigate whether the City of Flint was in compliance with federal laws for lead corrosion control.”

XX-XXX-2015 – [DATE TBD] Lee-Anne Walters made two phonecalls to a state lead poisoning nurse “Karen” in Lansing. “Karen” was dismissive about Walters’ concerns, saying “He is barely lead poisoned. If CDC had not changed their lead poisoning standard from 10 down to 5, we would not be having this conversation.” On protest from Walters, “Karen” said, “I am working with kids in their 40’s and 50’s. It is just a few IQ points...it is not the end of the world.”

10-JUL-2015 – MDEQ’s Brad Wurfel said, “anyone who is concerned about lead in the drinking water in Flint can relax. It does not look like there is any broad problem with the water supply freeing up lead as it goes to homes,” in an interview with Michigan Public Radio.

23-JUL-2015 – [EMAIL] Linda Dykema, Michigan Department of Community Health, sent an email with subject: “R.E.Director’s Office Assignment- Flint- need update ASAP”

27-JUL-2015 – [EMAIL] Email from [XXXX – confirm identity] asked, “[C]an you quickly run any tests to see if the difference in the first graph is statistically significant”

28-JUL-2015 – [EMAIL] Email summary includes, “This doesn’t say anything about causality, but it does warrant further investigation.”

10-AUG-2015 – [EMAIL] EPA Region 5 Chief, Ground and Drinking Water Branch Thomas Poy asked MDEQ’s Liane Shekter Smith, Richard Benzie, and Stephen Busch:

Liane: Any news on flint since our call a couple of weeks ago? Has the letter been sent to inform them that they are not optimized for lead based on their monitoring, Have they been approached about starting corrosion control sooner

rather than later?"

(Date of the referenced call not yet available as of this timeline update 15-FEB-2016, to be confirmed)

20-AUG-2015 – A Michigan Public Radio report demonstrates how MDEQ manipulated the report on Flint's water samples to meet federal guidelines for lead levels. Two dropped samples, one of which was from Lee Anne Walters' house, lowered the city below the federal action level.

24-AUG-2015 – A simple study by VA-Tech team demonstrates Flint's water's higher degree of corrosivity versus DWSD water. Flint River water has about 8 times more chloride in it than Detroit water; the increased corrosion may have resulted in numerous water main breaks.

02-SEP-2015 – [EMAIL] VA-Tech's Marc Edwards made data request to Robert Scott, MI-DCH, identical to data request in November 2006 for blood lead study in Lansing, MI. No response received. Email subject: "Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present."

06-SEP-2015 – MDEQ's Brad Wurfel refutes findings to date by Virginia Tech University's Marc Edwards. "The samples don't match the testing that we've been doing in the same kind of neighborhoods all over the city for the past year," saying MDEQ conducted two rounds of testing in the past year, and that MI-DCH also tests blood lead levels in Flint. "With these kind of numbers we would have expected to be seeing a spike somewhere else in the other lead monitoring that goes on in the community."

07-SEP-2015 – [EMAIL] VA-Tech's Marc Edwards sent reminder to Robert Scott, MI-DCH.

08-SEP-2015 – [EMAIL] 7:55 a.m. MI-DCH Robert Scott replied, "Yes, sorry for the delay; I'll get you a more complete answer later today."

08-SEP-2015 – [EMAIL] 4:19 p.m. MI-DCH Robert

Scott follow-up: "...There has been some concern about the water source change in Flint, and in fact we had a call about it today." A new data sharing agreement was requested; Scott indicated he would run it past "Legal."

10-SEP-2015 – [EMAIL] 7:57 p.m. VA-Tech's Marc Edwards asks MI-DCH's Robert Scott, "Do you need anything else from me?"

11-SEP-2015 – [EMAIL] 12:58 p.m. MI-DCH's Scott replies, "Maybe. My contact at Legal let me know the other day that he's unusually busy with other matters right now, so his review of DUAs might be delayed unless there was a specific reason for quicker action on his part. If you are in need of a reasonably quick turnaround—i.e., a week rather than a month or so—then please send me a paragraph explaining why. I'll pass that along with your DUA. If you're not in a hurry, then I'm all set for now—I'll submit your DUA as is."

11-SEP-2015 – [EMAIL] 1:03 p.m. VA-Tech's Marc Edwards replies to MI-DCH's Scott: "Yes, I think there is clearly some urgency to the situation. MDEQ has publicly stated that your blood lead records, are showing that there is no public health concern for residents in Flint. The levels of lead in Flint water, that we are finding in our water sampling, are certainly in a range that can cause childhood lead poisoning. Indeed, one child has already, likely been lead poisoned from exposure to high lead in water. I think the fact that you already have other teams working on these records, indicates a high level of interest, and urgency. Congressional interest in the safety of the water is also very high, and this will be an important issue in deciding options for treating the water, in the weeks and months ahead."

11-SEP-2015 – [EMAIL] 1:09 p.m. MI-DCH'S Robert Scott wrote to colleagues Nancy Peeler, Karen Lishinski, Wesley Priem, "The attached was submitted to me along with a request for de-identified data, which should be no problem. When you have a few minutes you might want to

take a look at it. Sounds like there might be more to this than what we learned previously. Yikes!.”

16-SEP-2015 – Virginia Tech University’s Marc Edwards and research team, in conjunction with ACLU of Michigan and Flint residents, wrap up water sample tests taken from approximately 300 homes around Flint. Lee Anne Walters’ sample is the highest, with a number of other samples approaching a level considered “hazardous waste.”

24-SEP-2015 – 2:09 p.m. Dr. Mona Hanna-Attisha, a pediatrician at Hurley Medical Center, releases research results on blood samples drawn from Flint children. The study, which compared blood samples gathered January-September 2013, to levels in samples collected from January-September 2015, showed blood lead levels elevated after the city switched to Flint River water.

24-SEP-2015 – 6:51 p.m. MI-HHSD spokesperson Angela Minicuci responded to the Hurley study results, indicating blood lead levels in Flint have remained fairly steady for children under 16 years old since the city switched from Lake Huron water to the river. “We are reviewing the results...Our data is not in line” with Dr. Hanna-Attisha’s report. (source: The Flint Journal-MLive)

30-SEP-2015 – Gov. Snyder said, “Things were not fully understood,” about the switch to Flint River water from DWSD, admitting mistakes were made.

XX-OCT-2015 – Data will show the second outbreak of Legionnaires Disease in Genesee County ends this month.

01-OCT-2015 – A Public Health Emergency is declared by Genesee County Health Department (GCHD) in response to the city’s water lead level advisory. The city launches an effort to distribute water filters to residents.

02-OCT-2015 – MDEQ director Dan Wyant said Flint

water system used corrosion controls. MDEQ spokesman Brad Wurfel said Flint used lime to correct water hardness and corrosion. Neither were accurate statements.

06-OCT-2015 – The State of Michigan distributes 20,000 water filters. GHCD and nonprofit United Way distribute another 4,000.

08-OCT-2015 – (Confirm time of day) MDEQ director Dan Wyant announced during a press conference that Flint's Eisenhower and Freeman elementary schools, and Brownell/Holmes STEM academies tested above federal limit for lead in drinking water. One of the schools tested at more than six times the federal limit.

08-OCT-2015 – (Confirm time of day and location) Gov. Snyder announces Flint's water system will switch back to DWS. The \$12 million cost will be paid by Mott Foundation (\$10 million) and Flint (\$2 million).

16-OCT-2015 – Flint's water system switches back to DWS. A full flush of the water system was expected to take three weeks.

19-OCT-2015 – MDEQ director Dan Wyant said department used the wrong federal standards for corrosion treatments over previous 17 months.

21-OCT-2015 – Gov. Snyder announces a Flint Water Task Force to review state, federal and municipal actions, offer recommendations

03-NOV-2015 – Karen Weaver elected as mayor of Flint, unseating incumbent Dayne Walling.

04-NOV-2015 – [EMAIL] MDEQ Michael Prysby, District Engineer, MI-ODWMA, emailed Brent Wright and Michael Glasgow with City of Flint, subject: "P04 Permit Oct28th.pdf":

Attached is the Act 299 permit authorizing installation of the corrosion control treatment system at the water treatment plant."

09-NOV-2015 – MDEQ released water testing data

from ~400 homes and businesses, including Freeman Elementary School. MDEQ said the tests showed the lead problems are specific to buildings or faucets and not the entire Flint water system.

10-NOV-2015 – EPA regional administrator Susan Hedman announces an audit of MDEQ's drinking water program to determine if SDWA requirements are met.

12-NOV-2015 – Documents FOIA'd by The Flint Journal show that water samples results from water samples taken from city residences were not drawn from those with highest risk of lead contamination, though certified documents filed with state regulators indicated otherwise. The samples' results may have delayed response to the city's public health emergency.

13-NOV-2015 – Flint residents filed a federal class action lawsuit against the state and city government employees, naming Gov. Rick Snyder, Daniel Wyant, Liane Shekter Smith, Adam Rosenthal, Stephen Busch, Patrick Cook, Michael Prysby, Bradley Wurfel, Darnell Earley, Gerald Ambrose, Dayne Walling, Howard Croft, Michael Glasgow and Daugherty Johnson, and the City of Flint.

16-NOV-2015 – Flint Director of Infrastructure and Development Howard Croft resigned. Croft had been in charge of Flint water system operations.

05-DEC-2015 – Mayor Karen Weaver declared a state of emergency in Flint due to the damaged water system.

28-DEC-2015 – A break-in at Flint's City Hall was discovered by a city employee. An office containing water files in the mayor's suite had been entered and a TV taken. It was not clear at the time the story was reported by The Flint Journal whether any documents were missing.

29-DEC-2015 – MDEQ director Dan Wyant and MDEQ spokesman Brad Wurfel resigned after Flint Water Advisory Task Force attributed Flint water crisis to MDEQ's handling in a letter to Gov.

Snyder. ***Is the task force's letter available to public?*

30-DEC-2015 – Gov. Snyder appoints Keith Creagh, director of Michigan Department of Natural Resources, as interim head of MDEQ.

2016

05-JAN-2016 – Gov. Snyder declared a state of emergency for the City of Flint due to the lead levels in Flint's drinking water.

05-JAN-2016 – U.S. Attorney's Office confirmed they are working with the EPA to investigate the city's water contamination.

13-JAN-2016 – Gov. Snyder, MI-HHSD Director Nick Lyon, and MI-HHSD Chief Medical Executive Eden Wells announced a spike in cases of *Legionella* bacteria were found in Genesee County. There were a total of 87 identified cases between June 2014 and November 2015, of which ten* were fatal. Wells said, "87 cases is a lot. That tells us that there is a source there that needs to be investigated." [*-Numbers in reports vary, some show 10 fatalities, others show nine. Subject to validation./Rayne]

16-JAN-2016 – FOIA's documents obtained by The Flint Journal-MLive revealed city, county and state public health officials identified Flint River water as a possible origin for *Legionella* bacteria – the cause of □Legionnaires' disease – as far back as 17-OCT-2014. The documents also showed city officials did not cooperate with county health personnel looking into contamination of Flint's water system. [NOTE; FOIA'd documents not available for public review as of 11-FEB-2016/Rayne]

22-JAN-2016 – MDEQ's Stephen Busch and Liane Shekter-Smith were suspended without pay, according to an announcement from Gov. Snyder's office.

03-FEB-2016 – MDEQ's Creagh, EPA Deputy Assistant Administrator for the Office of Water

at the U.S. Environmental Protection Agency Joel Beauvais, VA-Tech's Marc Edwards, Flint resident Lee Anne Walters testified before House Oversight Committee with regard to Flint's water crisis. EM Darnell Earley declined to appear; Rep. Jason Chaffetz promised to "hunt down" Earley to compel testimony at a future date. EPA's Miguel Del Toral also declined to appear; the committee excused him as Del Toral was working on conditions in Flint.

05-FEB-2016 – MDEQ Drinking water and Municipal Assistance unit head Liane Shekter Smith terminated from role after review of Flint water crisis.

10-FEB-2016 – The City of Flint issued a Boil Water Advisory for north side residents (north of Flushing Road). A water main break may have exposed water in the system to biological contaminants. Gov. Snyder tweets the Boil Water Advisory, using a link to ABC12-TV in Flint.

12-FEB-2016 – [EMAIL] Emails released by Gov. Snyder's office reveal warnings by MDEQ's Stephen Busch on 26-MAR-2013 about the health risks and increased expenses expected with a switch to Flint River water. However none of the emails released pre-date January 1, 2014.

MORE TO COME

SPECULATIONS AND QUESTIONS:

– Why was a 60-mile span of pipe with a new Lake Huron intake pursued, instead of 30-40 miles of pipe and connection to the City of Saginaw's water system to the north?

– Did Detroit's Emergency Manager Kevin Orr attempt to raise DWSD rates to Flint in order to force Flint off DWSD in preparation for the sale of DWSD to Oakland and Macomb Counties?

– Was DWSD used as an instrument to foreclose on Detroit/metro properties and transfer ownership (Example: Detroit Medical Society)?

*** See also double-asterisk items marked above.*

Sources:

- The Flint Journal-MLive
- Michigan Radio
- City of Flint
- FlintWaterStudy.org, a website produced by The Virginia Tech Research Team
- Metrotimes.com
- EPA.gov
- MarkMaynard.com
- Bridge Magazine
- Genesee County Drain Commissioner Water & Waste Services
- Michigan.gov, including Gov. Snyder's office (Link: Emails released 20-JAN-2016 (pdf))
- Eclectablog

THE CIRCUMSTANTIAL CASE FOR FLINT RIVER WATER AND HOT WATER TANKS LEADING TO FLINT'S LEGIONNAIRES' OUBREAK

Although the progressive community has been aware, for more than a year, of the water quality crisis in Flint that was created when the state-appointed emergency manager switched Flint from Detroit's water system to a supply from the nearby Flint River, national attention is only now starting to focus on it. Today's New

York Times features an editorial denouncing the “depraved indifference” Governor Rick Snyder’s administration showed toward Flint as the crisis unfolded.

The basics of what happened are clear. Water from the Flint River is much more corrosive than that from the Detroit water system (from Lake Huron). Even though this water leaves the Flint processing facility fairly clean and appearing to meet most standards, its corrosive nature results in the pipes in the aged Flint distribution system corroding. Both iron and lead leach into the water as a result of this corrosion, leaving the water with a reddish-orange tint and unsafe levels of lead. Children in the area have already shown elevated levels of lead in their systems. Sadly, lead damage is irreversible.

A bit of digging shows that the corrosive nature of the Flint River water comes from its high chloride content. [Note: free chloride ions (Cl^-) are distinct from intact molecular chlorine (Cl_2) and have very different chemical effects in the systems being described here. For brevity, they will be referred to as chloride and chlorine, respectively.] That high chloride content very likely results from heavy application of salt to roads during winter and subsequent runoff of the salt into tributaries and the river. The Flint River has a chloride content about eight or nine times higher than Lake Huron.

Technical documentation of the Flint water crisis is almost entirely the work of a group of researchers directed by Professor Marc Edwards of the Department of Civil and Environmental Engineering at Virginia Tech (frequently updated at their website, flintwaterstudy.org). As the Times editorial noted, the Snyder administration tried to dismiss one group of critics as “anti-everything”. That won’t work with Edwards, who won a MacArthur Foundation Fellowship (often called a Genius Grant) in 2007 for his work on water quality.

One very simple and elegant study carried out by Edwards and his team is described in this post from August 24 of last year. The team took a clean-looking sample of Flint water and put it into a glass jar along with a piece of iron. The iron is present to mimic the effect of the Flint water coming into contact with iron pipes as it flows through the distribution system into people's homes. An otherwise identical sample was prepared with water that came from the Detroit water system. After only five days, the jars looked dramatically different:

The water in the Flint jar looks just like what we have seen in countless photos of exasperated Flint residents wanting something done about the poor quality of the water coming out of their taps. Leached iron by itself could well be the cause of this discoloration that is common in Flint. We will come back to this same study in a bit.

In addition to the dire issue of unsafe lead levels in homes (and subsequently documented in children) that received Flint River water, another problem may relate to the changed water source. Writing at Huffington Post earlier this week, Erin Schumaker documented an outbreak of Legionnaires' Disease in Flint. Remarkably, in a graphic created by Alissa Scheller, we see that the outbreak coincides quite precisely with the change in water source:

How could there be a pathway connecting the water source to a Legionnaires' outbreak? After all, the original outbreak for which the disease is named was the result of *Legionella* growing in the cooling tower for the air conditioning system of a large hotel. The victims then inhaled the bacteria as aerosols that migrated into the ventilation system from the cooling tower. Note that the "cooling tower" is actually quite hot and one of *Legionella's* distinctive characteristics is its love for elevated temperatures.

There is a further problem for how *Legionella* could have been in the water system. This study

by the Edwards team showed that the standard test for bacterial contamination came up empty on Flint water. No coliform bacteria were found in Flint water collected at several sites, including from several homes.

This same study, however, found a huge warning sign. Although fecal bacterial contamination was not found, they found that many samples collected around town did not have any detectable levels of chlorine. Chlorine is needed in water systems to prevent growth of bacteria.

The August 24 study linked above went into further detail on this issue, where it was found that in the presence of iron, the corrosive nature of Flint water destroyed the chlorine that was present. This result leads to a very damning conclusion:

The high rates of iron corrosion from using Flint River water as a drinking water source are damaging the Flint distribution system. The corrosion is also causing chlorine to disappear quickly, which may make it more likely for harmful bacteria to grow in the water. Furthermore, it is possible that with the existing unlined iron pipe system in Flint, and the relatively low water demand (due to declining population, loss of GM – which used a lot of water – as a water customer, and high rates), that it will very difficult to meet Federal standards for minimum chlorine levels no matter what is done to treat the water.

So it turns out that although the Flint treatment plant treated the river water sufficiently to kill the coliform bacteria, once the water left the plant, its corrosive nature in iron pipes means that there would be no residual level of chlorine to retain antimicrobial activity. This is especially bad in an aging water system, as the residual

chlorine level would protect against low levels of bacteria introduced by failures in backflow control or small breaches in the system where surface or groundwater might be introduced into the system. In this same report, Edwards provides a link to reports of increased rates of water main leaks and breaks in Flint's aging system.

But when we move to consideration of *Legionella*, the situation gets much worse. Traditional water analysis for bacterial contamination, especially the fecal coliform test, would not reveal the presence of *Legionella*. The particularly difficult nature of culturing this bacterium led to prolonged confusion over the cause of the 1976 Philadelphia outbreak that gave the disease its name. So yes, *Legionella* likely would be eliminated just as the coliform bacteria were eliminated at the Flint treatment plant, but any *Legionella* introduced downstream could survive due to the low chlorine content. Further, *Legionella* would not be inactivated by the corrosive nature of the water. As for whether *Legionella* would be present in the region, consider that the disease Pontiac Fever (named for an outbreak in 1968) is also a *Legionella* infection that fortunately is less lethal. Pontiac is only 36 miles from Flint.

When we go to the literature on routes of *Legionella* infection, we have this from WHO (pdf):

The most common route of infection is the inhalation of aerosols containing the bacteria. Such aerosols can be generated by contaminated cooling towers, warm water showers, humidifiers and spas.

Warm water showers, huh? This gets even more interesting when we look at the temperature profile for *Legionella* survival and information on the proper setting for hot water tanks. Consider this little nugget from energy.gov:

Although some manufacturers set water heater thermostats at 140°F, most households usually only require them to be set at 120°F, which also slows mineral buildup and corrosion in your water heater and pipes. Water heated at 140°F also poses a safety hazard—scalding.

Savings resulting from turning down your water heater temperature are based on two components: reduced standby losses (heat lost from water heater into surrounding basement area); and consumption (from water demand or use in your home). Set too high, or at 140°F, your water heater can waste anywhere from \$36 to \$61 annually in standby heat losses and more than \$400 in demand losses.

If you have a dishwasher without a booster heater, it may require a water temperature within a range of 130°F to 140°F for optimum cleaning. And while there is a very slight risk of promoting legionellae bacteria when hot water tanks are maintained at 120°F, this level is still considered safe for the majority of the population. If you have a suppressed immune system or chronic respiratory disease, you may consider keeping your hot water tank at 140°F. However, this high temperature significantly increases the risk of scalding.

And there we have it. A Flint home downstream of a discontinuity in the water system that introduces a small amount of *Legionella* would be at risk since the water would be likely to have insufficient chlorine to kill the *Legionella*. Further, if the household has its hot water tank thermostat set too low, the *Legionella* could thrive in the tank and then infect an immune compromised individual who inhales aerosols of the bacteria while showering.

Update 9 pm Friday Evening

MILive is now reporting that *Legionella* was found in the water supply of a Flint hospital in 2014, after the switch in the supply:

“After the City of Flint switched to the Flint River as its water source in April of 2014, we noticed an increase in the number of Legionella cases that were coming to McLaren for treatment, as well as those being reported across the county and at other hospitals,” McLaren spokeswoman, Laurie Prochazka said. “Because of that concern, and concern over the quality of water that we were receiving from the city, we began aggressively testing our water supply. An early test result indicated the presence of a low level Legionella.”

MI'S NEW PLOT FOR WORLD DOMINATION: PIZZA

Faced with twin crises in MI and UM's athletic program, the best anyone seems to be able to come up with is ... pizza.