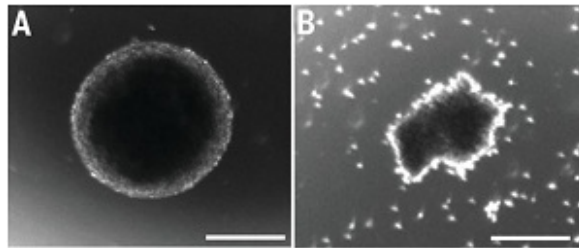


BRINGING OUT THE DEAD: WHAT WE KNOW ABOUT ZIKA VIRUS EFFECT ON HUMAN TISSUE



[(A) Control neurosphere

(B) Zika-infected neurosphere

Source: Science, 13MAY2016

<http://science.sciencemag.org/content/352/6287/816.full>]

Because unproven claims persist that chemical exposure – specifically the pyridine-based pesticide pyriproxyfen – causes the birth defects seen in children born to women exposed to Zika virus, I am bringing out the dead, laying out the bodies.

By ‘bodies’ I mean sharing here pictures of cells you see in the embedded photos from a peer-reviewed study published this May.

In these images you’ll see the damage done to human tissue in lab conditions.

No pyriproxyfen was present.

How Researchers Studied Zika

This is the methodology researchers used:

1) The researchers used human stem cells to create neurospheres – the kind of cells which turns into nerve and brain tissue in an actual embryo.

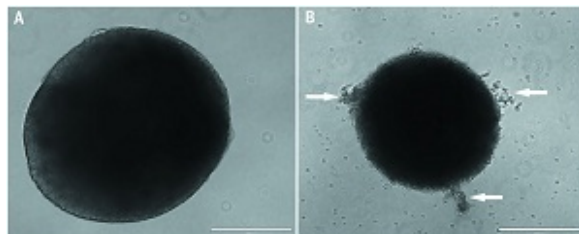
- 2) They set aside control samples of neurospheres which were not infected.
- 3) They infected test samples neurospheres with Brazilian Zika virus.
- 4) They observed the changes in the infected neurospheres.
- 5) They compared them to the uninfected control samples.
- 6) They wrote and published a report on their findings.

The image above is the best example from their report of the difference between Zika-infected cells and the uninfected test samples.

What Researchers Found in this Study

In short, Zika inhibits, damages, and kills infected neurospheres.

This is what we can expect to happen to a fetus' brain or nerve tissues when infected by Zika under the right conditions during early pregnancy.



[(A) Control mock-infected organoid
(B) Zika-infected organoid (damage noted at arrows)]

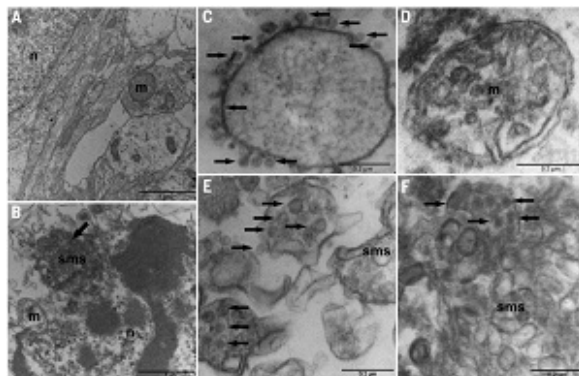
What Else Researchers Found in this Study

The researchers also conducted a very similar test on human brain organoids. These are not single neurospheres but neuro-tissue grown from stem cells so that they form a model like a tiny brain. Not a brain, a tissue-based model

of a brain.

They used the same six steps above using a mock-infected model, a Zika-infected model, and a dengue virus-infected model. (Dengue fever is caused by a flavivirus – the same family of viruses to which Zika and yellow fever belong.) Researchers found Zika virus caused similar destructive damage on these larger models while limiting their growth; they did not find the same damage or destruction in the dengue-infected models and none in the mock-infected control models. Zika alone damaged neurological tissue models.

Researchers also studied neural stem cells (NSCs) – the simplest neuro tissue model – and found similar results in which the Zika virus killed off NSCs. Studying NSCs, neurospheres, and organoids, the researchers observed Zika's actions on different stages of neuro tissue maturity. In each of these models, from the simplest (NSCs) to the most complex (organoids), Zika was destructive.



[ZIKV (Zika virus) induces death in human neurospheres. These micrographs show the ultrastructure of mock- and ZIKV-infected neurospheres after 6 days in vitro.

(A) Mock-infected neurosphere showing cell processes and organelles.

(B) ZIKV-infected neurosphere showing a pyknotic nucleus, swollen mitochondria, smooth membrane structures, and viral envelopes (arrow).

(C) Viral envelopes on the cell surface (arrows).

- (D) Swollen mitochondria.
- (E) Viral envelopes inside the endoplasmic reticulum (arrows).
- (F) Viral envelopes close to smooth membrane structures (arrows).]

Other Research on Zika Using Mouse Tissue

Three other studies published in May this year using mice or mouse tissues likewise showed evidences of neurological tissue and brain damage or growth suppression when infected by Zika virus. The studies came from research facilities in Brazil, China, and the U.S. – and in each study, *pyriproxyfen was not included*. The Zika-infected specimens showed damage and the control specimens did not.

The study from Brazil at the University of São Paulo also included research using human stem cells, comparing a Brazilian strain of Zika against an African strain:

Beltrão-Braga, Muotri, and their colleagues also grew brain organoids from human stem cells and infected these in vitro models with the Brazilian and African strains of the virus. In the human mini brains, both strains of the virus caused cell death, but the Brazilian strain appeared to also interfere with the formation of cortical layers. The virus didn't replicate in the brain organoids grown from chimpanzee stem cells, suggesting **it may have adapted to human tissue**, the researchers noted in their paper.

Emphasis mine. Research published earlier showed Zika has already mutated rapidly after arriving in Brazil, with at least nine variants found inside the last two years.

What's Next in Zika Research

What researchers don't yet know, for starters: How Zika works – how does it damage or kill cells? When exactly does the virus do the most damage? What mechanisms interfere with Zika's operations and can they be used in vaccines or drug therapy? What makes Zika different from dengue or other flavivirus? What does Zika do to adult neuro tissue to cause Guillain-Barre Syndrome? Which adults are most at risk? Will the different mutations in Brazil respond differently to vaccines? How long can humans carry live Zika virus? Has the virus mutated and become transmissible by bodily fluids or aerosol? These are just a few of the questions we still have about Zika.

There are some good guesses about Zika's mechanisms – like this hypothesis focusing on vitamin A storage in the liver, which also suggests Zika may negatively affect liver cells (yet another avenue of research needed). But will a vaccine targeting this activity work for other flavivirus, too? What if this guess is wrong; are there other approaches we've yet to hear about?

We won't have any of these answers in a reasonable period of time if we don't have adequate funding.

It's not just birth defects we are talking about here, either. Look at the damage in those images again; this virus not only damages fetal nerve and brain tissue, it kills fetuses. Infants born with Zika-related defects may be blind and may lead short, painful lives. And it may kill and maim adults, too, if they develop a serious case of Zika-related Guillain-Barre Syndrome.

Let's not bring out any more Zika dead.

(Note: Forgive me for the simplistic terms used in this post if you have a background in science. I had to make this as brief and succinct as possible for those who don't have that background.)

Source:

Zika virus impairs growth in human neurospheres and brain organoids

BY PATRICIA P. GARCEZ, ERICK CORREIA LOIOLA, RODRIGO MADEIRO DA COSTA, LUIZA M. HIGA, PABLO TRINDADE, RODRIGO DELVECCHIO, JULIANA MINARDI NASCIMENTO, RODRIGO BRINDEIRO, AMILCAR TANURI, STEVENS K. REHEN

SCIENCE13 MAY 2016 : 816-818

Zika virus infection in cell culture models damages human neural stem cells to limit growth and cause cell death.

URL:

<http://science.sciencemag.org/content/352/6287/816.full>

Zika Studies Using Mice:

F. Cugola et al., "The Brazilian Zika virus strain causes birth defects in experimental models," Nature, doi:10.1038/nature18296, 2016.

C. Li et al., "Zika virus disrupts neural progenitor development and leads to microcephaly in mice," Cell Stem Cell, doi:10.1016/j.stem.2016.04.017, 2016.

J. Miner et al., "Zika virus infection during pregnancy in mice causes placental damage and fetal demise," Cell, doi:10.1016/j.cell.2016.05.008, 2016.

WEDNESDAY MORNING: WOE, NELLY, WOE

I meant woe, not whoa. I do know the difference.

It's woe I was thinking of when I wrote this next bit.

What would you do if you were told you wouldn't be paid for last 2 months of a 9-month job?

Let's say you have kids to feed, a mortgage/car payment/college loan payments to make, childcare

to pay, out-of-pocket healthcare costs – you know, all the expenses the average working person has.

In spite of one or more obligatory college degrees, continuing education requirements and mandatory background checks, your job requires you to work in facilities where ‘mushrooms, black mold, fecal matter, dead rodents, no heat’ are common. It’s a workplace functioning like Flint’s water crisis, and it’s been this way for more than a decade. Fellow employees have had to bring in paper towels and light bulbs from home or solicit them as donations to the workplace.

Because of your employer’s money woes, you may even have made a concession agreeing to collect your pay over 3-4 months instead of the next six to eight weeks you are actually scheduled to work.

And then your employer’s employer says they aren’t going to pay, and you might have to work without pay for the next six weeks. Unpaid, as in violation of labor laws unpaid.

And your employer’s employer has a history of acting both in bad faith and with prejudice. Your workplace hasn’t improved for years; children were permanently poisoned and adults died as a result of their awful handiwork on this and other projects.

What would you do? Quietly stay at your desk working and hope for the best, or walk out in protest to demand action?

The employer’s employer accuses you of all manner of bad things, and is actively undermining your rights to organize, by the way.

Welcome to Detroit Public School system, and welcome to more of Michigan’s obnoxious and toxic GOP-led legislating. Pretty sure the jerks who are causing this latest crisis by grandstanding on teachers’ backs don’t care if the president arrives here in Michigan today.

Dude caught on video sprinkling substance on

food arrested by FBI

As if we didn't have enough to worry about in Michigan, some whackjob has been sprinkling a mixture of hand sanitizer and rodent poison on food in stores, including salad buffets. He was caught on security camera in Ann Arbor, but he is alleged to have sprinkled this mix in multiple stores in Ypsilanti, Saline, Birch Run, and Midland. The mixture is not supposed to be toxic, but who wants to eat remnants of isopropyl alcohol and an anticoagulant? What the hell was this all about anyhow?

Canadian city of 80,000 forced to evacuate overnight due to massive wildfire

Mind-boggling to think of an urban center this size forced to flee on such short notice, but Fort McMurray did just that beginning late afternoon yesterday. Even the local hospital was emptied as fire leaped from undeveloped to developed areas, consuming neighborhoods. 80% of homes in the Beacon Hill neighborhood are ash. Conditions have been unusually warm and dry in the region; the local temperature was 83F degrees before the evacuation notice was issued. Weather conditions today are expected to be hotter (32C/90F) and WSW winds stronger ahead of a cold front, likely spreading the fire even farther to the northeast.

The area around Fort McMurray has only been in moderate drought conditions, yet the fire was explosive, doubling in size in a matter of hours. Can't begin to imagine what might happen in areas where conditions are drier while this climate-enhanced super El Nino continues.

Volkswagen's former head of engine and transmission development exits company

Wolfgang Hatz, suspended by VW for his role in Dieselgate, chose voluntarily to leave the company. This bit in NYT's article is choice:

In 2007, shortly after being named head of engine and transmission development at Volkswagen, Mr. Hatz complained at an event in San Francisco that new rules on tailpipe emissions in California were

unrealistic.

"I see it as nearly impossible for us," Mr. Hatz said of a proposed regulation during the event, which was filmed by an auto website.

In other words, Hatz didn't see the purpose of the regulation, didn't perceive a challenge to design truly clean diesel – he saw an obstruction he needed to bypass. *Auf wiedersehen, Herr Hatz.*

Odds and sods

- Middle Eastern drought worst in 900 years (NASA) – Drought map of Cyprus, Israel, Jordan, Lebanon, Palestine, Syria, and Turkey looks awful, but Egypt – wow.
- Wars might be caused by lack of water (Scientific American) – I sense a theme developing...hey, guess when the Crusades were? 900 years ago.
- Study shows stocks overvalued often, too long (Phys.org) – Huh. Interleaves with economic social theory of reflexivity, that.
- Third leading cause of death in U.S.: medical errors (Science Daily) – Grok this: 250,000 deaths a year. You'd think insurance companies and policy makers would look

into this, considering annual death toll is like ten times that on 9/11. Imagine if we spend tax dollars on fixing this and improving health care instead of militarizing against the rare-to-non-existent domestic terror attack.

- Tesla's residential battery, Powerwall, now for sale (Bloomberg) – Residential solar may now explode with growth. We can only hope.

It's supposedly downhill from the top of this hump. Race you to the bottom!

TUESDAY MORNING: MONITOR

*Y me lamento por no estar alla
Y hoy te miento para estar solos tu y yo
Y la distancia le gano al amor
Solo te veo en el monitor*

– excerpt, Monitor by Volovan

Sweet little tune, easy to enjoy even if you don't speak Spanish.

Speaking of monitor...

**Flint Water Crisis: Michigan State Police
monitoring social media**

Creeptastic. MSP is following social media communications related to Flint water crisis,

which means they're watching this blog and contributors' tweets for any remarks made about Flint. Whatever did they do in the day before social media when the public was unhappy about government malfeasance?

MDEQ personnel told Flint city water employee to omit tests with high lead readings

The charges filed last week against two Michigan Department of Environmental Quality and a Flint city employee were related to the manipulation and falsification of lead level tests. From out here it looks like Mike Glasgow did what the MDEQ told him to do; with the city under the control of the state, it's not clear how Glasgow could have done anything else but do what the state ordered him to do. Which governmental body had higher authority under emergency management – the city's water department, or the MDEQ? And what happens when personnel at the MDEQ aren't on the same page about testing methodology?

MDHHS too worried about Ebola to note Legionnaire's deaths in 2014-2015?

Michigan's Department of Health and Human Services director Nick Lyons maintains a "breakdown in internal communication" kept information about the Legionnaire's disease outbreak from reaching him. He also said MDHHS was focused on Ebola because of its high mortality rate overseas. There were a total of 11 cases of Ebola in the U.S. between 2014 and 2015, none of which were diagnosed or treated in Michigan. Meanwhile, 10 people died of Legionnaire's due to exposure to contaminated Flint water in that same time frame. Not certain how MDHHS will respond to an imported biological crisis when it can't respond appropriately to a local one created by the state.

Other miscellaneous monitoring

- Charter Communications and Time Warner tie-up approved, with caveat (Reuters) – Charter can't tell content

providers like HBO they can't sell their content over the internet – that's one of a few exceptions FCC placed on the deal. I think this is just insane; the public isn't seeing cheaper broadband or cable content in spite of allowing ISPs to optimize economies of scale. Between Charter/TWC and Comcast, they'll have 70% of all broadband connections in the U.S.

- Mitsubishi Motors fudged its fuel economy numbers for last 25 years (AP) – This investigation is exactly what should happen across EU, because EU-based manufacturers have done this for just as long or longer. And the EU knows this, turns a blind eye to the tricks automakers use to inflate fuel economy ratings.
- Goldman Sachs has a brand new gig: internet-based banking (Fortune) – This is the fruit of GS' acquisition of General Electric's former financial arm. Hmm.
- BAE Systems has a nice graphic outlining the SWIFT hack via Bangladesh's central bank (BAE) – Makes it easy to explain to Grampa

how somebody carted off
nearly a billion dollars.

Toodledy-doo, Tuesday. See you tomorrow morning!

WEDNESDAY MORNING: WATER, WATER, EVERYWHERE [UPDATE]

*Day after day, day after day,
We stuck, nor breath nor motion;
As idle as a painted ship
Upon a painted ocean.*

*Water, water, every where,
And all the boards did shrink;
Water, water, every where,
Nor any drop to drink.*

– excerpt, *The Rime of the Ancient
Mariner* by Samuel Taylor Coleridge

Felony and misdemeanor charges are expected today in the Flint water crisis. State Attorney General Bill Schuette will put on a media dog-and-pony show, when it is expected that three persons – two engineers with the Michigan Department of Environmental quality and a Flint water department employee – will be charged for Flint's lead water levels after the cut-over to Flint River water.

Mind you, the descriptions of these persons do not match that of higher level persons who were responsible for

- 1) making the final decision to cut Flint off from Detroit's water system and switching to the Flint river;
- 2) evaluating work performed by consulting

firms about the viability of Flint River as a water source, or about reporting on lead levels after the cut-over;

3) ensuring the public knew on a timely basis the water was contaminated once it was already known to government officials;

4) lack of urgency in responding to a dramatic uptick in Legionnaire's disease, or the blood lead levels in children.

Just for starters. Reading the Flint water crisis timeline (and yes, it needs updating), it's obvious negligence goes all the way to the top of state government, and into the halls of Congress.

Michigan's Governor Snyder has elected to perform some weird self-flagellating mea culpa or performance art, by insisting he and his wife will drink filtered Flint city water for a month. It's a pointless gesture since the toxic lead levels, experienced during the two years immediately after the city's cut-over to the Flint River, have already fallen after doing permanent damage to roughly eight thousand children in and around Flint.

Flint's Mayor Karen Weaver said about the governor's stunt, "[H]e needs to come and stay here for 30 days and live with us and see what it's like to use bottled or filtered water when you want to cook and when you want to brush your teeth."

Or get a new mortgage, I would add. The gesture also does nothing for Flint's property values. Imagine living in Flint, trying to refinance your home to a lower interest rate, telling the bank, "Oh, but the water's safe enough for the governor!" and the bank telling you, "Nah. Too risky."

UPDATE – 10:45 AM EDT –

Charges have been filed against City of Flint's Laboratory & Water Quality Supervisor Mike Glasgow and Michigan Department of Environmental Quality Office of Drinking Water and Management Assistance district director Steven Busch and

MI-ODWMA District Engineer Michael Prysby.
Mlive.com-Flint reports,

Glasgow is accused of tampering with evidence when he allegedly changed testing results to show there was less lead in city water than there actually was. He is also charged with willful neglect of office.

Prysby and Busch are charged with misconduct in office, conspiracy to tamper with evidence, tampering with evidence, a treatment violation of the Michigan Safe Drinking Water Act and a monitoring violation of the Safe Drinking Water.

None of the individuals charged in the case have been arraigned.

Sure would like to see the evidence on Glasgow, given the email he wrote 14-APR-2014 (see the timeline).

House hearing on encryption yesterday

- Worth the time if you have it to listen to the House Energy and Commerce Oversight and Investigations Subcommittee's hearing, 'Deciphering the Debate Over Encryption: Industry and Law Enforcement Perspectives' to catch Apple's general counsel Bruce Sewell and UPenn's CIS asst. prof. Matt Blaze. Not so much for Indiana State Police Captain Charles Cohen, who was caught up in misinfo/disinfo about Apple's alleged non-

cooperation with the U.S. government. Wish there was a transcript, especially for the part where Sewell was quizzed as to whether Apple would encrypt their cloud.

- Speaking of Cohen and misinfo/disinfo, Apple said it hasn't released source code to Chinese (Reuters) – This is the spin IN's Cohen got caught up in. Nope.

Another Congressional hearing of interest: Fed Cybersecurity

In case you missed it, catch the video of today's House Oversight Subcommittee on Information Technology hearing on Federal Cybersecurity Detection, Response, and Mitigation. You may have seen Marcy's tweets on this hearing, at which Juniper Networks was a no-show, and Rep. Ted Lieu (D-CA) was kind of pissed off. Catch Bruce Schneier's post about Juniper's vulnerability.

Volkswagen has company: Mitsubishi's mileage data tweaked to cheat

The Japanese automaker may have to pay back tax rebates offered on vehicles meeting certain fuel efficiency standards. Data from mileage tests on hundreds of thousands of cars was fudged to make the cars look 5-10 percent more efficient.

Speaking of cheating: Volkswagen's use of code words masked references to emissions controls cheats

The amount of data under review along with the use of code words and phrases like "acoustic software" may delay the completion of the probe's report. Don't forget: tomorrow is the second 30-day deadline set for VW to provide a technical solution for owners of its passenger diesel vehicles.

That's enough. Michigan state AG newser underway

now as I update this again at 1:15 p.m. EDT; I may not update here since I addressed known charges above. Catch you on the other side of the hump.

TUESDAY MORNING: TRASH DAY

It's trash day in my neighborhood. Time to take the garbage to the curb. I aim for as little trash as possible, which means buying and consuming less processed/more fresh foods. I use paper/glass/ceramic/stainless steel for storage, avoiding plastics as much as possible. Every lick of plastic means oil – either the plastic has been created wholly from oil, or fossil fuels have been used in its manufacture. Can say the same about the manufacturing of paper/glass/ceramic/stainless steel, but paper can be composted/recycled/renewed, and the rest can be used for lifetimes if cared for. I use ceramic bowls that belonged to my great-grandmother, and stainless pots and bowls once belonging to my mother, and I expect to hand them down some day.

Which makes me all judgy when I'm walking through the neighborhood, side-eyeing the garbage cans at the curb. Can't believe how much waste is created every week, and how willing we are to pay tax dollars to stick it in the ground as landfill. How can Family X not bother to recycle at all? How can Family Y live on so much processed, chemical-laden garbage? It's all right there at the end of their driveway, their addiction to fossil fuel consumption spelled out in trash.

What small change can you make in your lifestyle so Judgy McJudgyPants here doesn't side-eye your trash cans?

Speaking of trash...

Piling on the wonks, Part 3: United Healthcare exiting Obamacare in Michigan

Disclosure: UHC is my health insurer, which I am fortunate enough to afford. But I couldn't stay with them if I had to go on Obamacare. UHC says it's losing too much money in Michigan to remain in the program – not certain how given the double-digit underwriting increase it posted for this past year. UHC will leave other states which may not fare as well as Michigan, and even Michigan will suffer from decreasing competition. Do tell us, though, wonks, how great Obamacare is. I'm sure I will feel better should I ever have to shop Obamacare plans for pricey coverage with a dwindling number of providers. And if you missed the previous discussions on inept Obamacare wonkery, see Part 1 by Marcy and Part 2 by Ed Walker.

Tech Tiews

- Don't let anybody say Apple isn't cooperating with law enforcement (Phys.org) – Apple has, to the tune of 30,000 times from Jul-Dec 2015 alone, according to a report released late Monday.
- BlackBerry CEO says telecom companies should 'comply with reasonable lawful access requests' to assist law enforcement (Reuters) – Nice bit of footwork from a company which passed their encryption key to Canadian law enforcement as far back as 2010.
- If you missed the 60 Minutes segment about the security

threat posted by Signalling System Number 7 protocol (SS7), you should read up. (The Guardian) – Also wouldn't hurt to look into end-to-end encryption for your communications. Wonder what role SS7 played in NSA's and GCHQ's 'treasure mapping' Germany's Telekom and other global networks, and if this explains why SS7 is still not secure?

- [Presence of drugs in car] plus [pics of cash on phone] = suspicious (Ars Technica) – Wait, isn't the presence of illegal drugs in one's car enough to make one a suspect?
- New technology for chip-embedded smart cards will speed checkout times, says VISA (Phys.org) – What the hell are we being forced to switch to so-called smart cards for if they don't actually improve checkout process already? We'll piss away any savings from increased security standing in line waiting.

Time to fetch the emptied trash can. See you tomorrow!

FRIDAY MORNING: DARK WATER JAZZ

It's Friday and that means jazz here at emptywheel. But no genre exploration today, just this lovely, evocative downtempo jazz/trip hop fusion work.

It's dark water jazz indeed this week...

Congress *oublies* the Flint water crisis

I can't find anything in C-SPAN about the House Energy and Commerce Committee hearing which was to address the crisis. Convenient for Republicans running for office right now to keep themselves at arm's length from a Republican scandal. We're lucky the hearing was captured at all; it can be found at the committee's website. (Video 3:44:08)

It must be difficult to kowtow to traditional GOP underwriters while trying to appear like you're doing a credible job of representing Americans most in need. But it's a lot easier to bury and forget the inconvenient.

The latest scuttlebutt is that the bipartisan Energy Policy Modernization Act of 2015 (S.2012) will proceed without additional funding to remedy Flint's damaged water system, still replete with lead piping. Senate Republicans led by Senator Mike Lee of Utah protested the inclusion of funding for Flint in this bill, threatening to reject it altogether.

Wait – you know who's up for reelection this season? Senator Mike Lee! Amazing coincidence! Or not. You know, Senator Lee, when your fellow senators leak about your obstruction, you should catch a clue. Sometimes actually helping Americans is more important than sucking up to your anti-tax overlords.

You know who else is up for reelection this

season? Senator Lisa Murkowski, the chair of the counterpart Senate Energy Committee and the sponsor of S.2012. You'd think she'd want to look effective as a leader and at governance.

Roughly 8,000 children will continue to live as if they are in a third world country, with a patchwork of assistance for their health and education, but no relief from the lead pipes which continue to run from the water department to their homes. Imagine them drinking water out bottles for the rest of their childhoods, their families having to take additional time and effort to lug bottles upon bottles for their daily essential needs.

Don't even suggest these families leave. They are stuck, STUCK in Flint, because their property values have been gutted by the failure of a GOP-led state administration, and the continued avoidance by a GOP-led Congress. Who wants to buy a home with lead pipes in Flint now? Which banks want to finance new mortgages to those homes? Which insurers want to write coverage on them?

Some government aid has been offered to Flint – which the ever-ineffectual Rep. Fred Upton recited like a litany during the hearing (see 0:13:30 in the video) – but none of it addresses the lead piping.

Donald Trump won the Republican primary in Flint's home county of Genessee, by the way. Can't understand why...

Cleaning off the desk

Stuff worth perusing, but I'm not going to elaborate on before I chuck it in the bin for the week.

- Microsoft suing U.S. government for gagging the software company about government requests for users' information. (Microsoft) – MSFT president

Brad Smith wrote in a blog post about the suit; note the complaint here (pdf) in which MSFT shared these details:

Between September 2014 and March 2016, Microsoft received 5,624 federal demands for customer information or data. Of those, nearly half—2,576—were accompanied by secrecy orders, forbidding Microsoft from telling the affected customers that the government was looking at their information. The vast majority of these secrecy orders related to consumer accounts and prevent Microsoft from telling affected individuals about the government's intrusion into their personal affairs; others prevent Microsoft from telling business customers that the government has searched and seized the emails of individual employees of the customer. Further, 1,752 of these secrecy orders contained no time limit, meaning that Microsoft could **forever** be barred from telling the affected customer about the government's intrusion. The government has used this tactic in this District. Since September 2014, Microsoft received 25 secrecy orders issued in this District, none of which contained any time limit. These secrecy orders prohibit Microsoft from speaking about the government's specific demands to **anyone** and forbid Microsoft from ever telling its customers whose

documents and communications
the government has obtained.
The secrecy orders thus prevent
Microsoft's customers and the
public at large from ever
learning the full extent of
government access to private,
online information

Emphasis Microsoft's. Therein the one
way to release a limited amount of
information: file suit against the
government.

- Claims after March attack that Brussels airport security was lax impels Belgium's transport minister to quit (euronews) – Bombs were detonated before security clearance area; not certain how minister could have prevented bombing except to move clearance all the way to the edge of the airport's perimeter instead of after check-in.
- UC-Davis sanitized the internet to prop its image (SacBee) – School paid \$175K to excise references to a 2011 attack on student protesters by police using teargas. Should keep in mind UC-Davis is part of the University of California, of which former Homeland Secretary Janet Napolitano is president, who authorized

spying-by-malware on UC-Berkeley.

- Hey, did you know there's a tiny sovereign country inside U.S. borders? (Atlas Obscura) – Welcome to Molossia, have a nice day! Surprised no uber-wealthy hit on this as a potential money-laundering. tax-avoidance strategy: make your own country inside the U.S.

And with that we're off, headed for a nice spring weekend ahead. Have a good one!

CDC: ZIKA VIRUS CONFIRMED AS A CAUSE OF MICROCEPHALY

CDC director Dr. Tom Frieden confirmed Wednesday that the flavivirus known as Zika is a cause of microcephaly and other severe fetal brain defects.

The confirmation is based on an evaluation of available data for potential teratogenic effects. Using both Shepard criteria and Bradford Hill criteria, researchers proved prenatal Zika virus infection has a causal relationship with microcephaly and other serious brain anomalies.

The first set of seven criteria used in the assessment were developed by Dr. Thomas Shepard to assess an agent's teratogenicity – the ability to cause birth defects. The criteria of

proof are:

1. Proven exposure to agent at critical time(s) in prenatal development
2. Consistent findings by two or more epidemiologic studies of high quality
 - a. control of confounding factors
 - b. sufficient numbers
 - c. exclusion of positive and negative bias factors
 - d. prospective studies, if possible, and
 - e. relative risk of six or more
3. Careful delineation of the clinical cases. A specific defect or syndrome, if present, is very helpful.
4. Rare environmental exposure associated with rare defect. Probably three or more cases.
5. Teratogenicity in experimental animals important but not essential.
6. The association should make biological sense.
7. Proof in an experimental system that the agent acts in an unaltered state. Important for prevention.

Note:

Items 1~3 or 1, 3, and 4 are essential criteria.

Items 5~7 are helpful but not essential.

Shepard criteria summary:

1. The microcephaly and other brain defects observed in infants and fetuses were consistent with maternal Zika infection during first and second trimester of pregnancy. Mothers exhibited

symptoms, and/or had infections confirmed by labs, and/or had traveled to areas where Zika was endemic. **This criterion was met.**

2. Data documenting the location of Zika virus infections and the subsequent incidence of microcephaly in those areas was supported by two epidemiologic studies. But as sample sizes were too small and controls were lacking, this criterion has not yet been met.

3. Cases manifesting with a very specific defect (an atypical microcephaly) or syndrome (a narrow range of neurological defects in tandem with microcephaly) **satisfied this third criterion.** With Zika infection, microcephalic cases displayed adequate bone tissue and scalp skin production, but 'collapsed' due to the disrupted development of fetal brain tissue. This is not common in other microcephalies.

4. An adequate number of cases **fulfilled the criteria** of rare exposure and rare defect – one example cited was that of a pregnant woman who traveled for a week to areas where Zika was not endemic. She tested positive for Zika during her second trimester, and the fetus displayed brain defects associated with Zika after the infection.

5. Studies for this criteria – teratogenicity in animal models – are still under way. This criterion is not yet satisfied.

6. **This criterion is met** as the causal relationship makes biologic sense.

7. This criterion does not apply to infectious agents.

The essential Shepard criteria have been met for proof of teratogenicity.

Bradford Hill criteria summary

Of the nine criterion – the strength of association, consistency, specificity, temporality, biologic gradient, plausibility, coherence, experiment (on animal models), and analogy – only two criterion are not applicable

or not available. The remaining seven criterion were met in much the same manner as the Shepard criteria 1, 3, 4 were met.

What's next

A spectrum of additional fetal abnormalities has not yet been fully identified in association with Zika infection. This will become clear once some pregnancies being monitored reach term.

We don't yet know if Zika virus affects adult neurological tissues; some cases of Guillain-Barre Syndrome (GBS) have been reported in areas where Zika is endemic. GBS has occurred in patients after viral infections where neurological tissues have been affected; it would make biologic sense for there to be a causal relationship between Zika and GBS. However, GBS has occurred in patients long after an initial infection, making it difficult to see obvious relationships without further screening and testing.

A Zika vaccine may be some time off; of the flavivirus family, only yellow fever and a couple of encephalitis viruses have vaccines while others like West Nile and dengue do not.

Mosquito control varies widely from state to state, let alone by county or municipality. We do not know if it is adequate to ensure Zika's spread via *Aedes aegypti* and *Aedes albopictus* mosquito species is limited. U.S. experience with the spread of West Nile Virus may be informative.

Funding for additional research, education, training, vaccine development and mosquito control, as well as funding increases for birth control are much needed, But the GOP-led Congress will likely avoid this issue during the remaining days it is in session this election year.

In the meantime, if you're around mosquitoes in warmer areas of the U.S., are pregnant, plan to be pregnant, or might get someone pregnant, check the CDC's guidelines on Zika.

#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?

EL NINO SCALIA

Antonin Scalia is dead. Say what you will, there is no rejoicing from me. Was Nino a malefactor in Supreme Court jurisprudence over the decades since his confirmation on September 26, 1986?

Yes, and an irascible one as well. Once Bork got Borked, Scalia was the whipping post for all liberals, on the continuity of the spectrum. Did he earn that status? Yes, and maybe then some.

The hagiography of Nino is already quite well underway. I was out shopping for garden/landscaping things and had no idea until called by Marcy. It still took me a while to get back and dive into this. There are a million takes already underway on the net and in the press, such as the press may be these days. If you want a recap of the same old, this ain't it. And, for now, what I have to say is not all that long or extricated.

First off, let's talk about Scalia the man and Justice. As said above, once Bork got Borked, there was going to be a piñata for liberals (like me) to pound on. And, over the years, boy have I, and we, done just that. And for, mostly, good reason.

But anybody can blabber about what a prick Nino was. Fairly. But, in the current context, I want to do something different. As loathsome as Scalia often was, he was still somewhat of a hero to people that practice actual criminal law. No, not across the board, but enough that it ought be mentioned and left as a part of his legacy.

Why? Okay, this is a quick take:

Fourth Amendment: There is actually a long thread of Scalia decency on Fourth Amendment issues over the years. I have had occasion to quote him from both majority and dissents frequently. But, most recently, you can probably relate most easily to *United States v. Jones*, *Riley v. California* and, significantly, *Kyllo v. United States*. Now Scalia only penned *Jones* and *Kyllo*, but his fingerprints were all over *Riley* too. This is just my opinion, but I am not sure that a lesser conservative justice on the court would have seen these decisions through, and allowed them to be as consensus as they were.

One law professor, Tim MacDonnell, put it this

way:

Since joining the United States Supreme Court in 1986, Justice Scalia has been a prominent voice on the Fourth Amendment, having written twenty majority opinions, twelve concurrences, and six dissents on the topic. Under his pen, the Court has altered its test for determining when the Fourth Amendment should apply; provided a vision to address technology's encroachment on privacy; and articulated the standard for determining whether government officials are entitled to qualified immunity in civil suits involving alleged Fourth Amendment violations. In most of Justice Scalia's opinions, he has championed an originalist/textualist theory of constitutional interpretation. Based on that theory, he has advocated that the text and context of the Fourth Amendment should govern how the Court interprets most questions of search and seizure law. His Fourth Amendment opinions have also included an emphasis on clear, bright-line rules that can be applied broadly to Fourth Amendment questions. However, there are Fourth Amendment opinions in which Justice Scalia has strayed from his originalist/textualist commitments, particularly in the areas of the special needs doctrine and qualified immunity.

I do not agree with everything in MacDonnell's article, but it is quite good and his dubious context is spot on. Scalia has been more than prominent in Fourth Amendment jurisprudence since his time on the court. I have serious issues with many of the "exceptions" he has bought off on in the name of police expediency, but I can, and do, imagine a different justice being far, far, worse on the Fourth (can you say "Alito"? Of course you can). So, there is that. But, by the same token, I remember coming out of

court and getting informed of the *Kyllo* decision. Several drinks were hoisted to Scalia that afternoon and night.

Then, there is the Sixth Amendment. This is an area on which Scalia gets scant attention and credit for. And, yes, if you practice criminal law, it is one of critical importance, whether pundits or the press realize it or not. Because if you happen to actually do criminal jury trials (or bench for that matter), you know the critical importance of being able to confront and cross-examine the witnesses and evidence against your client, the defendant. I have cited Scalia's words, both successfully and unsuccessfully, for a very long time on confrontation issues. But the successes I, and clients, have had owe in large part due to Scalia. Here is a bit from David Savage, of the LA Times, from 2011 that summarizes Scalia's Confrontation Clause championing about perfectly:

The 6th Amendment to the Constitution says the "accused shall enjoy the right ... to be confronted with the witnesses against him." To Scalia, this clause not only gives defendants the right to challenge actual witnesses, but also the right to bar testimony from all those "witnesses" who did not or cannot testify in court. He takes this view even if the witness is dead.

Three years ago, Scalia led the court in reversing the murder conviction of a Los Angeles man who shot and killed his girlfriend. A police officer testified the victim had reported that Dwayne Giles threatened to kill her. Scalia said that testimony violated Giles' rights because he could not confront or cross-examine her.

"We decline to approve an exception to the Confrontation Clause unheard of at the time of the founding," Scalia said for 6-3 majority. This went too far for

liberal Justices John Paul Stevens and Stephen G. Breyer.

Two years ago, Scalia spoke for a 5-4 majority reversing the conviction of an alleged cocaine dealer from Massachusetts because prosecutors did not bring to court a lab analyst whose test confirmed the bags of white powder were indeed cocaine. The dissenters, including Chief Justice John G. Roberts Jr. and Justices Anthony M. Kennedy and Samuel A. Alito Jr., said a lab technician who conducts a test is not a "witness" in the ordinary sense of the term.

In June, the court went one step further. The Scalia bloc, by a 5-4 vote, overturned the drunken-driving conviction of a New Mexico man because the lab analyst who testified about his blood alcohol did not actually work on the defendant's blood sample. He put together an odd-couple coalition with Justices Clarence Thomas, Ruth Bader Ginsburg, Sonia Sotomayor and Elena Kagan.

"This is not a left-right split. This is principle versus pragmatism," said University of Michigan law professor Richard Friedman.

Frankly, Scalia has only reinforced that since late 2011 when Savage wrote said words. If you practice in a criminal trial courtroom, you owe a debt of gratitude to Antonin Scalia for your ability to still confront and cross-examine witnesses and evidence. I don't think it is hyperbole to say that, without Scalia, this fundamental procedural right would be totally shit right now.

So, this is but a nutshell of the greater whole, and I am still trying to catch up. But those are my thoughts for now. Do not get me wrong,

Antonin Scalia was never, nor will ever be, my favorite, nor even an overall positive Supreme Court Justice in my eyes. There is too much malignancy and caustic history from Scalia, on far too many fronts, for that to ever be the case. But the man is not yet even in the ground, and there were a couple of important positive things to say before the ultimate obituary is written.

And, on one other note, let's keep in mind that the warm and fuzzy stories of Scalia with Ruth Bader Ginsburg, from court interaction, to opera to shooting at animal trips is not the only history of Nino Scalia and women on the Supreme Court. He was, certainly less famously, in some instances, a frat boy jerk to Sandra Day O'Connor. So, take the lionization of the Kagan relationship with a healthy grain of salt.

Antonin "Nino" Scalia was a flawed, but important man. He is now gone. So, the biggest issue is, what happens now? Republican leadership did not have to announce that they will stall their asses off and try to prevent the confirmation of ANY nominee that Obama would put up. Frankly, that went without saying in today's Congress.

But, can they do that, will there be no Obama SCOTUS nominee confirmed, no matter what? I would not be shocked if that were not so. By the same token, the longest a confirmation battle has ever taken to confirm a SCOTUS Justice is 125 days (Obama has 361 left).

Obama has already said he will make a nomination, and I believe he will. If I had to bet right now, my bet is that the nominee is Sri Srinivasan. I have long thought this, and Sri, while being a decent guy, is a dead nuts centrist, barely a "liberal" at all kind schlub that Obama loves. But I doubt the crazed GOP led Senate would confirm even a milquetoast centrist like Srinivasan. Let other speculation begin now even though the chances of confirmation of any nominee are close to nil.

Irrespective, the primary, and certainly the general, elections just got FAR more interesting. Frankly, this is the only part of the election I was really worried about from the get go. Now it is squarely on everyone's plate.

[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 DWSD 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 DWSD, 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 Oconfirm 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 DWSD.

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 DWSD. 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 DWSD. 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

Prysbys, 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