

NORTH TEXAS MUNICIPAL WATER – IS IT REALLY SAFE?

--- or ---

is Erin Brockovich wrong?





Dallas and Fort Worth withdraw their drinking water from the Trinity River.

Raw water contains sediment, minerals, ions, and illness-causing pathogens such as Giardia, Cryptosporidium, bacteria and viruses that must be treated before drinking.

As early as 2000 B.C., Greece was purifying drinking water.

- Treatment consisted of sediment removal (settling ponds) and filtration (porous stone or fabric bags).
- They knew nothing of pathogens or disinfection.

The basics of treatment haven't changed – we still remove sediment through settling basins and filtration.

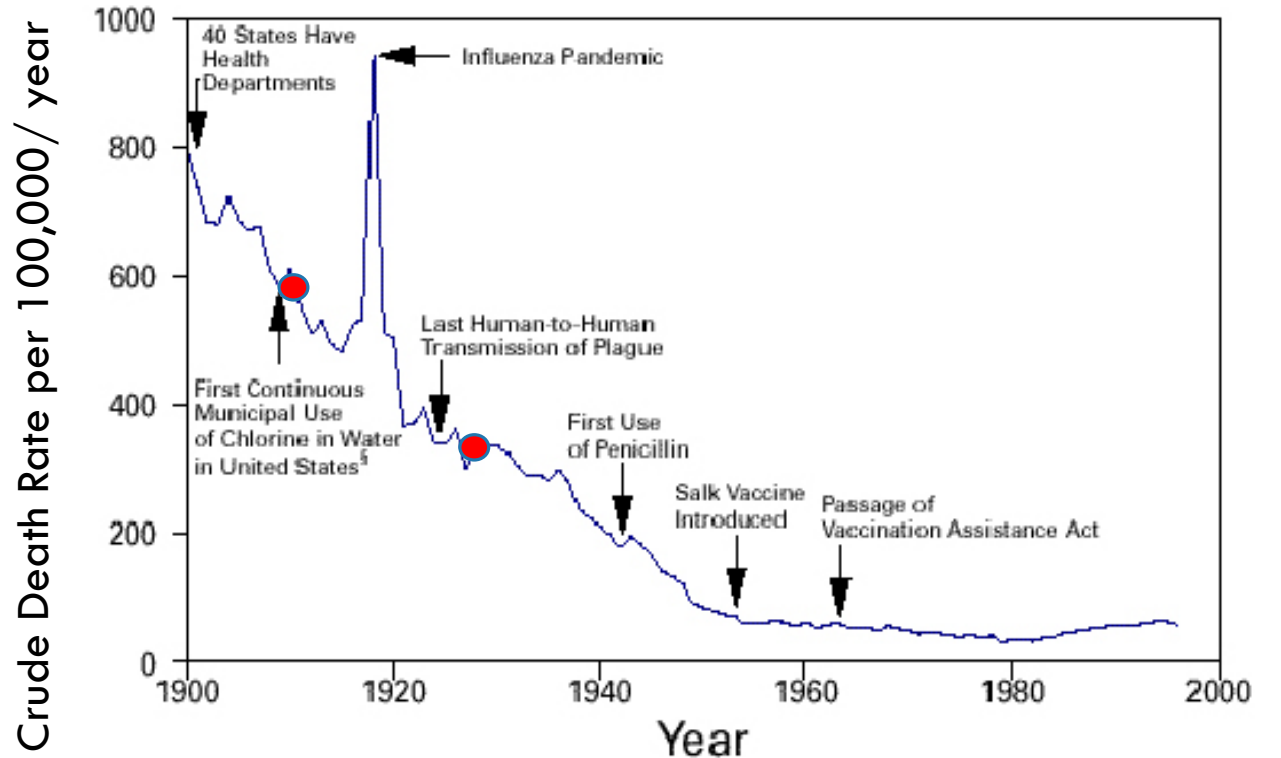


Disinfection has been called the greatest health advancement of the 20th century.

1908 - Jersey City, NJ is first US city to begin routine disinfection of drinking water.

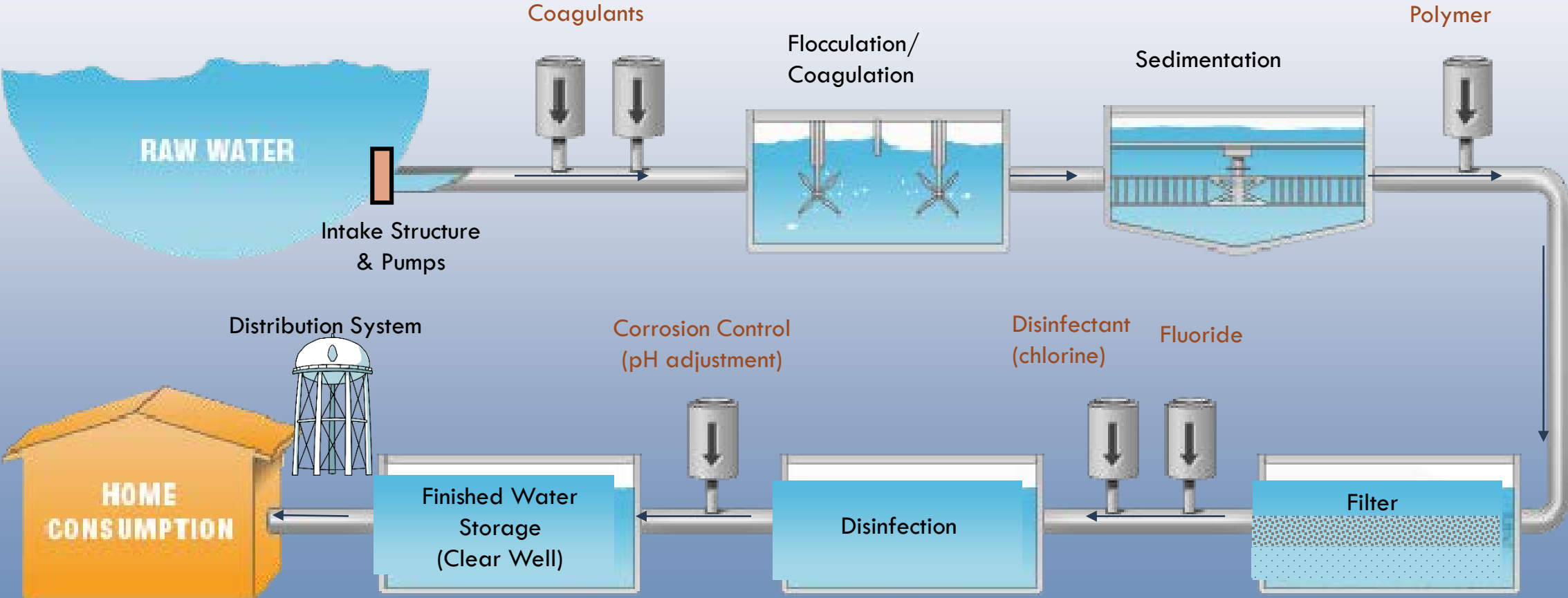
US death rate dropped from ~600 to ~370 in 20 years. (38%)

Today's water treatment plants are uniquely designed for each location based on the quality of the raw water to be treated.



<https://www.cdc.gov/healthywater/drinking/history.html>

BASIC WATER TREATMENT PROCESS





RESIDUAL DISINFECTION

Treated and disinfected water flows through distribution piping to your business or your home.

Microbes can hide in distribution lines.

To ensure that no re-infection of the water occurs, public water supplies must add more disinfectant to the water.

They must add enough to ensure that the disinfectant is present at the point of consumption.

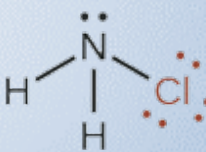
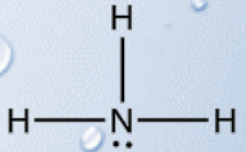
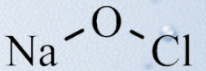
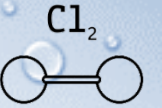
DISINFECTION TECHNIQUES

1. Chlorine (Cl₂) - typically injected as chlorine gas

- **Bleach (NaOCl)** (sodium hypochlorite,) - most commonly used for small treatment systems and groundwater.

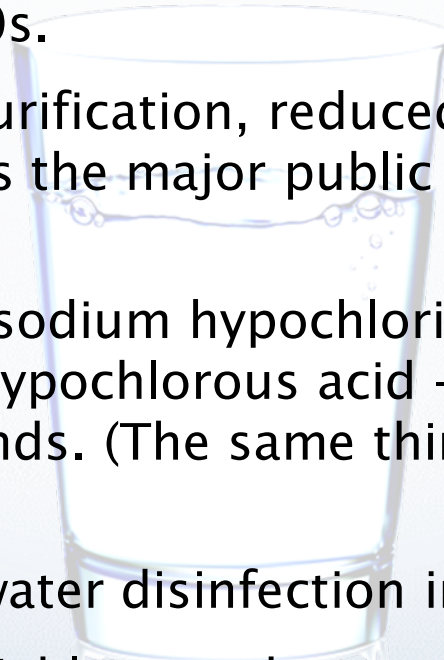
2. Ammonia (NH₃) - never used alone, mixed with chlorine to form chloramines.

3. Chloramines (NH₂Cl) - produced by adding aqueous ammonia to water containing free chlorine (HOCl or OCl). Optimum pH of 8.4 and optimum chlorine/ ammonia of 6:1.



CHLORINE (AND BLEACH)

- Discovered in 1774
- First known use of chlorine for disinfection was 1850 (John Snow, London cholera epidemic).
- Not widely used until early 1900s.
- Chlorine revolutionized water purification, reduced the incidence of waterborne diseases, and has been hailed as the major public health achievement of the 20th century.”
- Gaseous chlorine (Cl_2) or liquid sodium hypochlorite (bleach, NaOCl) is added to, and reacts with, water to form hypochlorous acid – a strong oxidizing agent that reacts with a variety of compounds. (The same thing can happen with bromine, forming hypobromous acid.)
- Most widely used chemical for water disinfection in the United States.
- Class D carcinogen - (not classifiable as to human carcinogenicity), based on a 1990 National Toxicology Program (NTP) study.
- Also a pesticide in food and agriculture.

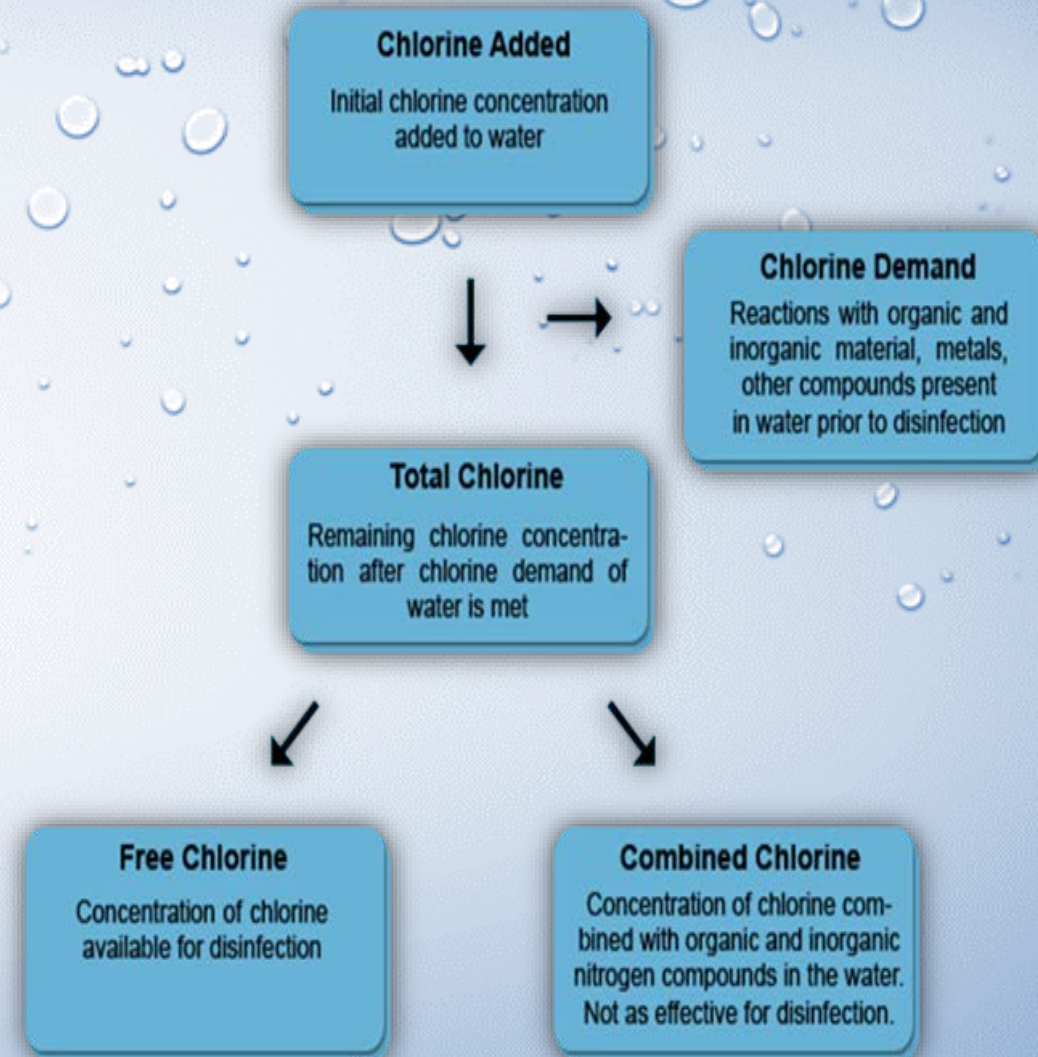


CHLORINE

When chlorine is added to water:

1. Chlorine Demand: Cl_2 reacts with organics, inorganics, and metals in the water and is not available for disinfection.
2. Total Chlorine: the remaining chlorine after Cl demand is met, divided into:
 - a) Combined chlorine - amount that has reacted with inorganic (nitrates, etc.) and organic nitrogen-containing molecules (urea, etc.) to make weak disinfectants that are unavailable for disinfection and,
 - b) Free chlorine - the chlorine that is left over and is available to inactivate disease-causing organisms.

Free chlorine = Total chlorine - Combined chlorine



CAN YOU USE POOL TEST KITS FOR DRINKING WATER?



POOL TEST KITS – VISUAL MATCH

YELLOW

- Most common are the color change kits that use orthotolidine (OTO) that turns yellow in the presence of total chlorine. This method does NOT measure free chlorine.

Problems:

- OTO degrades with time and causes inaccurate readings
- Does NOT provide quantitative results
- Lack of calibration and standardization



PINK

- Uses DPD (N,N diethyl-p-phenylene diamine (DPD in powder or tablet) that turns pink in the presence of chlorine. Can measure free chlorine and/or total chlorine (using different chemicals) with a range of 0 – 3.5 mg/L.

Problems

- Potential for user error
- Lack of calibration and standardization

AMMONIA (NH₃)

- Ammonia - colorless gas, naturally occurring, highly soluble in water.
- Also found in industrial process wastes and sanitary wastewater.
- Aqueous ammonia (NH₄⁺) is the dominant form found in water until pH increases to 9.3, then NH₃ predominates.
- While not registered by EPA as a disinfectant, ammonium hydroxide (NH₄OH) is caustic. Its “disinfection” properties are really just a result of the pH change (10.6 – 11.6).
- Ammonia has been used in municipal treatment systems for more than 70 years to prolong the effectiveness of disinfection chlorine added to drinking water. The addition of ammonia enhances the formation of chloramines, and it reduces the formation of chlorination by-products which may be carcinogenic.

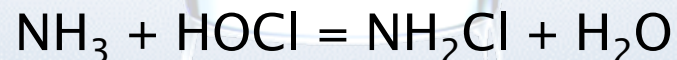
CHLORAMINES

Three different inorganic chloramines can form, depending on pH:

Inorganic chloramines

- Are not persistent, with half lives of 1 minute to 23 days.
- Are more persistent than free chlorine.
- Form more di- and tri- chloramines if ammonia concentrations are high.

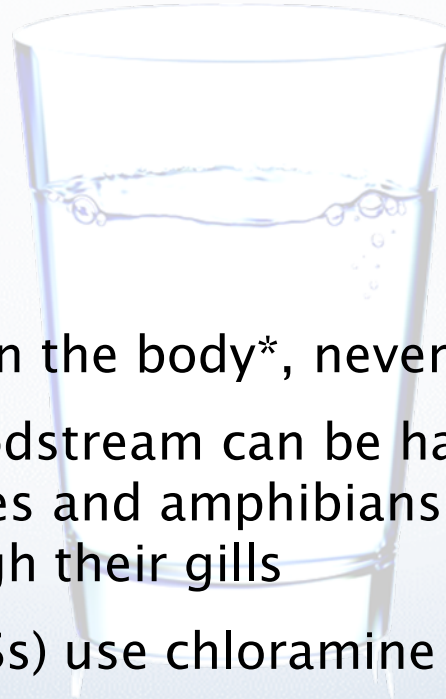
The addition of anhydrous or aqueous ammonia (NH₃) before or after the addition of chlorine (HOCl) produces monochloramine (NH₂Cl).



Organic chloramines may also form, but are not very effective at disinfection.

CHLORAMINES

- Chloramines have been used by water utilities since the 1930s. More than one in five Americans uses drinking water treated with chloramines.
- Water that contains chloramines and meets EPA regulatory standards is safe to use for:
 - Drinking
 - Cooking
 - Bathing
 - Other household uses
- Chloramines are metabolized in the body*, never reaching the bloodstream.
- Chloramines that reach the bloodstream can be harmful, especially to immunocompromised, and fishes and amphibians who can directly take up chloramines in the blood through their gills
- Many public water systems (PWSs) use chloramine as their secondary disinfectant.



*People with weakened immune systems (children, elderly people, people with HIV or chemo therapy) should be cautious using chloramine-disinfected water.

CHLORAMINES

Formation

Based on pH

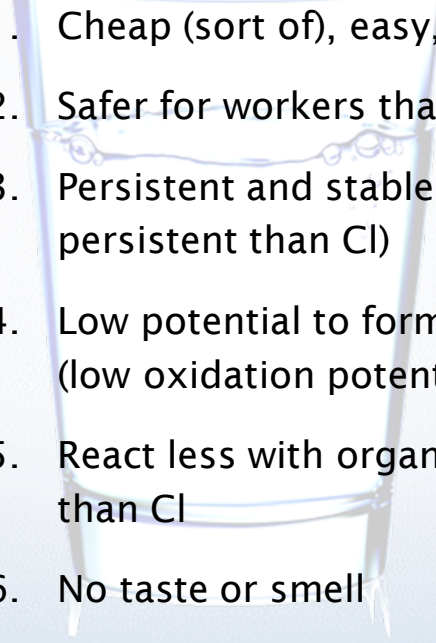
1. Monochloramine (NH_2Cl) - $\text{pH} > 7$
2. Dichloramine (NH_2Cl_2) - $\text{pH} 4-7$
3. Trichloramine (NCl_3) - $\text{pH} \leq 3$

Use

Not a primary disinfectant

Used to maintain residual disinfection in distribution because of its stability

Pros

- 
1. Cheap (sort of), easy, effective
 2. Safer for workers than Cl
 3. Persistent and stable (more persistent than Cl)
 4. Low potential to form THMs (low oxidation potential)
 5. React less with organic matter than Cl
 6. No taste or smell
 7. Doesn't affect pH

Cons

1. Weak disinfectant
2. Must prevent the vaporization of ammonia
3. Ammonia can become a nutrient source
4. Longer contact time than Cl to eliminate cysts and viruses
5. Requires granular active carbon or acetic acid to remove (doesn't dissipate like Cl)

RESIDUAL DISINFECTION IN DISTRIBUTION

Minimum added at treatment plant:

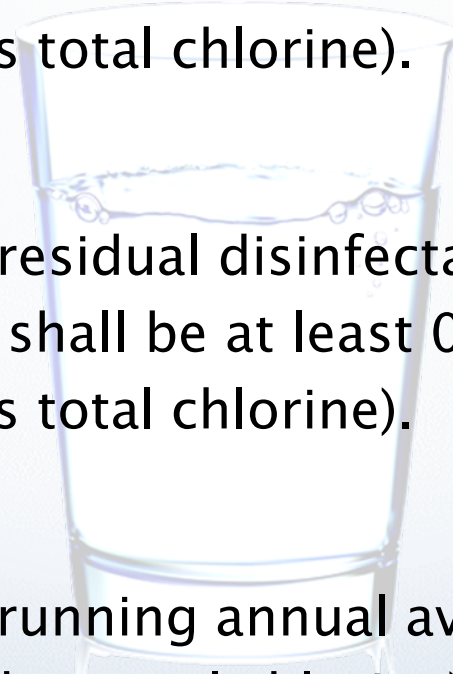
- 30TAC §290.110 (b) (2) - The residual disinfectant concentration in the water entering the distribution system shall be at least 0.2 mg/L free chlorine or 0.5 mg/L chloramine (measured as total chlorine).

Minimum required at the tap

- 30TAC §290.110 (b) (4) - The residual disinfectant concentration in the water within the distribution system shall be at least 0.2 mg/L free chlorine or 0.5 mg/L chloramine (measured as total chlorine).

Upper Limit or Maximum

- 30TAC §290.110 (b) (5) - The running annual average of the free chlorine or chloramine residual (measured as total chlorine) of the water within the distribution system shall not exceed an MRDL of 4.0 mg/L.

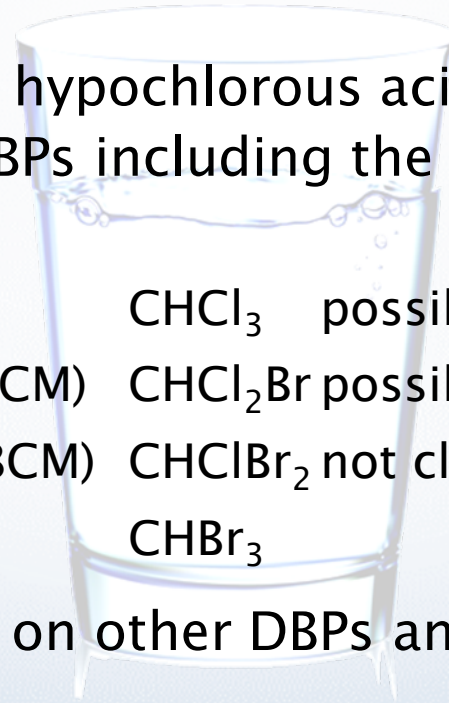


DISINFECTION BY-PRODUCTS

DBPs

DISINFECTION BY-PRODUCTS

- Disinfection byproducts are chemical, organic and inorganic substances that can form during a reaction of a disinfectant with naturally present organic matter in the water.
- In 1974, Rook discovered that hypochlorous acid and hypobromous acid react with organic matter to form DBPs including the four primary trihalomethanes (THMs):
 1. Chloroform CHCl_3 possible human carcinogen
 2. Bromodichloromethane (BDCM) CHCl_2Br possible human carcinogen
 3. Dibromochloromethane (DBCM) CHClBr_2 not classifiable as human carcinogen
 4. Bromoform CHBr_3
- That discovery led to research on other DBPs and their health effects.
- More than 600 DBPs have been identified. The concentration of THMs and Halo-Acetic Acids (HAAs) can be used as indicators for all potentially harmful DBPs.

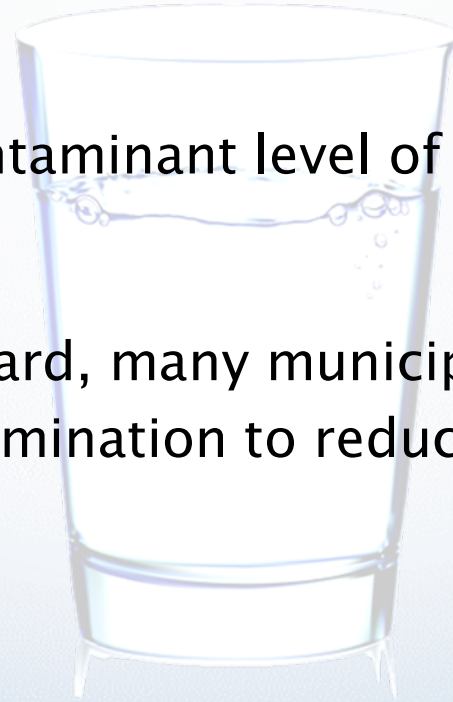


DISINFECTION BY-PRODUCTS

Aqueous chlorine (HOCl) reacts with certain organic materials (TOC) present in water to form trihalomethanes (THMs), a disinfection by product that can be harmful.

EPA established a maximum contaminant level of 0.08 mg/L for THMs.

To conform with the THM standard, many municipal water supplies have switched from aqueous chlorine to chloramination to reduce the formation of DBPs.



DISINFECTION BY-PRODUCTS

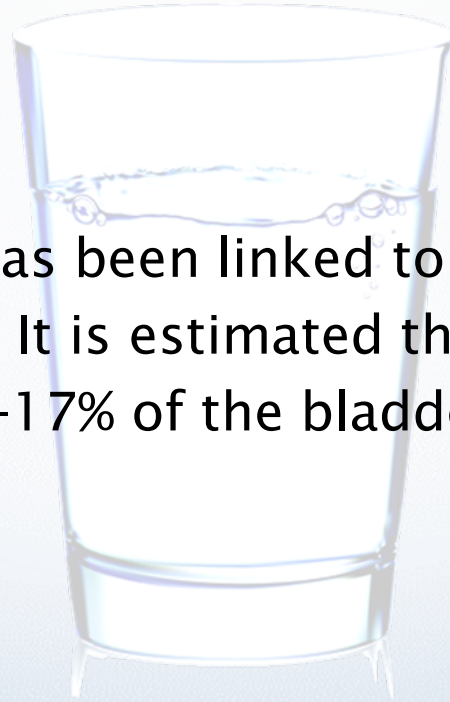
- EPA established the disinfectant/disinfection by-products (D/DBP) rule. Note that EPA does not regulate THMs or HAAs individually – there is only a standard for total THMs and total HAAs.

Table 3: D/DBP Rule Implementation

| Stage | TTHM Standard | HAA Standard |
|---------|---------------|--------------|
| Initial | 100 µg/L | |
| Stage 1 | 80 µg/L | 60 µg/L |
| Stage 2 | 80 µg/L | 60 µg/L |

EXPOSURE TO DBPS

- Humans are exposed to DBPs through drinking (ingestion), dermal (washing) and inhalation (vapors in a hot shower). Dermal absorption in the shower accounts for more exposure to THMs than ingestion.

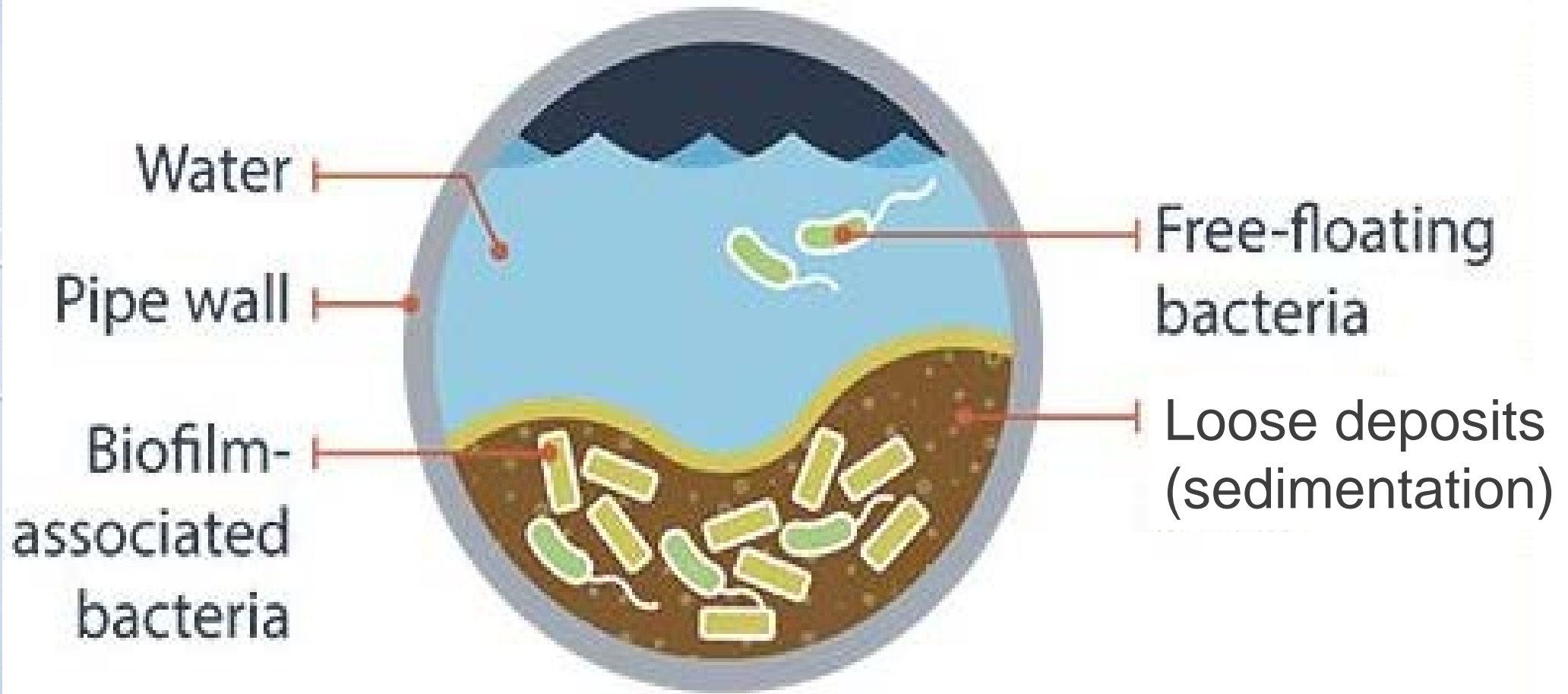


- Long-term exposure to DBPs has been linked to an increased risk of cancer and infant birth delivery problems. It is estimated that THMs in drinking water are responsible for as many as 2%-17% of the bladder cancers diagnosed each year in the US.

SYSTEM MAINTENANCE

- **Flushing** - water in a distribution system ages, meaning that residual disinfection can be consumed. This in turn can lead to biofilm buildup and potential re-infection of the water from microbes in the distribution system.
- **Biofilms** - form when free floating organisms attach to pipe walls via Van Der Waals forces. If not immediately displaced, they can anchor more permanently by building structures.
- **Chlorine “burn”** - systems that use chloramines to prevent high levels of DBPs may periodically need to use chlorine instead of chloramines in the distribution lines. This will inactivate the bacteria that can form biofilms and may also reduce nitrate/nitrite levels in the distribution system.
- NTMWD has performed routine chlorine maintenance since 2007, shortly after the more stringent DBP rules were enacted.





Water

Pipe wall

Biofilm-associated
bacteria

Free-floating
bacteria

Loose deposits
(sedimentation)

Cross section of pipe

DRINKING WATER TESTING

- EPA and TCEQ mandate numerous daily, weekly and monthly tests for drinking water systems under the Safe Drinking Water Act (1962).
- NTMWD collects and analyzes approximate 685 samples per day or >250,000 samples per year to ensure compliance with TCEQ and EPA requirements.
- Of these 685 daily samples, 40 per day are dedicate to disinfection residual testing.



SDWA – SAFE DRINKING WATER ACT

1. **Public water supply standards 40 CFR 141.** (1962/1990 mod) Applies to public water systems (min 15 service connections or serve min 25 people for min 60 days a year).

2. Primary Standards for

- Microorganisms
- Organic chemicals
- Disinfection Byproducts
- Inorganic Chemicals
- Disinfectants
- Radionuclides

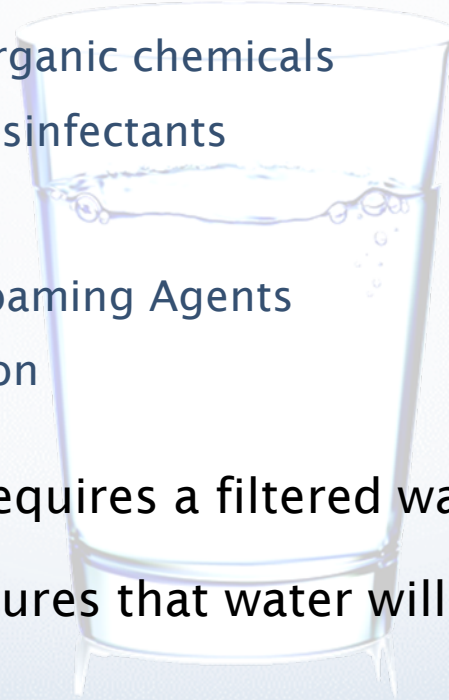
3. Secondary Standards

- Corrosivity
- Foaming Agents
- Total dissolved solids
- Color
- Iron
- pH

4. **Surface Treatment Rule** – requires a filtered water supply.

5. **Lead and Copper Rule** – assures that water will not leach Pb and Cu from piping due to corrosivity.

6. **Disinfection By-products Rule** – stipulates MCL for DBPs.





THE FACEBOOK CONTROVERSY

All verbiage is taken
verbatim from Facebook.

I have not edited the posts
in any way,
including the typos and
grammar.



Disclaimer

Erin Brockovich

Consumer Advocate

19 years and still fighting

Erin Brockovich ✓
@ErinBrockovichOfficial

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Brain-damaging lead found in tap water in



Water contamination big issue in Michigan race

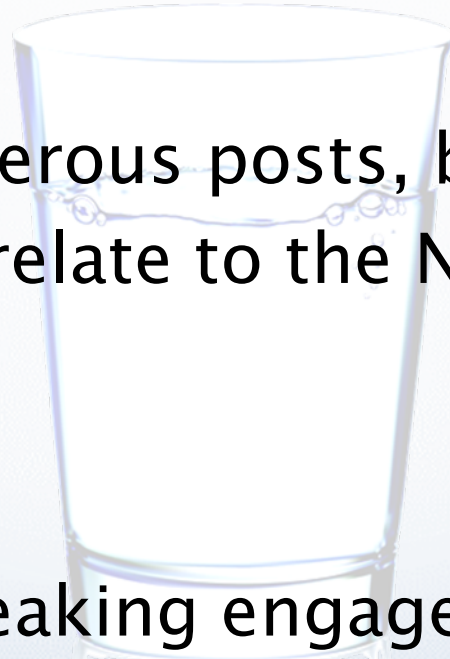
DETROIT (PAI)—Almost four years after lead-contaminated and water first started flowing into residents' pipes and into their home

PEOPLESWORLD.ORG



FACEBOOK CONTROVERSY

- Erin Brockovich started a controversy on her facebook page on March 14, 2018 regarding water quality in north Texas.
- Her page contains numerous posts, but I would like to dissect six of them today that relate to the North Texas Municipal Water District.
- Note that she had a speaking engagement in Dallas on April 5, 2018 and needed to fill seats?





#1

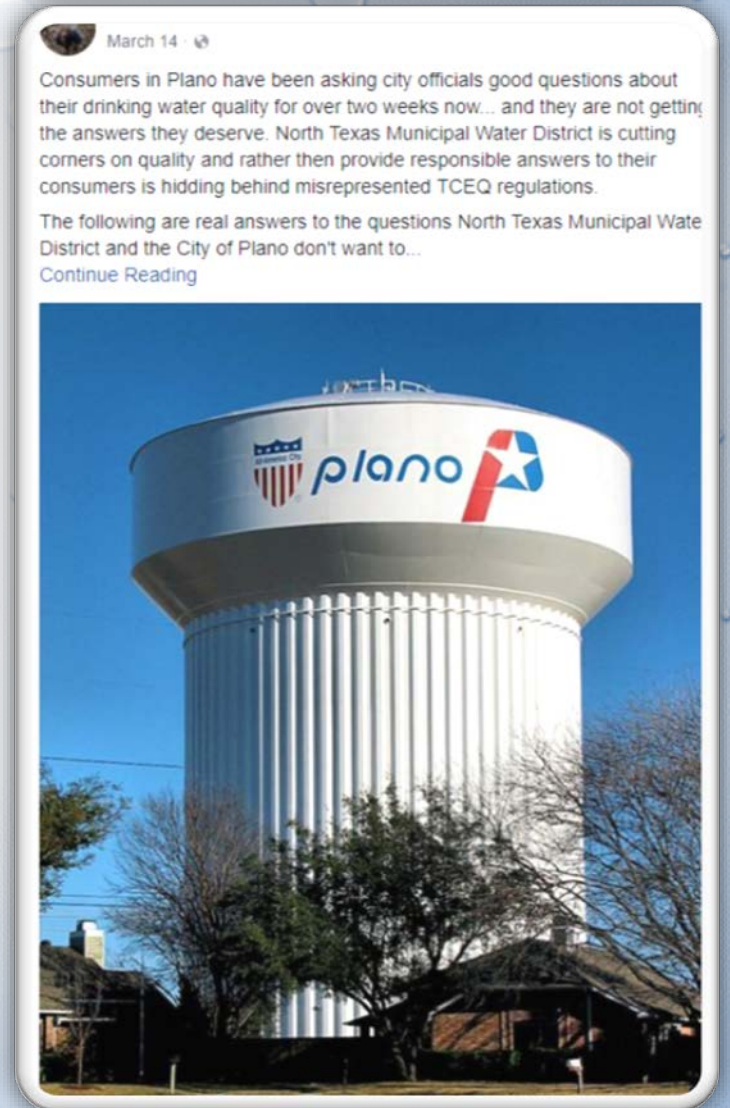
This post is long and complicated, so I'm going to show it, then condense the issues down to 1 slide.



#1 MARCH 14, 2018 @ 8:21AM

Consumers in Plano have been asking city officials good questions about their drinking water quality for over two weeks now... And they are not getting the answers they deserve. North Texas Municipal Water District is cutting corners on quality and rather than provide responsible answers to their consumers is hiding behind misrepresented TCEQ regulations.

The following are real answers to the questions North Texas Municipal Water District and the city of Plano don't want to tell you. Let me be perfectly clear... If a community water system is forced to conduct a chlorine burn because they are experiencing nitrification... It is because they have failed... It is not a "maintenance procedure" permitted by TCEQ... It is a remedial action to correct a serious problem they themselves have created because they are cheating on the regulations.

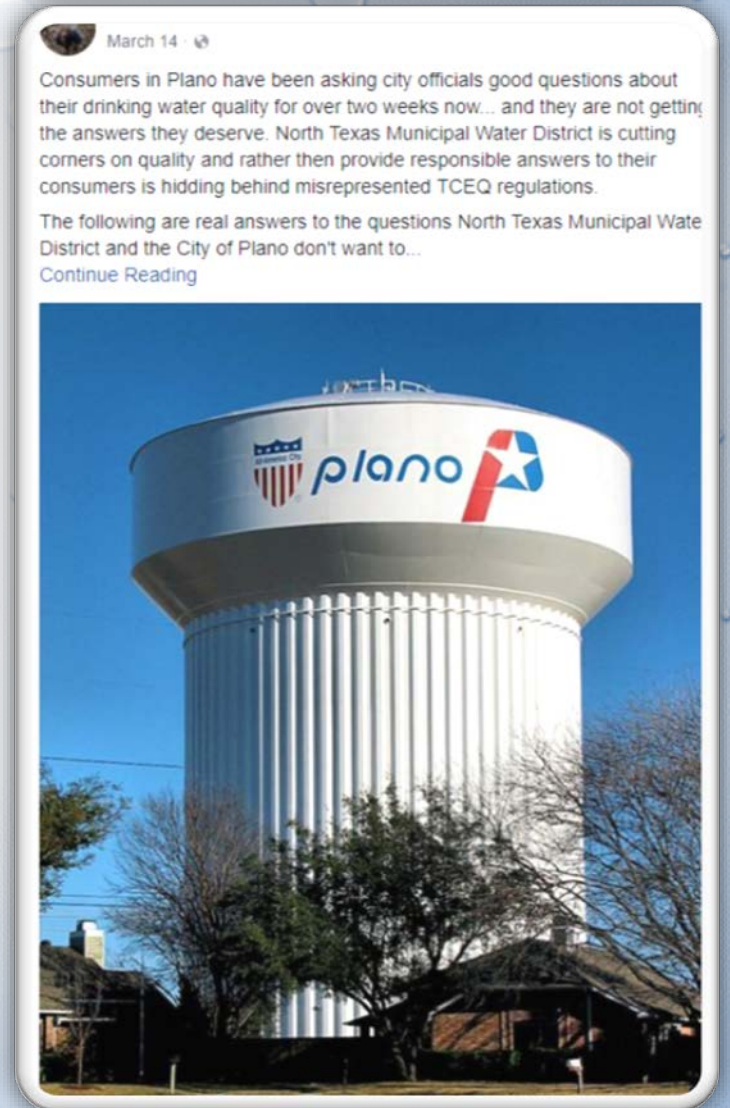




#1 MARCH 14, 2018 @ 8:21AM

What did North Texas Municipal Water District chose to do instead... Add ammonia to chlorine to form chloramine. Good people of North Texas... This is a **cheap dirty trick** and a really bad idea. It does not reduce the DIRT in the drinking water... It masks or covers up the ability for chlorine to react with the remaining dirt and form "regulated" disinfection byproducts. Sadly... They only care about "regulated" toxins. Chloramine actually forms toxins 1,000 time more dangerous... They are just not yet "regulated". They know this and frankly just don't care.

So... The ammonia (which is nitrogen) is pumped into your drinking water... It is not "safe"... It is a weaker disinfectant... Which allows (actually feeds) bacteria and biofilms in the pipes, plumbing systems and appliances. This biofilm exhausts the chlorine freeing up the ammonia (nitrification) which is like candy to bacteria and your system begins to fail. After this failure... The free chlorine burnout becomes necessary. Again... It is not "safe" it is toxic and dangerous. Just where do you think the broken down biofilm ends up? Yuck!

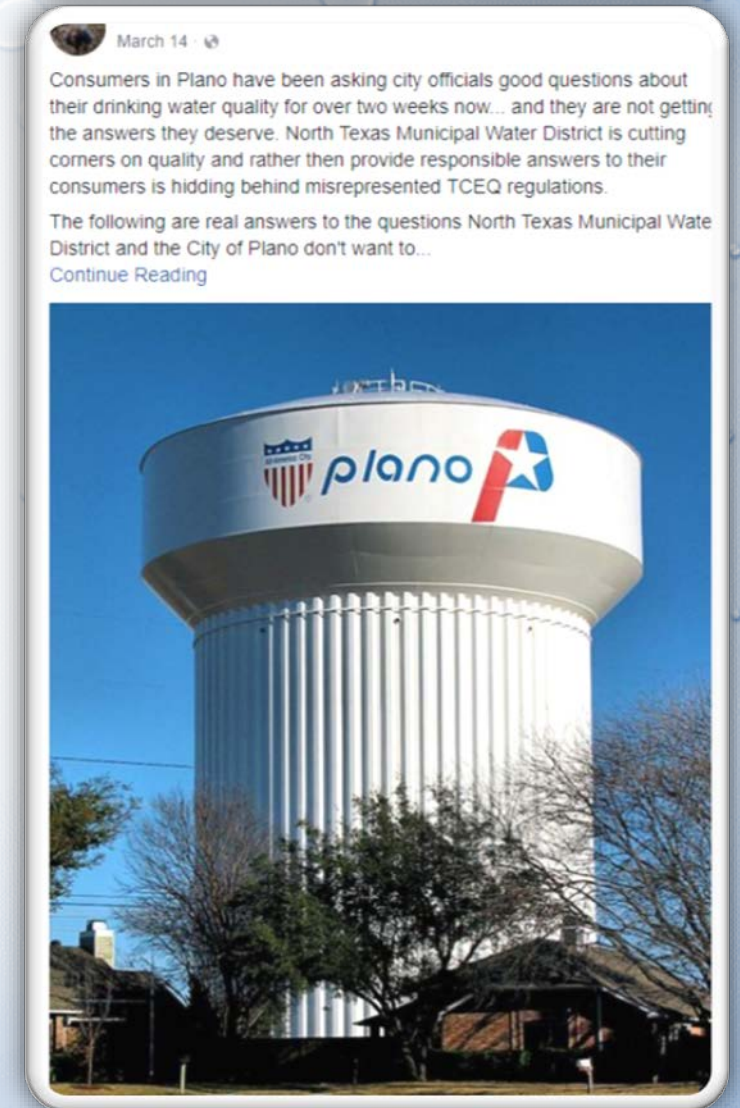




#1 MARCH 14, 2018 @ 8:21 AM

Below are the question that have been submitted and have gone unanswered - and how I would answer them:

- When will the test results of the burnout be available for public review?
They will not do water quality testing during the burnout... They know the numbers will be well over the regulatory limits... So let's just call it creative timing. Don't sample... Don't tell.
- Will these tests during the burnout be performed by a 3rd party testing lab and if so what lab will it be?
They will not test... Period.
- If any sample test returns a result higher than the maximum contaminant level (mcl), how long will it be before the public is notified? What media outlets will be used if notification is required?
Won't happen... They only are required to sample every 90 days...
- What was the current level of nitrifying bacteria before the burnout and when will a test be performed once the burnout process is finished to show the effectiveness of the burnout? When will these results be available to the public?
They don't have to test... Or tell you anything.
- What are the qualifications of the staff responsible for collecting water samples during this burnout process? How often will fire hydrants be flushed during this process and will a sample be collected each time? Is there any difference in frequency of hydrant flushing for dead end mains?
They are supposed to develop an engineered flushing plan... Most don't. They are supposed to use their hydraulic flow model... Most don't know how... Or don't trust their models.





#1 MARCH 14, 2018 @ 8:21AM

- Once water samples have been taken how long will it be before they are given to the lab for testing?

They don't plan to sample anything... They intend to clean out their pipes chemically... And dump the accumulated biofilm, sludge and debris into your homes and businesses. It will ruin your water heaters and other appliances.

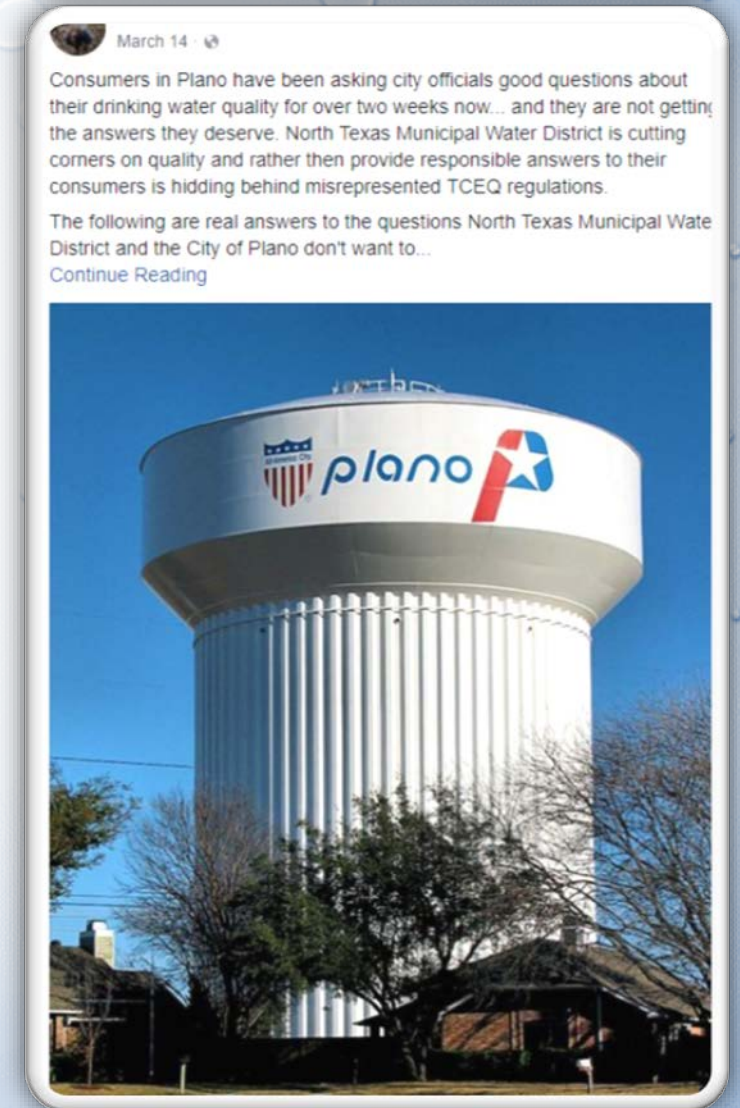
- Your website states:

“Chlorine maintenance does not have a negative effect on water quality. While water may take on a slightly different taste or smell, this does not alter the quality of the drinking water provided to consumers. The water remains safe to use and drink.”

If this is the case and a burnout is being performed for maintenance, where dose the nitrifying bacteria end up during this process?

- What is an acceptable level of flushing to ensure the disinfectant byproducts (dbp) like trihalomethane don't end up in customer homes?

[no answer was posted here]





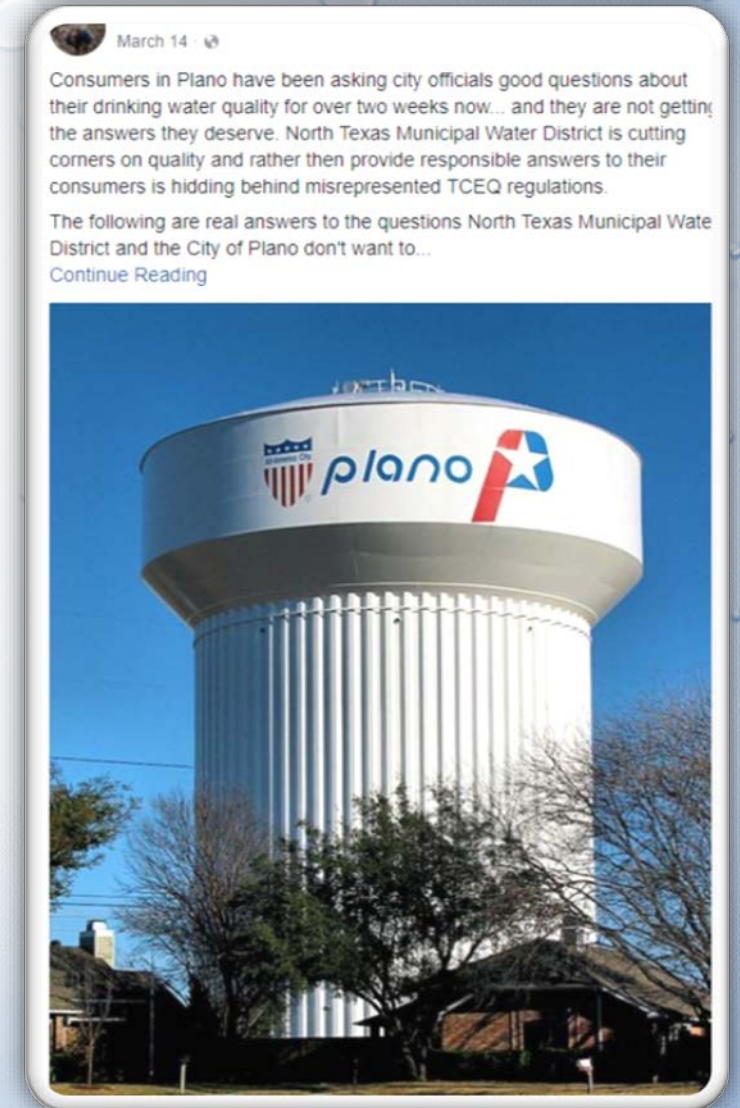
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- What plan dose ntmwd have in place to discontinue this burnout process? If there is not a plan to discontinue this process, when will there be one? Much larger cities (including dallas water utilities) have already put an end to the burnout maintenance and surely NTWMD has the same concerns about this questionable practice.

In this article from 1999,

- http://www.Nesc.Wvu.Edu/ndwc/articles/qanda/otsp99_q_a.Pdf, (attached) this issue of chlorine disinfection and the byproducts it produces, namely trihalomethanes which is a category that includes several toxic chemicals, is discussed as well as the necessity to prevent this practice and what can be done so it is no longer needed. That was nearly 20 years ago! As this article and several other more recent ones report, devastating, incurable, life-altering results come from trihalomethanes, like cancers, reproductive issues, and miscarriages.

- Our neighboring cities covered by dallas water utilities (addison, carrollton, cedar hill, cockrell hill, the colony, coppell, denton, desoto, duncanville, farmers branch, flower mound, glenn heights, grand prairie, grapevine, highland park, hutchings, irving, lancaster, lewisville, mesquite, ovilla, red oak, richardson, seagoville, university park, and wilmer) do not have to be concerned about these burnouts as they are not necessary given how dallas water utilities manages their water supply.





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4. total organic carbon (dirt)
5. The best available technologies are clearly defined in the regulation: 1. Lime softening followed by granular activated carbon filtration; or, 2. Enhanced coagulation followed by granular activated carbon filtration.
6. This is a **cheap dirty trick** and a really bad idea. It does not reduce the DIRT in the drinking water... It masks or covers up the ability for chlorine to react with the remaining dirt and form "regulated" disinfection byproducts.
7. They only care about "regulated" toxins. Chloramine actually forms toxins 1,000 time more dangerous... They are just not yet "regulated". They know this and frankly just don't care.
8. So... The ammonia (which is nitrogen) is pumped into your drinking water... It is not "safe"... It is a weaker disinfectant... Which allows (actually feeds) bacteria and biofilms in the pipes, plumbing systems and appliances. This biofilm exhausts the chlorine freeing up the ammonia (nitrification) which is like candy to bacteria and your system begins to fail. After this failure... The free chlorine burnout becomes necessary. Again... It is not "safe" it is toxic and dangerous. Just where do you think the broken down biofilm ends up? Yuck!



TCEQ REGULATIONS

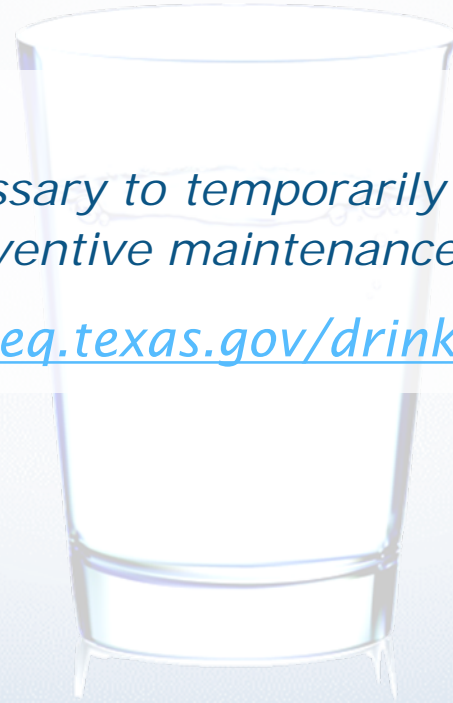
TCEQ on their website specifically mentions a temporary conversion to free chlorine is a preventative measure.



Preventive Maintenance:

Some systems find it necessary to temporarily convert to free chlorine as disinfectant as a part of their periodic preventive maintenance routine.

<https://www.tceq.texas.gov/drinkingwater/disinfection/nitrification.html>

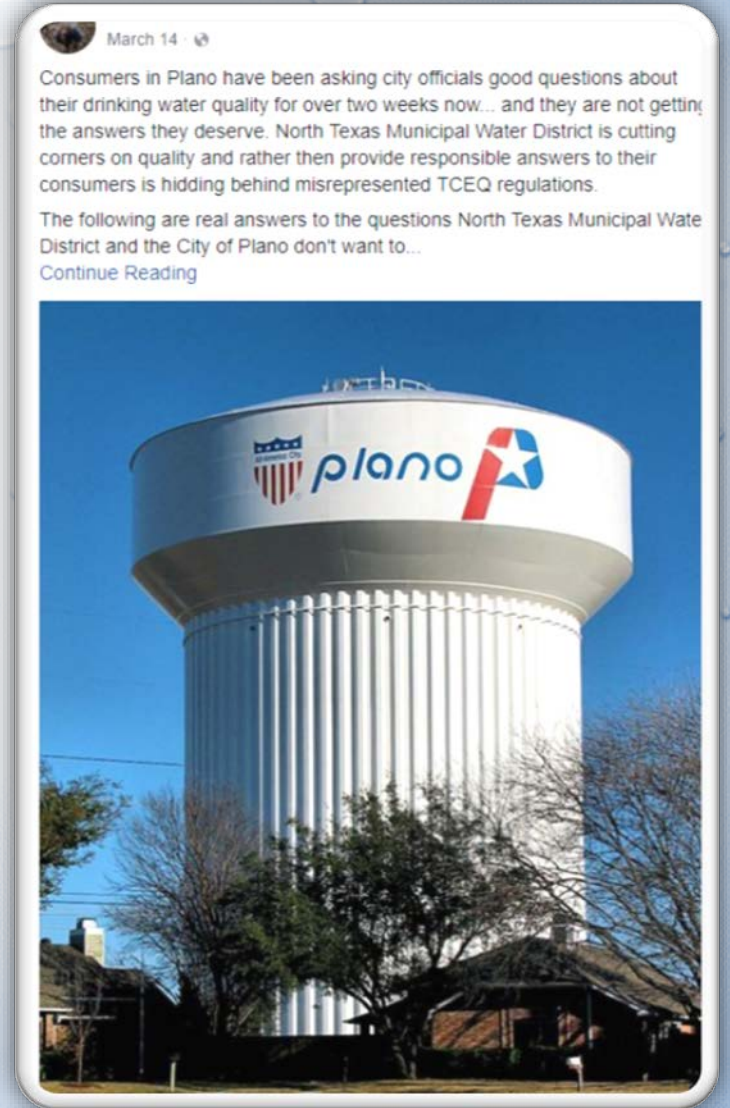




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TCEQ REGULATIONS

- TCEQ's website explains nitrification:

Nitrification is a microbial process that converts ammonia and similar nitrogen compounds into nitrite (NO₂⁻) and then nitrate (NO₃⁻). Nitrification can occur in water systems that contain chloramines.



The problem is greatest when temperatures are warm and water usage is low. For example, a number of water systems in Texas saw episodes of nitrification during the rainy summers of 2007 and 2015.

Nitrification will usually show up first in areas where residence time (or “water age”) is highest—for example, dead-end mains, storage tanks, and areas where pressure planes overlap.

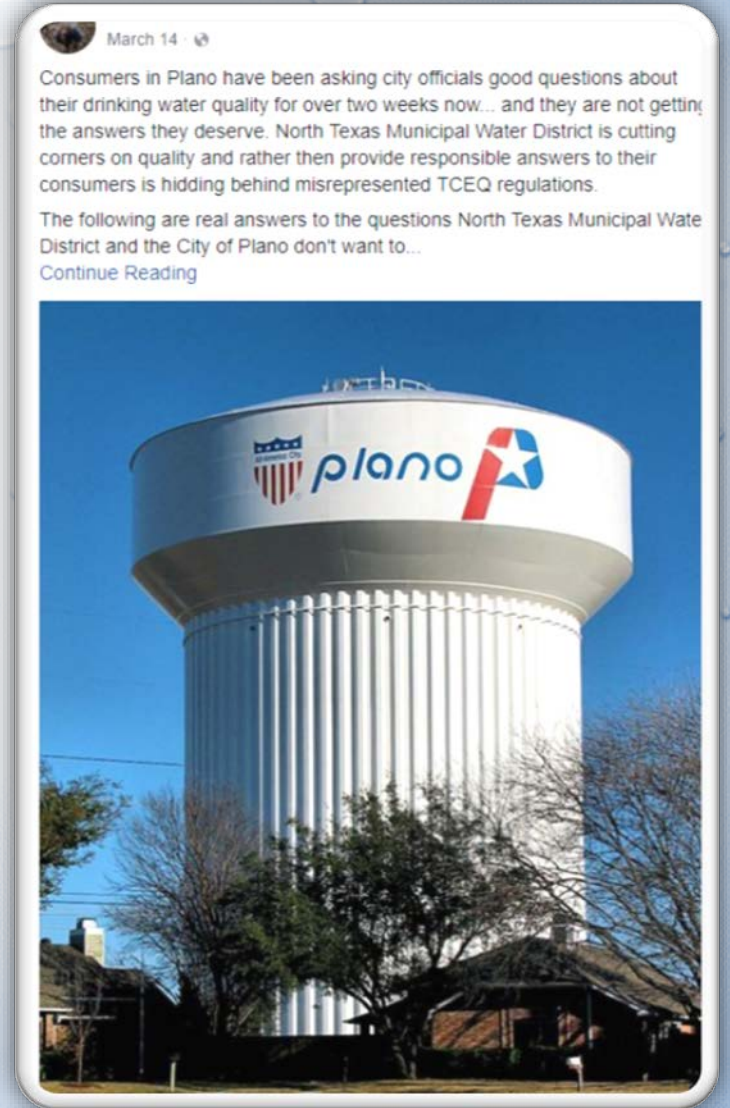
<https://www.tceq.texas.gov/drinkingwater/disinfection/nitrification.html>



#1 MARCH 14, 2018 @ 8:21AM

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TCEQ REGULATIONS

TCEQ's website explains how systems monitor for nitrification signs:

The nitrogen balance (in mg/L) of your system is:

$$\begin{array}{ccccccc} \text{Nitrogen balance} & = & \text{Free ammonia (as N)} & + & \text{NO}_2^- \text{ (as N)} & + & \text{NO}_3^- \text{ (as N)} & + & (0.27 \times \text{NH}_2\text{Cl}) \\ & & (\text{NH}_3) & & (\text{nitrite}) & & (\text{nitrate}) & & (\text{chloramine}) \end{array}$$

This number will fluctuate somewhat under normal operating conditions.

Line breaks (i.e., contaminants) can contribute to the problem – it's not always nitrification when the nitrogen balance is a little off.

<https://www.tceq.texas.gov/drinkingwater/disinfection/nitrification.html>



30 TAC §290.110 DISINFECTANT RESIDUALS

30 TAC §290.110 (c) (1) (A) Disinfectant Residuals

Public water systems that treat surface water or groundwater under the direct influence of surface water and sell treated water on a wholesale basis or serve more than 3,300 people must **continuously monitor and record the disinfectant residual** of the water at each entry point.





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STANDARD METHODS FOR EXAMINATION OF WATER & WASTEWATER

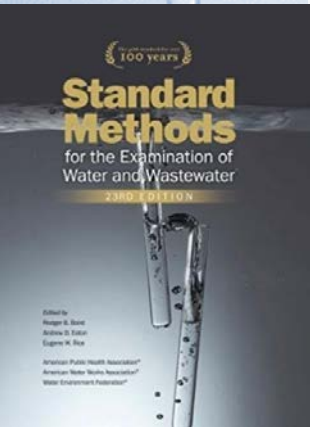
Total organic carbon (TOC) is the amount of carbon found in an organic compound.

TOC may also refer to the amount of organic carbon in soil, or in a geological formation.

A typical analysis for total carbon (TC) measures both the total carbon present and the so-called "inorganic carbon" (IC), the latter representing the content of dissolved carbon dioxide and carbonic acid salts. Subtracting the inorganic carbon from the total carbon yields TOC.

$$TOC = Total\ Carbon\ (TC) - Inorganic\ Carbon\ (IC)$$

Lenore S. Clescerl; Arnold E. Greenberg; Andrew D. Eaton (1999). [Standard Methods for Examination of Water & Wastewater \(20th ed.\)](#). Washington, DC: American Public Health Association. ISBN 0-87553-235-7. Method 5310A.





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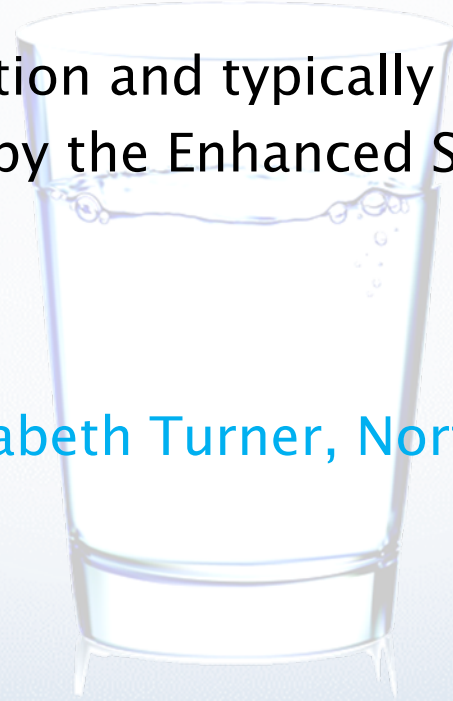
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RESPONSE

Treatment techniques are not a one solution fits all. You must understand the quality of your source water.

NTMWD uses enhanced coagulation and typically exceeds the minimum TOC removal requirements required by the Enhanced Surface Water Treatment Rule (40 CFR 141.502)



- Elizabeth Turner, North Texas Municipal Water District



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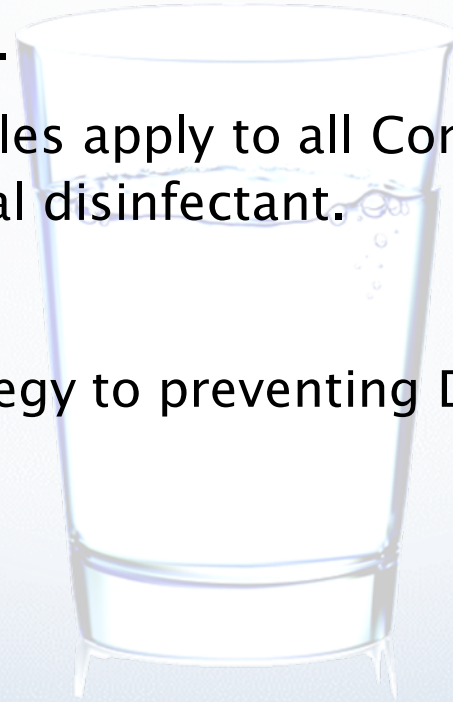


RESPONSE

Chloramines can convert organic materials into disinfection by products (DBPs).

- DBPs can form in water when disinfectants combine with naturally occurring materials found in source water.
- The Disinfection By-Products Rules apply to all Community Water Systems (CWS) that add/deliver a primary or residual disinfectant.

The removal of TOC is a key strategy to preventing DBPs.



- <https://www.epa.gov/dwreginfo/stage-1-and-stage-2-disinfectants-and-disinfection-byproducts-rules>



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RESPONSE

Research continues on the affects of nitrogenous disinfection by-products. I have not been able to find any validated research study that shows chloramines form toxins in water that are “1,000 times” more dangerous.

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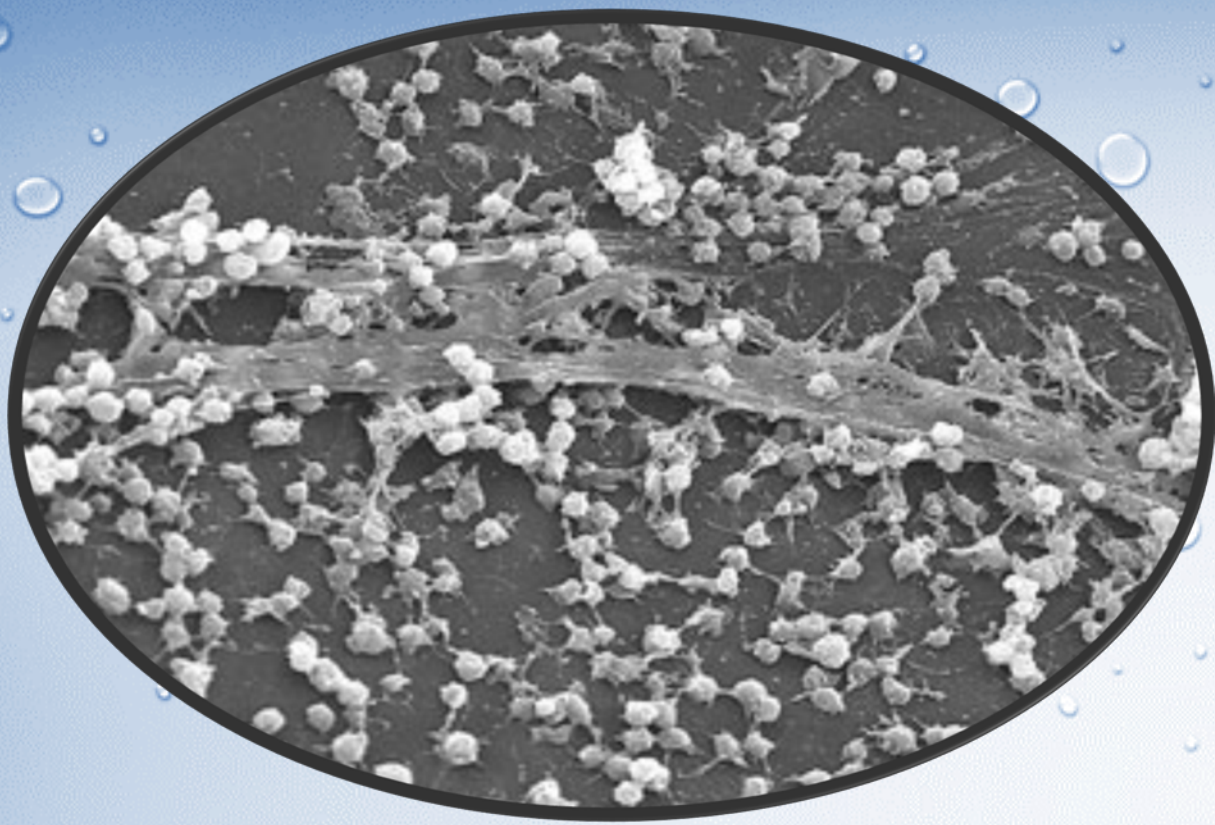
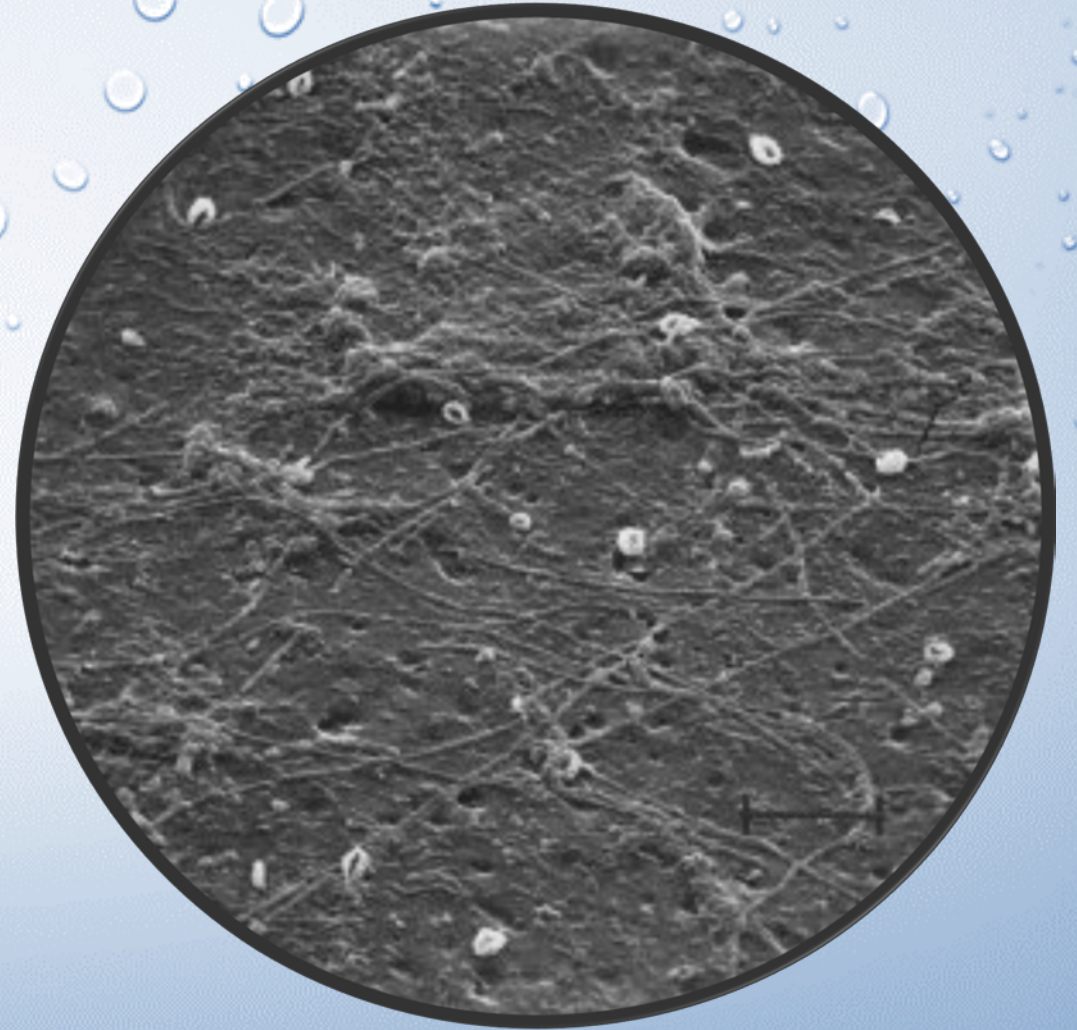


image courtesy cdc/rodney m. donlan, ph.d; janice carr

image courtesy of https://www.Lenntech.Com/biofilm_removal.Htm



RESPONSE

If the chloramine molecule breaks down, the ammonia can serve as a food source for bacteria. However, chloramines have been shown to be a longer lasting disinfectant that can penetrate deeper into the biofilm and reach to the ends of the distribution system. The service area for NTMWD is 2,200 square miles – twice the size of Rhode Island.



- Elizabeth Turner, North Texas Municipal Water District



#1 MARCH 14, 2018 @ 8:21AM

Below are the question that have been submitted and have would answer them:

- When will the test results of the burnout be available for

They will not do water quality testing during the burnout... They know the numbers will be well over the regulatory limits... So let's just call it creative timing.

- Will these tests during the burnout be performed by a 3rd what lab will it be?

They will not test... Period.

- If any sample test returns a result higher than the maximum how long will it be before the public is notified? What media notification is required?

Won't happen... They only are required to sample every 90 days...

- What was the current level of nitrifying bacteria before the burnout test be performed once the burnout process is finished to show the burnout? When will these results be available to the public?

They don't have to test... Or tell you anything.

- What are the qualifications of the staff responsible for collecting this burnout process? How often will fire hydrants be flushed during will a sample be collected each time? Is there any difference in frequency flushing for dead end mains?

They are supposed to develop an engineered flushing plan... Most don't know how... Or don't trust their models.

Testing for many parameters continues during the maintenance period: turbidity, chlorine residuals, bacteriological samples, metals, nitrate/nitrite, etc. Unlike other states, TCEQ controls the sample collection and testing of disinfection by-products. TCEQ will not collect disinfection by-product samples during a maintenance period.

MCL is based on a location-specific running annual average, and not a single high result as this statement implies. The DBP rule is based on chronic high exposure and not acute conditions.

Tests are not typically done to identify and quantify nitrifying bacteria. The test is difficult and expensive. Each utility must have a Nitrification Action Plan which details the routine monitoring performed (nitrite, nitrate, free ammonia, chlorine residual, HPC) and trigger levels that kickstart additional actions.

Hydraulic models are not required by regulation but are a best practice.

CLAIMS





#1 MARCH 14, 2018

• Once water samples have been taken how long will it be before they are given to the lab for testing?

They don't plan to sample anything... They intend to clean out their pipes chemically... And dump the accumulated biofilm, sludge and debris into your homes and businesses. It will ruin your water heaters and other appliances.

• Your website states:

“Chlorine maintenance does not have a negative effect on water quality. While water may take on a slightly different taste or smell, this does not alter the quality of the drinking water provided to consumers. The water remains safe to use and drink.”

If this is the case and a burnout is being performed for maintenance, where do the nitrifying bacteria end up during this process?

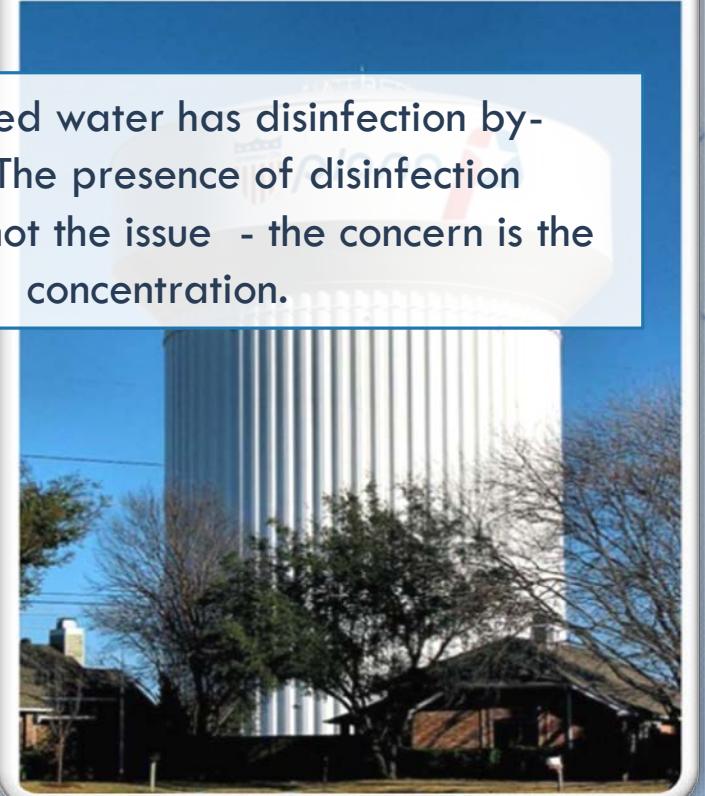
• What is an acceptable level of flushing to ensure the disinfectant byproducts (dbp) like trihalomethane don't end up in customer homes?

[no answer was posted here]

This is also a physical process as most of the cities perform additional flushing to push the material through the system and discharge it appropriately.

All disinfected water has disinfection by-products. The presence of disinfection byproducts is not the issue - the concern is the concentration.

Consumers in Plano have been asking city officials good questions about water quality for over two weeks now... and they are not getting the answers they deserve. With Texas Municipal Water District is cutting corners on quality and rather than provide responsible answers to their consumers is hiding behind misrepresented TCEQ regulations. The following are real answers to the questions North Texas Municipal Water District and the City of Plano don't want to... Continue Reading



CLAIMS



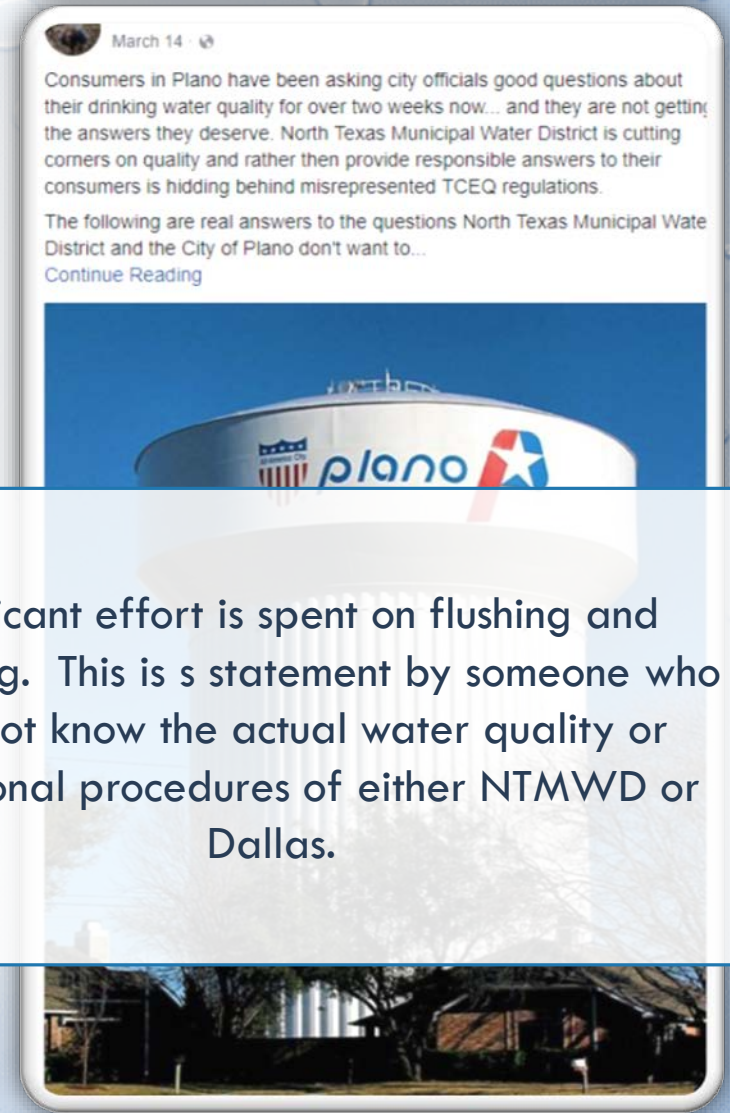
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- What plan dose ntmwd have in place to discontinue this burnout process? If there is not a plan to discontinue this process, when will there be one? Much larger cities (including dallas water utilities) have already put an end to the burnout maintenance and surely NTWMD has the same concerns about this questionable practice.

In this article from 1999,

http://www.Nesc.Wvu.Edu/ndwc/articles/qanda/otsp99_q_a.Pdf, (attached) this issue of chlorine disinfection and the byproducts it produces, namely trihalomethanes which is a category that includes several toxic chemicals, is discussed as well as the necessity to prevent this practice and what can be done so it is no longer needed. **That was nearly 20 years ago! As this article and several other more recent ones report, devastating, incurable, life-altering results come from trihalomethanes, like cancers, reproductive issues, and miscarriages.**

- Our neighboring cities covered by dallas water utilities (addison, carronlton, cedar hill, cockrell hill, the colony, coppell, denton, desoto, duncanville, farmers branch, flower mound, glenn heights, grand prairie, grapevine, highland park, hutchings, irving, lancaster, lewisville, mesquite, ovilla, red oak, richardson, seagoville, university park, and wilmer) do not have to be concerned about these burnouts as they are not necessary given how dallas water utilities manages their water supply.



CLAIMS



#2



#2 MARCH 14 AT 9:12AM

If your Drinking Water System tells you... TCEQ made us use chloramine... or, TCEQ made us do a free chlorine burnout... or, TCEQ mandated this or that...

THEY ARE LYING

TCEQ is there to administer the Safe Drinking Water Act and HELP Community Water Systems make good decisions, advise them and guide them... period. **TCEQ does not "mandate" anything.** If the Drinking Water Utility fails... TCEQ is there to regulate... but local control and local choice is where the rubber meets the road.

#StoptheBullshit





#3



#3 MARCH 15 AT 6:18PM

Today, the North Texas Municipal Water District (NTMWD) officials attempted to assure the public that the processes used to treat and maintain the safety and quality of the district's drinking water meet federal and state standards. Quite frankly, their "press release" doesn't say much... meeting the extremely limited Safe Drinking Water Act regulations is laughable. Did you know we are allowed to drink what is illegal to flush in our toilets... the system is broken... NTMWD knows this and made a conscious choice to cut corners and do the bare minimum. Their choice to add ammonia was made with zero community input! It is a cheap... temporary fix to a much bigger problem.

NTMWD is conducting a temporary 30-day "system maintenance process" (TCEQ calls it a chlorine burnout) that is allowed by the Texas Commission on Environmental Quality (TCEQ) for systems that are experiencing nitrification. Nitrification is a microbial process that converts ammonia and similar nitrogen compounds into nitrite (NO₂⁻) and then nitrate (NO₃⁻). It means the water treatment system has FAILED. Nitrification only occurs in a system that is adding ammonia to form chloramine. Chloramine is used as a disinfectant to sequester (cover-up) reactions with dirt (TOC). Would you rather have dirt removed or ammonia added to your drinking water? Both TCEQ and USEPA regulation recommend TOC (Dirt) reduction... NOT AMMONIA. Just because it is "allowed"... doesn't make it right. NTMWD is "allowed" and DOES have herbicides, pesticides, pharmaceuticals and other emerging contamination in your water... but doesn't want to talk about that. And when they are burning out your drinking water distribution system... just where does all of the sludge, biofilm and debris go? In your drinking water, ice makers, hot water heaters, showers, laundry... YUCK!

Erin Brockovich
March 15 · 🌐

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[Continue Reading](#)

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Safe Drinking Water Act governs what impacts human health through consumption of drinking water. The Clean Water Act governs what is discharged to water bodies and impacts the health of aquatic organisms. The concentration of a material that can harm a fish is significantly less than the concentration that can harm a human.





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[Continue Reading](#)

Nitrification can occur in any drinking water system, regardless of the choice for residual disinfection

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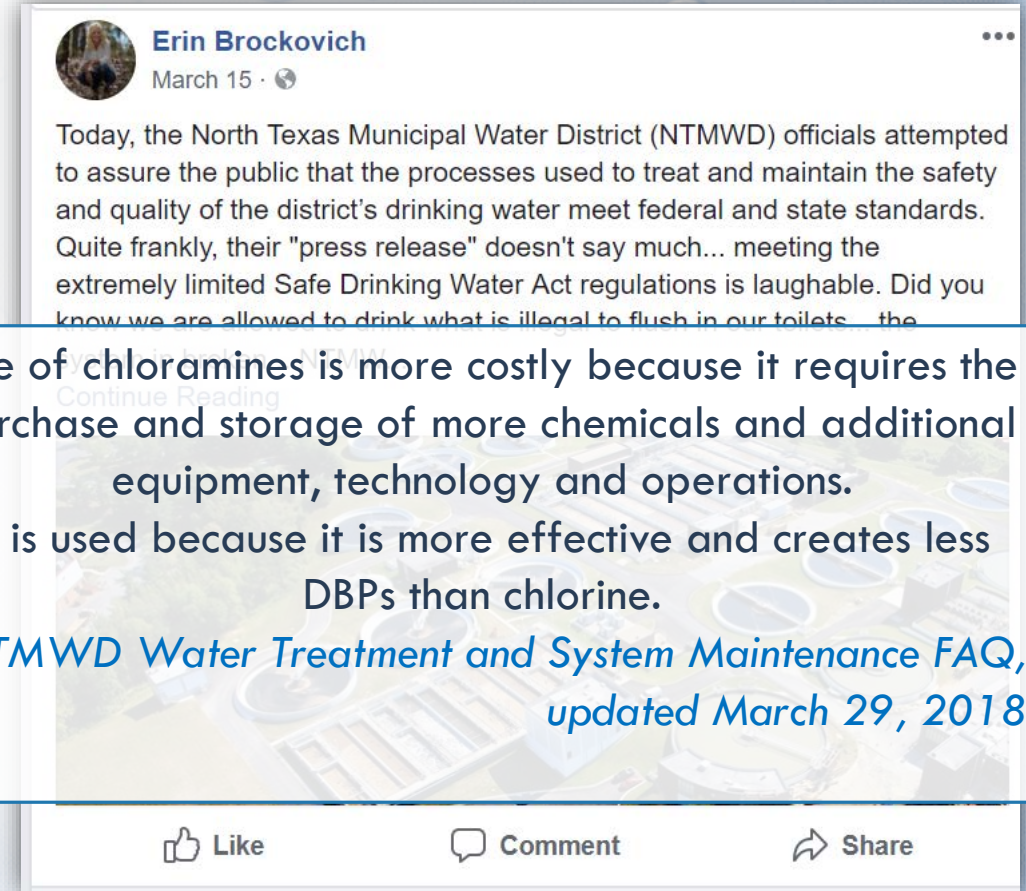
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Use of chloramines is more costly because it requires the purchase and storage of more chemicals and additional equipment, technology and operations. It is used because it is more effective and creates less DBPs than chlorine.

-NTMWD Water Treatment and System Maintenance FAQ, updated March 29, 2018

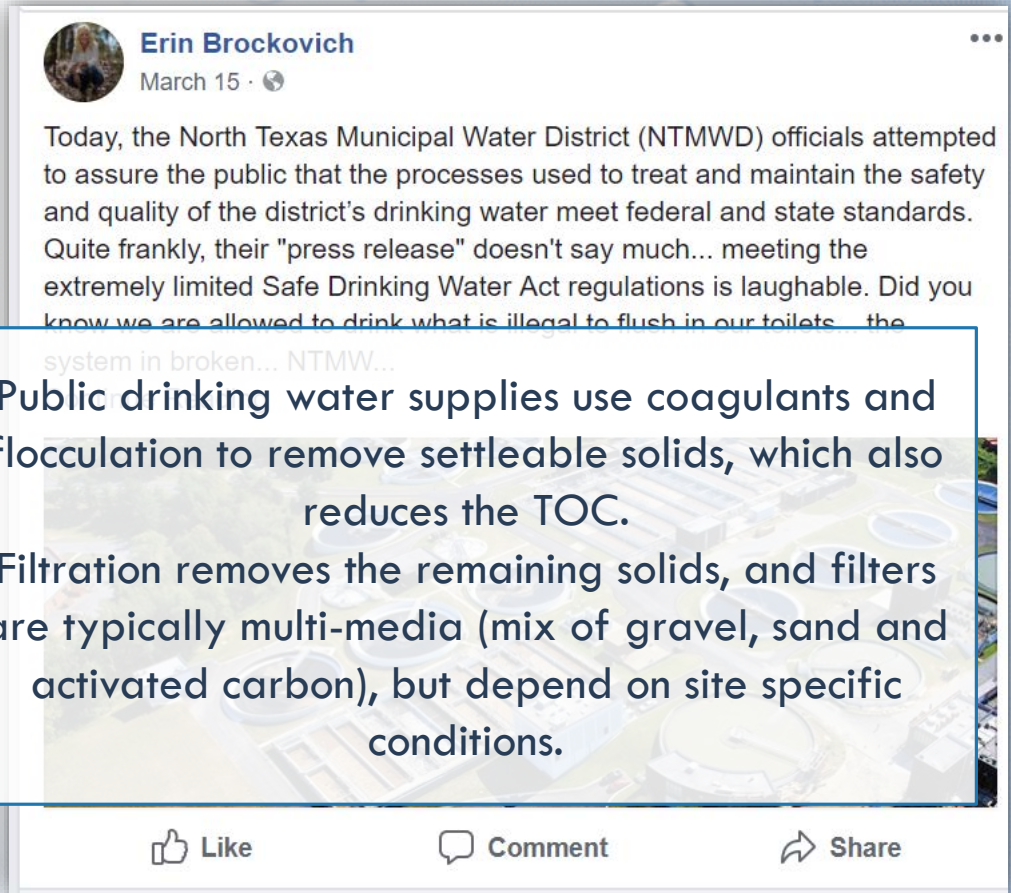




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NTMWD is conducting a temporary 30-day "system maintenance process" (TCEQ calls it a chlorine burnout) that is allowed by the Texas Commission on Environmental Quality (TCEQ) for systems that are experiencing nitrification. Nitrification is a microbial process that converts ammonia and similar nitrogen compounds into nitrite (NO₂⁻) and then nitrate (NO₃⁻). It means the water treatment system has FAILED. Nitrification only occurs in system that are adding ammonia to form chloramine. Chloramine is used as a disinfectant to sequester (cover-up) reactions with dirt (TOC). **Would you rather have dirt removed or ammonia added to your drinking water? Both TCEQ and USEPA regulation recommend TOC (Dirt) reduction... NOT AMMONIA.** Just because it is "allowed"... doesn't make it right. NTMWD is "allowed" and DOES have herbicides, pesticides, pharmaceuticals and other emerging contamination in your water... but doesn't want to talk about that. And when they are burning out your drinking water distribution system... just where does all of the sludge, biofilm and debris go? In your drinking water, ice makers, hot water heaters, showers, laundry... YUCK!





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Erin Brockovich
March 15 · 🌐

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Would love to see her data. Our monitoring results for regulated pesticides and herbicides show only trace levels of atrazine and simazine at the detection limit.

👍 Like 💬 Comment ➦ Share



#3 MARCH 15 AT 6:18PM

During this period, residents may experience a stronger smell of chlorine, however NTMWD has not increased the amount of chlorine in the water. The only change during this temporary maintenance period has been the discontinuation of ammonia while maintaining all other treatment processes. The odor will be more noticeable due to the lack of ammonia. This is a false and misleading... lame explanation...it doesn't hold water in the science community.

"Water quality and safety is a top priority, and we work closely with officials in Member and Customer Cities, federal and state agencies to fulfill our mission," said Mick Rickman, Deputy Director of Operations and Maintenance at NTMWD. "This is a safe and scientifically proven method to ensure that treated water remains safe as it moves throughout the distribution system," Rickman added. They claim to work "closely" with federal and state agencies to fulfill their mission... honestly, I bet NTMWD doesn't even know who to call at the Drinking Water Office at the USEPA... this is a canned response when your back is against the wall.

The results for multiple samples have been less than 28 parts per billion (ppb) which is significantly lower than the USEPA Maximum Contaminant Level of 80 ppb. The results of all testing are within federal and state guidelines. This is a total misleading dodge... so what NTMWD has multiple results of 28 ppb (I am assuming for TTHMs) "regulated" disinfection byproducts at the treatment plant... the regulation for TTHMs IN NOT at NTMWD's treatment plant... the regulation is the responsibility of the retail community water systems like the City of Plano. What are the levels found at the "regulatory" sample location approved by TCEQ in their distribution system?

I am so disappointed in these responses and this bogus "press release". It's time to fess up... get with the program... follow the intent of the Safe Drinking Water Act regulations... stop taking short cuts... UGH... and do your jobs!

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[Continue Reading](#)

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Erin Brockovich

Additionally, the testing for residual Cl shows concentrations no higher than 4.31 mg/l during a maintenance period, with the average at 3.76 mg/l

Chlorine's odor IS more "detectable" so you may indeed smell a difference.

Monochloramine thresholds: odor (0.65 mg/l) and taste (0.48 mg/l)

Chlorine thresholds: odor (0.002 mg/l in air and (0.31 mg/l) in water. Taste threshold (0.4 mg/l)

-Agency for Toxic Substances and Disease Registry www.atsdr.cdc.gov

-Scottish Center for Infection and Environmental Health

Like Comment Share

Total Chlorine Residuals (mg/L) at NTMWD Treated Water Storage Reservoir Sites

| Sampling Locations | 01/01/18 - 02/25/18 | | | During Maintenance Period 02/26/18 - 03/26/18 | | | 01/01/17 - 03/12/17 | | | During Maintenance Period 03/13/17 - 04/10/17 | | |
|---------------------|---------------------|---------|---------|--|---------|---------|---------------------|---------|---------|--|---------|---------|
| | Average | Maximum | Minimum | Average | Maximum | Minimum | Average | Maximum | Minimum | Average | Maximum | Minimum |
| Custer Pump Station | 3.81 | 4.14 | 3.60 | 3.68 | 3.97 | 3.32 | 3.81 | 4.07 | 3.53 | 3.48 | 3.92 | 3.23 |
| Farmersville | 3.61 | 3.86 | 3.38 | 3.08 | 3.50 | 2.62 | 3.45 | 3.91 | 2.99 | 2.37 | 3.14 | 1.98 |
| Forney | 3.51 | 3.84 | 2.86 | 1.67 | 2.60 | 0.21 | 2.93 | 3.11 | 2.55 | 2.11 | 3.26 | 1.13 |
| Garland #2 | 3.86 | 4.13 | 3.64 | 3.64 | 3.82 | 3.40 | 3.78 | 4.10 | 3.60 | 3.12 | 3.79 | 2.58 |
| Garland #4 | 3.86 | 3.99 | 3.76 | 3.66 | 3.78 | 3.54 | 3.74 | 3.90 | 3.60 | 3.26 | 3.90 | 2.87 |
| McKinney | 3.77 | 4.18 | 3.44 | 3.35 | 3.83 | 2.51 | 3.11 | 3.66 | 1.52 | 2.34 | 3.29 | 1.29 |
| Plano #2 | 3.86 | 4.17 | 3.65 | 3.76 | 4.31 | 3.27 | 3.71 | 4.08 | 3.48 | 3.66 | 4.10 | 3.35 |
| Princeton | 3.56 | 3.83 | 3.32 | 3.22 | 3.68 | 2.93 | 3.34 | 3.62 | 2.97 | 2.21 | 3.27 | 1.65 |
| Rockwall | 3.45 | 3.78 | 3.01 | 3.34 | 3.84 | 2.77 | 3.55 | 3.79 | 3.36 | 2.07 | 3.04 | 1.70 |
| Royse City | 3.51 | 3.76 | 3.30 | 2.48 | 2.94 | 2.10 | 3.17 | 3.57 | 2.81 | 1.77 | 2.33 | 0.60 |
| Shiloh | 3.90 | 4.17 | 3.68 | 3.83 | 4.10 | 3.44 | 3.89 | 4.12 | 3.66 | 3.63 | 4.15 | 3.41 |
| Sunnyvale | 3.54 | 4.11 | 3.30 | 2.63 | 3.62 | 1.17 | 3.30 | 3.64 | 2.87 | 2.32 | 2.59 | 2.19 |

1 mg/L = 1 ppm (parts per million)

***NOTE:** Water providers are required to maintain an **annual average** chlorine disinfection residual level of between 0.2 parts per million (ppm) and 4 parts per million (ppm).



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#4



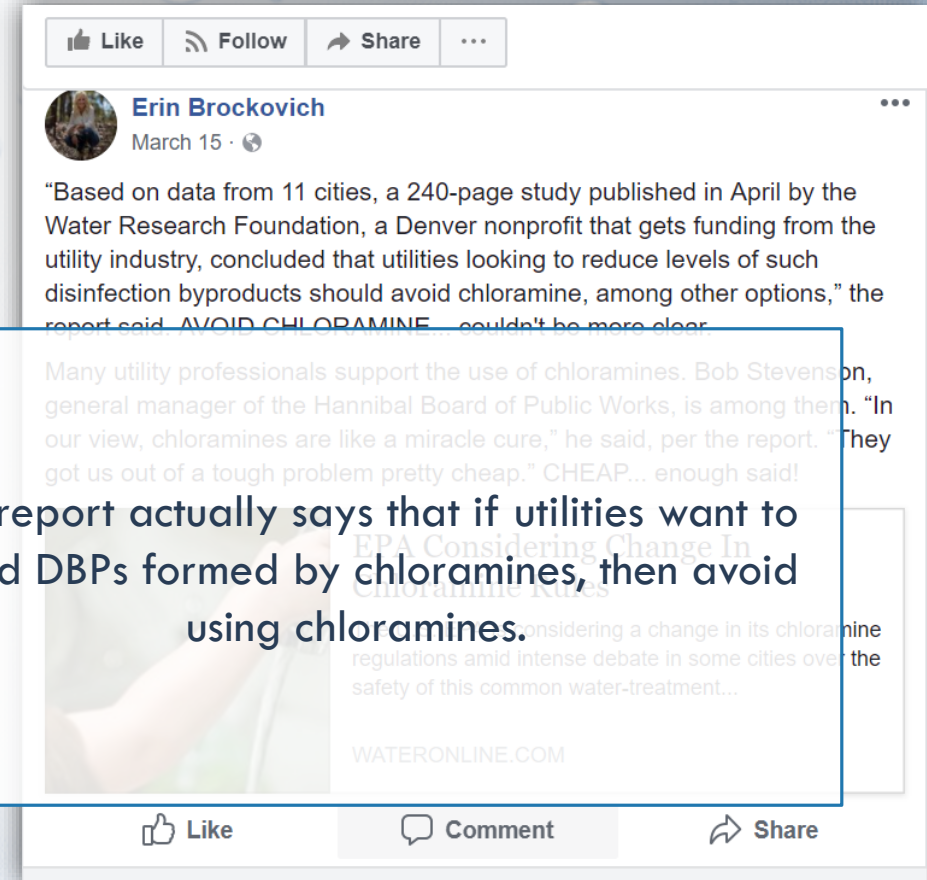
#4 MARCH 15 AT 7:27PM

“Based on data from 11 cities, a 240-page study published in April by the Water Research Foundation, a Denver nonprofit that gets funding from the utility industry, concluded that utilities looking to reduce levels of such disinfection byproducts should avoid chloramine, among other options,” **the report said.**

AVOID CHLORAMINE... couldn't be more clear.

Many utility professionals support the use of chloramines. Bob Stevenson, general manager of Hannibal Board of Public Works, is among them. “In our view, chloramines are like a miracle cure,” he said, **the report.** “They got us out of a tough problem pretty cheap.” **CHEAP... enough said!**

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#5

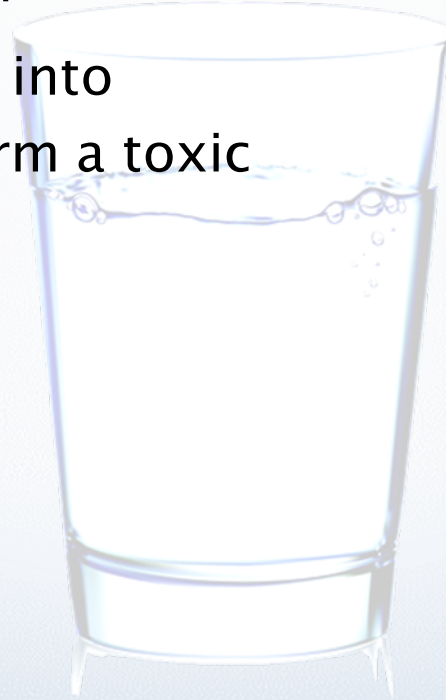


#5 MARCH 16 AT 8:06AM

North Texas Municipal Water District

It's time to talk... or are thousands of your consumers just making things up?

Start by admitting when you get into nitrification... and have to perform a toxic burnout... **you have failed.**





#6



#6 MARCH 20, 2018 AT 6:09 PM

YELLOW

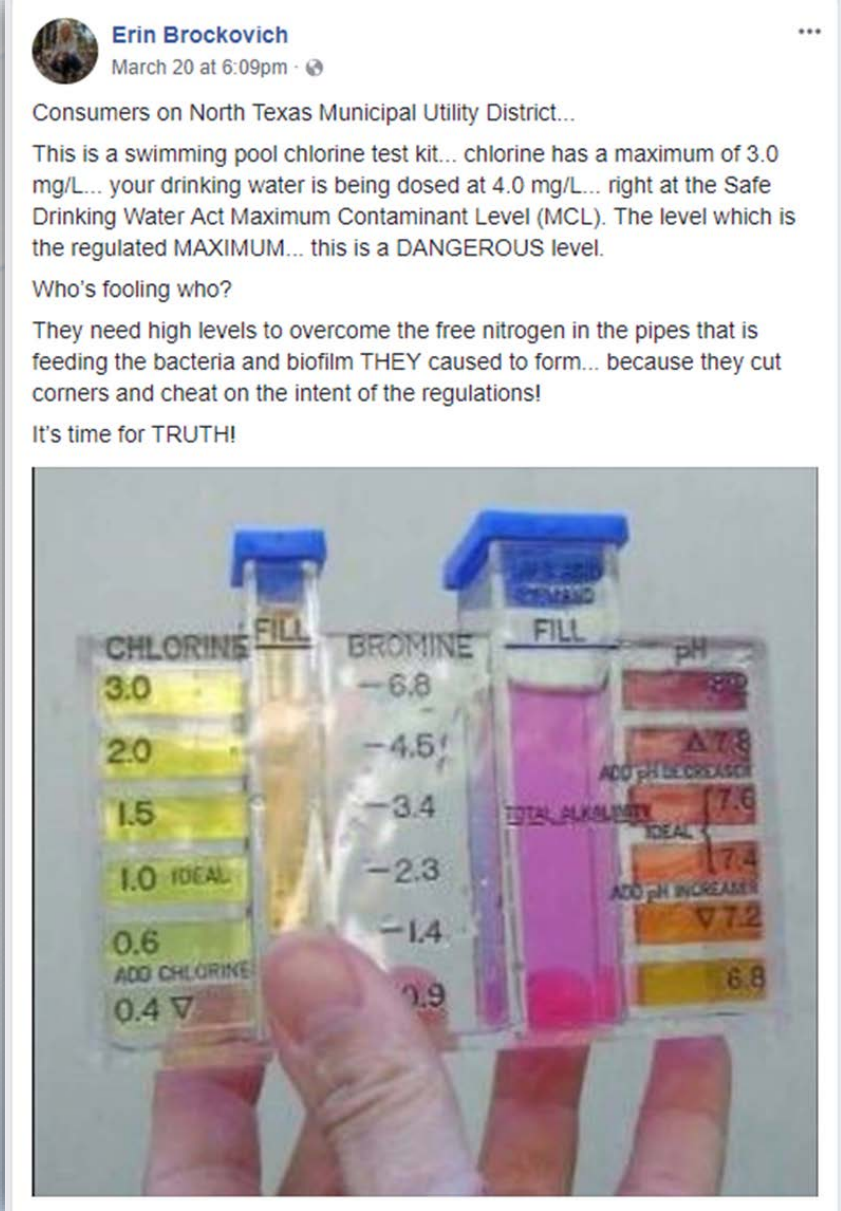
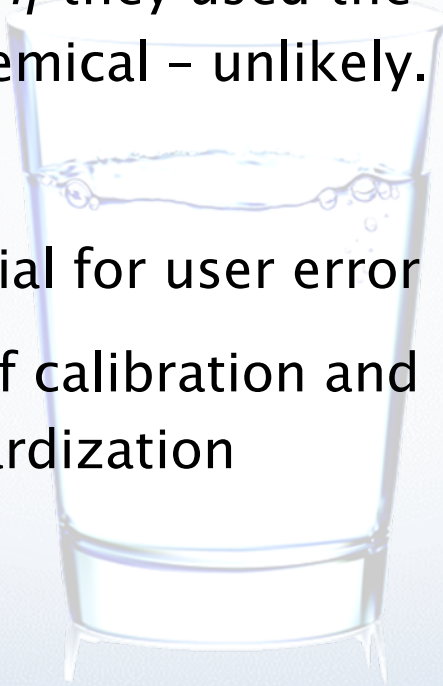
This method does NOT measure free chlorine.

- Does NOT provide quantitative results
- Lack of calibration and standardization

PINK

Might measure free chlorine *if* they used the right chemical - unlikely.

- Potential for user error
- Lack of calibration and standardization



OPEN LETTER TO ERIN BROCKOVICH



Rogue Water

March 20 · 🌐

Hey Erin Brockovich (first of all--story I missed the c in your last name...it's since been corrected but for some reason not updating) This is an open letter t...

[See More](#)



**An open letter to Erin Brokovich –
Rogue Water LLC – Medium**

By Stephanie Zavala, CEO and Co-Founder of
Rogue Water

[MEDIUM.COM](https://medium.com)

OPEN LETTER TO ERIN BROCKOVICH

Dear Erin,

First of all, mad respect for what you did in Hinkley, CA at the beginning of your career... I love movies like yours and Civil Action. I love movies that tell a David and Goliath story....

This is not a David and Goliath story.....

If your end goal is about bringing change to the industry—you're speaking my language. Is there a better way to be treating our water? Let's get together and talk about it. Let's bring in all of the stakeholders.... Let's make it happen.....

Please—don't come in hot. You aren't making things better in the long run.....

We respect your grit, your gumption, and your passion for public health. We are cut from the same cloth. But let's talk with each other and not at each other.

- [Stephanie Zavala, CEO and Co-founder of Rogue Water](#)





Stephanie Corso Zavala is with **Becky Johnson**.

March 22 · Fort Worth · 🌐

I was super excited to be a part of this conversation. The students wrote every claim made on Facebook by Erin Brockovich and basically debunked them all. They researched all of the answers and also used what they had learned in class and at their tour of the water treatment plant in Fort Worth. In April, they get to tour a wastewater treatment plant to learn the other side.

Did you know that unclean water has killed more people in the world than any act of violence, including war? Again, I'm never one to say anything is perfect (except for the falafel at Terra's) but we are incredibly privileged to have the water treatment plants, policies, and professionals that we do. Our industry has a lot of engineering and a lot of science--something that doesn't come easy to most of us. It's ok to ask questions. But ask lots of experts in the field, objective professionals. And please, if you don't know who to ask...reach out to me and I'll help you sort through it all. Happy [#WorldWaterDay](#)



World Water Day: Understanding the science of water and wastewater treatment | College of Science & Engineering

Examining contemporary issues in science is one of Becky Johnson's teaching goals – especially when relevant current events can be used to enhance the learning process...

CSE.TCU.EDU



#7

#7 MARCH 26, 2018 AT 9:47 PM

- What's the old saying... "the cover up is often worse than the crime".
- This is yet just another rambling attempt to appease; but you all know better!
- This language is right out of the play book... but the scariest one of all from the City of Frisco... "In short, the lack of ammonia during a 'chlorine maintenance period' makes your water smell like chlorine." is outrageous! Clearly uninformed nonsense. Yes... the ammonia sequesters the reactions between the chlorine and the dirt they leave in the water... but it's merely a chemistry trick... in fact, the ammonia chlorine combination forms byproducts 1,000 times more toxic than those currently regulated.
- Consumers of Frisco... ask one simple question of the Assistant Public Works Director... how many TTHM samples did you take at the TCEQ approved byproduct sample location during the chlorine burnout... my guess... ZERO. Lots of talk... but it's all smoke and mirrors.
- **#dontbuythebullshit**

Same stuff, different day.



The image shows a screenshot of a Facebook post by Erin Brockovich, dated March 26 at 9:47pm. The post contains a paragraph of text that is partially obscured by a blue box. The visible text includes: "the cover up is often worse than the crime", "This is yet just another rambling attempt to appease; but you all know better!", "This language is right out of the play book... but the scariest one of all from the City of Frisco... 'In short, the lack of ammonia during a 'chlorine maintenance period' makes your water smell like chlorine.' is outrageous! Clearly uninformed nonsense. Yes... the ammonia sequesters the reactions between the chlorine and the dirt they leave in the water... but it's merely a chemistry trick... in fact, the ammonia chlorine combination forms byproducts 1,000 times more toxic than those currently regulated.", and "Consumers of Frisco... ask one simple question of the Assistant Public Works Director... how many TTHM samples did you take at the TCEQ approved byproduct sample location during the chlorine burnout... my guess... ZERO. Lots of talk... but it's all smoke and mirrors." Below the text is a photo of water being poured from a faucet into a glass. At the bottom of the screenshot, there is a news article snippet from Community Impact Newspaper, dated Mar 26, 2018, titled "Water district's annual chlorine maintenance ends today".



The End



#CheapDirtyTrick

#StopTheBullshit

#EnoughSaid

#YouHaveFailed

#DontBuyTheBullshit

QUESTIONS?

Special thanks to Elizabeth Turner of NTMWD for reaching out, providing data, and encouraging this presentation.

Becky L. Johnson, P.G.
becky.johnson@tcu.edu
817-257-7271

