

## Message from Tom Kula, NTMWD Executive Director

*NTMWD has been delivering safe, quality water to cities for 60+ years. The water industry is highly regulated. NTMWD meets or exceeds all standards of the Safe Drinking Water Act. The treatment, testing and maintenance we use are proven, industry practices optimized to our system. NTMWD water supplies are from surface water (lakes) and requires treatment processes specific to our region and system. Hundreds of samples are collected and tested daily and more than 250,000 are tested annually to ensure compliance with all regulatory requirements. Our monthly and annual water quality reports are posted online at [www.NTMWD.com](http://www.NTMWD.com). The Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency have confirmed that NTMWD is in full compliance.*

*Our experts have developed the following answers to questions we are seeing from our cities and the public we all serve. We hope this helps address those questions and assure the public that the water we provide remains safe for drinking and all other uses. **More resources available at:** [www.SafeWaterNorthTexas.com](http://www.SafeWaterNorthTexas.com).*

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## Questions and Answers about Water Treatment, Disinfection and Chlorine Maintenance Performed by the North Texas Municipal Water District (NTMWD)

### Water Treatment Process

#### **How does NTMWD treat drinking water?**

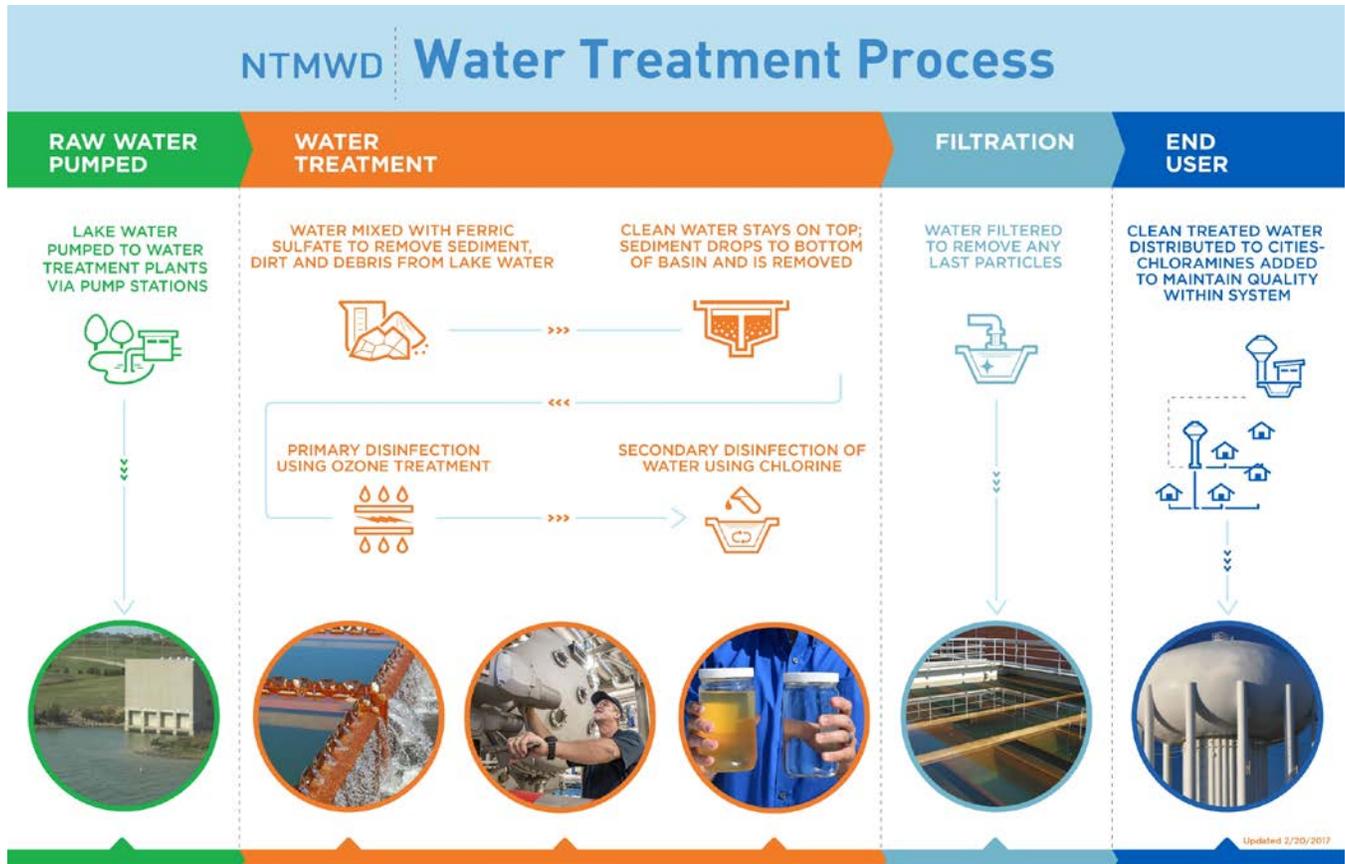
NTMWD uses an industry-standard, multi-step process to treat water from lakes that makes up all of our water supplies. The disinfection process eliminates bacteria, parasites and viruses through the combination of ozone, chlorine and chloramine (chlorine + ammonia) for disinfection. According to data provided by the Water Research Foundation, approximately 45 percent of the U.S. population is served by public water supplies using chloramine, a proven and effective method of maintaining water disinfection as it travels through systems and into homes and businesses.

#### ***Here is an overview of NTMWD treatment processes:***

First, chemicals are blended with lake water to remove large particles and sediment. Next, ozone is injected into the water as the primary disinfectant. Ozone is one of the fastest and most powerful disinfection processes available – 100 times more powerful than chlorine. Ozone is generated on-site by converting liquid oxygen into a gas using electricity. This is a state-of-the-art water process that is designed to ensure no ozone is released into the atmosphere. The addition of ozone at this stage eliminates bacteria and viruses and greatly reduces organic matter in the water. Using ozone reduces the amount of chlorine that is needed at the end of the disinfection process, thus reducing disinfection by-products and greatly improving water's taste and odor.

After the water is treated with ozone, it is further disinfected with free chlorine before it passes through a series of carbon filters. These filters use a purified form of carbon that further removes sediment and organic material. In addition, these carbon filters remove constituents from the water such as, nitrate, nitrite, metals, and many other minerals and trace elements.

While ozone is a very effective primary disinfectant, it doesn't last long enough to provide disinfection throughout the distribution systems. The only disinfectants that are able to provide long-lasting protection are chlorine and chloramine. There are no other alternatives for maintaining the required levels of disinfection. Chloramine lasts longer than chlorine and ensures water remains disinfected throughout the distribution systems. Before leaving the treatment plant, chloramine is added as the last step to maintain water quality as it travels the long distances to the homes and businesses served by our cities. View **Journey of Water** video: <https://youtu.be/a9vf6JRmbsQ>



## Use of Chlorine, Chloramine and Chlorine Maintenance

### **Is chlorine/chloramine commonly used?**

Chlorine and chloramine have been used to treat North American water supplies for almost a century and are the most widely used disinfectants. The use of chlorine, chloramine and other disinfectants has virtually eliminated instances of waterborne diseases like typhoid fever, cholera and dysentery in the United States and other developed countries. This is because of the use of these disinfectants that American drinking water supplies are among the safest in the world.

Both the World Health Organization and the U.S. Centers for Disease Control and Prevention describe water filtration and disinfection as among the most significant public health advancements of the last century.

### **Why do you conduct annual chlorine maintenance?**

The Water Research Foundation, the nation's leading water research group, recognizes that periodic chlorine maintenance is a **preventive** measure to reduce the potential for nitrification occurring in the distribution system during warmer months. View **Chlorine Maintenance video**:

<https://youtu.be/EaBQ7R2iGZs>

All public water systems harbor some biofilm. Water providers are required to be proactive in minimizing biofilm. Biofilm can convert the ammonia used to create chloramine into nitrate, which can be harmful to public health if left unchecked. A safe and effective way to control biofilm is through an industry-accepted procedure called chlorine maintenance or "free chlorine." Chlorine safely controls biofilm and minimizes the need to flush distribution lines. Because warmer temperatures increase the potential for harmful bacteria in the distribution system, many water utilities including NTMWD conduct annual chlorine maintenance prior to the hot summer months.

According to the Texas Commission on Environmental Quality (TCEQ), "Temporary conversion to free chlorine in conjunction with distribution line flushing has been shown to be an effective strategy to improve water quality." While chemicals like chlorine could be harmful in high doses, when they are properly added to water, they result in low concentrations that kill germs but are still safe to drink. If used properly, there should be no detrimental impacts to customers.

### **Does NTMWD add more chlorine during this period?**

Chlorine levels during this temporary maintenance period are consistent with normal year-round operations. The only change during this maintenance is the discontinuation of ammonia while maintaining all other treatment processes. The odor of chlorine may be more noticeable due to the lack of ammonia.

### **Is the chlorine maintenance being done because of a "failure" in the treatment system due to a nitrification problem?**

No, it is a preventive measure to safeguard public health. According to the Texas Commission on Environmental Quality (TCEQ), many utilities throughout the state and country, commonly in states with warmer climates, that use chloramines for their distribution disinfectant convert to free chlorine on a routine or as needed basis. NTMWD has performed this maintenance as a routine practice since 2007.

### **Do NTMWD and its member cities and customers test during the maintenance period?**

Daily routine testing for bacteria, disinfectant residuals, nitrate, and many other parameters occurs during the maintenance period at the treatment plant and in the distribution systems. -Samples are collected by TCEQ-licensed water operators and analyzed in accredited labs. NTMWD tests for trihalomethanes (THMs), which are disinfection by-products that may be created when chlorine reacts with natural organic matter. EPA and TCEQ regulations stipulate that the annual average of samples collected must be below 80 parts per billion (ppb) of THMs. The NTMWD test results are in full compliance with this standard. Monthly and annual water quality reports can be found on the [www.NTMWD.com](http://www.NTMWD.com) website here: <https://www.ntmwd.com/water-quality/>

**Per TCEQ:** "As of March 20, 2018, after review TCEQ's drinking water compliance data, the NTMWD Wylie water treatment plants public water system has no current violations under the revised Total Coliform Rule, Stage 2 Disinfection By Products Rule and Surface Water Treatment Rule. TCEQ's records show that the system is in compliance with these regulations and also meets the TCEQ's requirements for disinfection residuals."

### **How does the chlorine maintenance affect my water?**

Although users may experience a stronger smell of chlorine during the maintenance period, **the water is safe to consume**. Disinfectant (chlorine) residuals during the maintenance period remain within EPA requirements: [https://www.ntmwd.com/wp-content/uploads/2018/03/Chlorine-Residuals-at-NTMWD-Treated-Water-Ground-Storage-Reservoirs\\_2018-2017-maintenance-periods.pdf](https://www.ntmwd.com/wp-content/uploads/2018/03/Chlorine-Residuals-at-NTMWD-Treated-Water-Ground-Storage-Reservoirs_2018-2017-maintenance-periods.pdf)

### **Why don't you just do a better job of removing the dirt from the water?**

Lake water naturally contains sediment, organic matter and potentially harmful bacteria. The water goes through a proven multi-step process to remove sediment and organic material, eliminate bacteria and viruses (ozone – primary disinfection), filtration through carbon and sand filters, chlorine and chloramine (chlorine + ammonia) added as secondary disinfectant to maintain water quality throughout the distribution system.

### **Where does the nitrifying bacteria end up during this process?**

Chlorine reacts with and kills these bacteria, making them harmless to humans. Flushing of distribution systems helps remove these dead, or inactivated, bacteria. However, the presence of some organic matter can remain in the distribution system. This is common to all public water distribution systems.

### **What is the typical level of flushing the system through fire hydrants to ensure the Disinfectant By Products (DBP) don't end up in customer homes?**

Flushing the lines through fire hydrants is highly dependent on the specific characteristics of each city's distribution system. In addition, factors such as temperature, age of water, and system demands can also influence the need for flushing. Keeping the water fresh in the system helps reduce the formation of disinfection by products and maintains the state-mandated disinfection residuals.

## **Water Testing**

### **How often do you test the water and how are the results shared?**

NTMWD has a state-certified laboratory that analyzes more than 250,000 water quality samples a year – about 685 samples daily – to ensure drinking water meets or exceeds regulatory, health and aesthetic standards set by the Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency (EPA). We test water in our system and provide testing services for member cities and customer entities. Routine testing has been done during the chlorine maintenance period. Samples taken during and prior to the maintenance period show that NTMWD complies with all TCEQ and EPA requirements, including the Stage 2 Disinfection By Products Rule. Test results can be viewed at: <https://www.ntmwd.com/water-quality-reports/>.

### **What are the levels of chlorine during the maintenance period?**

NTMWD and its city/customer water providers are required to maintain an **annual average** chlorine disinfection residual level of between 0.2 parts per million and 4 parts per million. The water leaving the treatment plant will have a higher level of chlorine or chloramine than the water at a resident's tap which ensures it will meet required disinfection levels.

The following table shows chlorine residuals data in conjunction with bacteriological samples collected at designated NTMWD ground storage reservoirs before being delivered to city distribution systems. These sample sites are approved by TCEQ for our routine testing. Routine sample results are analyzed for compliance and sent to the TCEQ.

The chlorine residuals are recorded as part of the revised Total Coliform Rule compliance. NTMWD collects and analyzes a higher number of samples than required by TCEQ. The laboratory submits the results of the coliform testing and chlorine residuals of 40 samples each month to the TCEQ. These residuals are used for the annual [Consumer Confidence Report](#). Cities are required to perform additional testing and reporting on their distribution systems. NTMWD Member City and Customer water quality and Consumer Confidence Report links can be found at [www.SafeWaterNorthTexas.com](http://www.SafeWaterNorthTexas.com).

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).*

### Why are my swimming pool chlorine levels close to the levels in my drinking water?

According to the Texas Commission on Environmental Quality, “A normal level for drinking water disinfection can range from 1 parts per million to 4 parts per million which is similar to chlorine levels found in swimming pools.” However, using pool test kits to test drinking water is not recommended as a reliable method. According to the Centers for Disease Control (CDC), the following are drawbacks to using pool test kits for drinking water: Degradation of the OTO (orthotolidine) solution that causes inaccurate readings over time; generally not reliable quantitative results; and lack of calibration and standardization. Link to CDC recommendations on testing chlorine levels:

<https://www.cdc.gov/safewater/chlorine-residual-testing.html>

### Why am I noticing the chlorine more this year?

The chlorine is typically more noticeable during the annual maintenance period due to the lack of ammonia. However, chlorine levels during the maintenance period (which ended March 26) are consistent with normal year-round operations. A number of factors may cause it to be more noticeable, including greater rainfall and lower consumption in the system, as well as longer time spent in the distribution systems. NTMWD is assessing potential contributing factors that may have caused it to be

more noticeable for some residents this year and will be talking with our cities about any potential changes to consider in the future.

### **Health, Taste and Odor**

#### **What can I do to eliminate the chlorine taste or smell?**

According to the Water Quality and Health Council, if you are bothered by chlorine odor or taste, there are two simple practical solutions. 1) Fill a pitcher of water and set it aside uncovered for several hours, while chlorine dissipates. Transferring water rapidly between two pitchers can accelerate chlorine dissipation. 2) Install an activated carbon filter at the tap.

#### **Could the chlorine cause rashes or other health problems?**

Some individuals may be more sensitive to chlorine. If you are concerned, you should consult your doctor. It is important to note that NTMWD chlorine levels are consistent with normal year-round operations. The only change during this temporary maintenance period has been the discontinuation of ammonia while maintaining all other normal year-round treatment processes.

### **Other Questions Raised on Social Media**

#### **Why don't you use other disinfection techniques?**

While ozone is a very effective primary disinfectant, it doesn't last long enough to provide disinfection throughout the distribution system. The only disinfectants that are able to provide long-lasting protection are chlorine and chloramine. There are no other alternatives for maintaining the required levels of disinfection. Chloramine lasts longer than chlorine and ensures water remains disinfected throughout the distribution systems. Before leaving the treatment plant, chloramine is added as the last step to maintain the water quality as it travels the long distances to the homes and businesses served by our cities.

#### **Does the chlorine maintenance accumulate biofilm, sludge and debris that could affect water heaters and other appliances?**

While water heaters may collect sediment over time, if maintained properly according to manufacturer guidelines, there should be no impact on their operation or expected lifespan.

#### **Does NTMWD plan to discontinue the chlorine maintenance process? What could be done instead of it?**

NTMWD has no plans to discontinue this routine and accepted practice. Discontinuing this process would require different operational practices in the distribution systems, such as increased fire hydrant flushing which would reduce available water supply and could impact our ability to meet demand for water in the summer months and for fire fighting. In order to do this, we would need additional supplies above and beyond those being planned.

#### **Do you use chloramine because it is the least expensive treatment?**

No, we use it because in conjunction with ozone and chlorine, it is the most effective treatment. It provides long-lasting disinfection benefits with minimal disinfection by products. In many cases the use of chloramines is more costly because it requires the purchase and storage of more chemicals (ammonia). It also requires additional equipment, technology and operations.

### **Does chloramine form dangerous toxins?**

Since chloramines are not as reactive as chlorine with organic material in water, they produce substantially lower concentrations of disinfection byproducts in the distribution systems. Some disinfection byproducts, such as the trihalomethanes (THMs), may have adverse health effects at prolonged high levels. EPA closely regulates these disinfection byproducts and NTMWD is in full compliance.

### **Why doesn't Dallas use this process?**

It is our understanding that the Dallas Water Utilities (DWU) has an ongoing flushing program to control nitrification in their system. However, based on NTMWD's water conservation program, and its lack of excess water supplies, controlling nitrification solely through flushing is not a viable or cost-effective option for our regional system.

### **How does your treatment rank with others?**

NTMWD has been recognized for the superior performance of its treatment facilities in doing more than what is required to meet state and federal drinking water standards by the TCEQ's Texas Optimization Program (TOP). More information on the TOP program can be found here:

<https://www.tceq.texas.gov/drinkingwater/swmor/top>

### **Why is Erin Brockovich involved?**

Ms. Brockovich has made claims about our water system and processes which are not accurate. Ms. Brockovich isn't familiar with our water treatment and disinfection processes or the system. **The EPA, TCEQ, CDC and Water Research Foundation all indicate that the use of chloramines and free chlorine maintenance are safe, common, accepted and proven practices for maintaining water quality.**

### **Additional Resources**

#### **Where can I find more information?**

More information about water treatment and the use of chlorine as a disinfectant, including free chlorine maintenance, can be found on the following websites:

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

EPA - <https://www.epa.gov/dwreginfo/chloramines-drinking-water>

Water Research Foundation -

<https://www.awwa.org/portals/0/files/resources/publicaffairs/pdfs/monocommkit.pdf>

Centers for Disease Control (CDC) - <https://www.cdc.gov/healthywater/drinking/public/chloramine-disinfection.html>

CDC - <https://www.cdc.gov/healthywater/drinking/public/chlorine-disinfection.html>

American Water Works Association – <https://drinktaps.org>.

More information about NTMWD water quality, including test results is available on the NTMWD website at: <https://www.ntmwd.com/water-quality-reports/>

NTMWD has compiled links to industry, district and city resources into one online location at: [www.SafeWaterNorthTexas.com](http://www.SafeWaterNorthTexas.com).