



Manatee County Water System Odor and Taste Related Aesthetic Issues

FACT SHEET

Produced by the Manatee County Water Treatment Plant Quality Control Laboratory

The odor and taste of drinking water are often the primary characteristics upon which consumers base their judgment of the water quality. There are many constituents, which when dissolved in water, will affect its odor or taste. While there are methods available for quantifying many of these constituents, overall odor and taste, in both quality and intensity, remain a subjective measure. Water that is “funny tasting” or has an “awful smell” to some is viewed as unremarkable by others, and odor and/or taste that are different from what one is accustomed are often judged unfavorably. Manatee County provides drinking water that meets all safety standards and strives to provide drinking water to each tap in our system that is free from unfavorable odor or tastes. Our experience with customers has shown that due to the subjective nature of odor and taste and other factors listed below that there are a few categories which encompass the vast majority of their odor and/or taste concerns. The information below describes some of these concerns, details possible causes, and for some, provides diagnostic procedures that can be performed by homeowners. Also, the Manatee County Water Treatment Plant Quality Control Laboratory provides sample collection and analyses for Manatee County customers with all types of water quality concerns. If you have other non-odor or taste water quality concerns, or further questions not answered by the information below, call 941-746-3020, x-5014 to speak with Laboratory personnel.

“CHLORINOUS”, “BLEACH”, or “CHEMICAL” ODOR: These odors are attributable to the residual disinfectant that is required in all distribution systems by Safe Drinking Water Act regulations. Manatee County utilizes chloramines (chlorine + ammonia) as a disinfectant. Chloramines are much less reactive compounds than free chlorine (bleach), and create fewer disinfection by-products. Chloramines have a different odor than free chlorine. Many people who have experienced water systems that use free chlorine do not attribute any odor to chloramines, while others are sensitive to the ammonia component of chloramines. The chloramine concentration in your water will vary depending on the distance you live from the Water Treatment Plant and the time of the year. Generally, higher concentrations are found closer to the plant during the winter. This is due to the water having a shorter residence time in the pipe (shorter distance and higher flows) and lower water temperatures. Conversely, the lowest levels will occur at the ends of the system, in the summer (rainy season, winter residents gone) when water temperature is high (can reach 92°F). As chloramines “disinfect” the water, they are broken down and some free ammonia is formed. Water with elevated free ammonia levels are often described as having a “chemical taste”. Because of this variability, water at one home may not have the same degree of “chlorinous” taste as water from another part of the County.

“EARTHY”, “MUSTY”, or “MOLDY” ODOR: These odors/tastes are primarily caused by algae and bacteria that grow naturally in all lakes, including Lake Manatee, the source for approximately two thirds of the County’s water. Certain algae and bacteria produce compounds (MIB and geosmin) as part of their metabolism that impart the earthy/musty odor/taste to the water. (These same compounds are produced by bacteria in soil and make “dirt smell like dirt”.) The compounds do not affect the safety of the water but produce odors at very low levels (part per trillion). The causatory algae blooms are episodic; they appear most frequently in the late spring and early summer but can occur at anytime during the year. On average they occur 2 to 3 times per year and last 2-4 weeks each. Most of the time the Water Treatment Plant can adjust treatment to remove these compounds to below threshold levels. However, during drought conditions (like in 2006 and 2007), the odorants can reach levels that exceed our capability to remove them. Typically, if you are experiencing this odor in your water, it is occurring throughout the system.

“SULFUR”, “SEWER” OR “ROTTEN EGG” ODOR: The rotten egg odor is caused by the presence of hydrogen sulfide (H₂S). At normal temperatures H₂S is actually a gas that can dissolve in water. In water, H₂S is usually produced by a type of bacteria, sulfate reducing bacteria (SRB), that use sulfate from the water in their metabolism and convert it to H₂S. There are several situations that could cause the detection of H₂S and a little investigative work can rapidly help diagnose the cause.

In our system, the vast majority of H₂S reports by customers are actually caused by odors from drains as opposed to odors in the tap water. Water that sits in the trap under a sink typically contains bacteria which are capable of producing H₂S. The H₂S exists in equilibrium as a gas in the drain pipe above the water and dissolved in the water in the trap. When a customer turns on their tap and water goes down the drain, this equilibrium is disturbed and the air in the drain containing this H₂S is displaced, resulting in H₂S moving up through the drain and into the air above the sink. Because H₂S is a gas, it can disperse throughout a bathroom in a few seconds, making the whole room smell like "rotten eggs". The longer water sits in a trap and is undisturbed, the more time the bacteria have to produce H₂S, and the more intense the odor can be. Often customers will report the odor is most intense when the water is first used in the morning, when they turn the water on and then bend over to wash their face or brush their teeth. A quick way to determine if this is the cause of the odor is to capture the first water out of the tap in a cup, without letting any go down the drain, and then smelling the water in the cup. If there is no H₂S odor the problem is probably with the drain. Letting some water go down the drain and checking for the odor can confirm the source of the odor. If the odor is coming from the drain, there are two things that can be done to eliminate the odor causing bacteria from the trap. 1) Put two tablespoons baking soda down the drain with an ounce or two of water (run faucet for 2-3 seconds); let it stand in drain for several hours, then flush trap by letting faucet run for about ten seconds. This will often take a repeat application to completely eliminate odor. Or 2) pour 1/4 cup of household bleach into the offending drain; let it stand for about 15 minutes, and then flush by letting the

faucet run for about 15-30 seconds. The bleach treatment is usually more effective, but there may be residual bleach odor for a day or two.

The second most common source of H₂S odors, is the water heater. Some species of SRB can grow in a water heater if the temperature is not set above 138 degrees, or if the water heater is unused for an extended period. Typical chlorine disinfectant levels in community water systems will keep SRB from growing, but the chlorine disinfectants are reactive, and will dissipate after a couple of weeks. It's relatively easy to determine if the problem source is the water heater, by checking the cold water and the hot water for odor. If you have single handle "mixing type" valves, be sure to move it all the way to the cold side and then all the way to the hot side when checking for odor. Since you've determined that the problem is not from the drains, it is okay to let the water run, but you should collect a sample in a cup to check for odor. If the source is the water heater, the odor will get stronger and persist as hot water from the water heater gets to the faucet. (You may want to take the cup out of the room to check for odor to ensure you're not detecting "background" odors). Additionally, if the water heater is involved, the odor will be from every hot water tap in the home. To correct, the water heater should be drained and flushed. It is also recommend that you check the thermostat setting, because many new installs have the thermostat set at less than 120 degrees. Some customer's have set the thermostat to 150 degrees for a couple of days when they first return from an extended absence to "clean" the hot water lines and then set it back to 135 - 140 for routine use.

An additional source of H₂S odors that we have seen over the last several years is an SRB biofilm growth on the inside of certain flexible, plastic supply lines. These are the lines that connect the cold and hot water lines that extend from the wall to the sink faucets. Most of the lines where this has been documented are white in color and have an integral push-pull valve attached. The vast majority of installations of these type lines do not experience this problem, nor have we documented this problem in non-plastic supply lines. Characteristic to this problem are odors that occur in the "first draw" from a sink faucet and quickly disappear from the water as the water is run (the odor may remain in the room as H₂S is a gas). Most of the time the odor is not detected from typical shower or tub installations as the CPVC or copper is plumbed directly to the valves with no need for the flexible supply lines. As with odor from the drains, the longer the water sits in the supply line (the longer the period between uses), the greater the chance the H₂S odor will return. To determine if this is the problem, collect the first cupful (6-8 oz.) of water from the faucet and try to detect if the odor is in the cup. Then collect the second cupful and check for odor. Repeat with a third and fourth cup if necessary. If an SRB biofilm on the supply lines is the cause, the odor will be present in the first cupful and will typically be completely gone by the third cupful. Check each line independently, hot and cold (remember to push single lever mixing-type faucets all the way to cold and then all the way to hot when checking each side). We have investigated cases of side by side sinks in a bathroom where one sink has the problem and the other does not, or where only the cold line has the problem and the hot does not. A manufacturer of the one-piece, white flexible supply lines with plastic push-pull valve recommends a 3x3x3 flushing program to clear the lines. They suggest flushing each offending line for 3 minutes, 3 times day, for 3 days, being sure to only flush one at a time to insure maximum flow and scour

through the line. Some of our customers have elected to replace the offending supply lines.

Another source of H₂S, of which we see with decreasing regularity, is a cross connection with an irrigation system. Many irrigation systems rely on shallow or intermediate aquifer wells that have elevated H₂S levels. This cause can be tricky to isolate, but can be identified by shutting the water off at the potable meter and then checking to make sure there is no flow at the faucets. If the irrigation system is a pressure system and there is a cross connection there should be flow. If it is not a pressure system, with the potable water shut off, turn the pump on and check for flow. Any flow in these situations should have the characteristic H₂S odor and indicates a cross connection, which must be immediately disconnected.