MISSISSIPPI STATE UNIVERSITY EXTENSION

Testing Residential Private Well Drinking Water and Understanding Bacteriological Analyses

Clean, safe drinking water is important to your health, and you expect it when you turn on the tap. You may be concerned about contamination of drinking water if you notice a change in its appearance, taste, or odor. However, it is important to remember that many of the chemicals or microorganisms that could make you sick cannot be seen, tasted, or smelled. Likewise, contaminants in drinking water do not necessarily put your health at risk. If you are concerned about the quality of your water, this publication will provide guidance on how to collect a water sample, what tests should be run on the sample, and how to interpret your test results.

Public Water Supply versus Private Well

Homeowners get their drinking water from one of two sources: public infrastructure or private wells. A community water system is any water system with at least 15 connections or that serves a residential population of at least 25 people for 60 days per year. Community water systems, whether in a municipality (city or town), utility district, or rural water cooperative, are regulated and required to test for contaminants to ensure that unsafe levels of contaminants are not present.

The United States Environmental Protection Agency (EPA), originally authorized by the Safe Drinking Water Act (SDWA) of 1974 and under the 1996 amendments, is tasked with ensuring that community and noncommunity water systems (hotels, campsites, schools, restaurants, work sites, etc.) meet minimum standards for protecting public health. Among other things, the EPA has developed maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) for all regulated contaminants. MCLs are regulated and enforceable contaminant levels, while MCLGs are health-based goals that are not enforceable. States can apply to EPA for "primacy," or the authority to implement the SDWA, if they meet certain criteria. In Mississippi, the Mississippi State Department of Health (MSDH) is the primacy agency for implementing SDWA regulations and the national drinking water standards set forth by EPA.

Small, private water supplies (less than 15 connections)—including privately owned wells serving an individual home and/or farm—are not regulated by federal drinking water standards. It is the responsibility of the owner to test and treat this water as needed to avoid health risks.

Determining Water Quality

If you receive your drinking water from a community water system, you should receive a Consumer Confidence Report (CCR) annually. Community water systems are required by federal law to provide this to their customers. The population served by the water supply determines the method by which the water supply provides the CCR to customers. The report must list detected contaminants in the water supply, as well as the amount and source of the contamination. Your supplier may post this online.

If your water comes from a private source, such as a well on your property, you are responsible for making sure your water is safe to drink and your system is properly maintained. Private well owners are not required to test their private well water. However, it is recommended that individuals drinking the water produced by a private well test the water regularly. Private well owners have three options to test drinking water professionally:

1. A private laboratory
2. The MSDH Division of On-Site Wastewater (1-855-220-0192)
3. Mississippi State University Extension's Mississippi Well Owner Network (1-662-325-1788)

For this publication, we will address the water testing performed by the MSDH Division of On-Site Wastewater.

How to Collect a Drinking Water Sample for Testing

Collecting a drinking water sample is generally straightforward, but take precautions to ensure the sample is not contaminated during collection. For instance, when collecting a sample to be analyzed for coliform bacteria, it is important to use a sterile container to prevent accidental contamination.

Most laboratories conducting water analyses will supply the appropriate sample bottle along with instructions for how to collect the sample. Private well owners in Mississippi who would like to get their drinking water tested may call the MSDH Call Center and ask to have an environmentalist visit their private well and sample the drinking water. There is a fee for having your private well water tested. Contact the MSDH Division of On-Site Wastewater.

The MSDH environmentalist will visit the private well location and take the water sample in a sterile container provided by the MSDH lab. There is no set number of times a well can be sampled in a year. It is recommended that private drinking water wells be tested at least one time per year to ensure consistent quality.

Contaminants Tested

The MSDH environmentalist has a standard procedure for testing private wells. He or she will collect a water sample that will be analyzed at the MSDH state laboratory in Jackson for the presence or absence of total coliform. Coliform bacteria are microorganisms in animal intestines. They can also be found in the environment, including in soil and water. The presence of coliform bacteria in a water sample indicates the potential for the presence of organisms that can make people sick. These bacteria can enter wells when the well structure is poorly constructed, unsealed, or fractured. They can also contaminate groundwater when sinkholes and other subsurface voids provide a quick route for surface water to reach groundwater without percolating through the soil.

If the water sample tests negative for total coliform, no further tests are needed. If results are positive for total coliform, a second test will be performed to check for *Escherichia coli* (*E. coli*), which is a subgroup within the total coliform group of bacteria. The Mississippi Public Health Lab will test for bacteria only (total coliform and *E. coli*) because the majority of water safety problems are linked to these contaminants. The bacteria tests are usually sufficient if you just want to determine the general health of your drinking water and do not have a concern about a specific contamination problem.

If the second sample tests positive for *E. coli*, do not drink the water without boiling it first. Consult with the MSDH Call Center, Mississippi Public Health Lab, or MSDH Bureau of Public Water Supply for basic recommendations. These contacts will provide all the precautionary steps to take if *E. coli* is found in your private well drinking water. Recommended steps may include identifying and eliminating the source of contamination, chlorinating (disinfecting) the well, and taking additional samples to confirm that the contamination has been cleared. For information on how to chlorinate a well, see MSDH's page on private well disinfection.

Understanding the Lab Results

Most results will be reported in milligrams per liter (mg/L), which is a measure of the mass of contaminant per unit volume of water—parts per million (ppm)[1] or parts per billion (PPB). One ppm is about the same as 1¼ two-liter bottles poured into an Olympic-size swimming pool, while one ppb is roughly ½ teaspoon in the same pool.[2]

Total coliform results will be reported as present or absent, and any presence of total coliform is unacceptable. *E. coli* results will be reported as present or absent. There is no acceptable range for *E. coli*—any trace is considered hazardous.

For more information on private well drinking water testing in Mississippi and/or public water supplies, contact one of the following agencies:

Mississippi State Department of Health
Division of On-Site Wastewater

Mississippi State University Extension Service
Mississippi Water Resources Research Institute
P.O. Box 9547
Mississippi State, MS 39762
(662) 325-1788

1. 1 milligram per liter is the equivalent of 1 part per million (ppm).
2. An Olympic-size swimming pool is 660,000 gallons of water with an approximate dimension of 164 feet long, 82 feet wide, and 6½ feet deep.

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