

METHANE GAS AND WATER WELLS

What is methane?

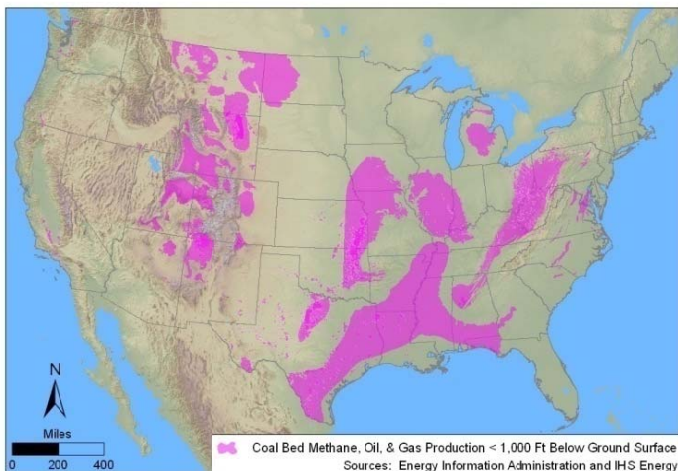
Methane is a naturally occurring, colorless, odorless and tasteless gas that is the primary component of natural gas. It is especially prevalent in coalbeds, but occurs in non-coal rocks as well. Methane is also called fire damp, marsh gas or swamp gas. Potential methane sources include: decaying organic matter, swamps, landfills, natural seeps, leaking pipes, septic systems and sewers, abandoned or active coal mines, or improperly abandoned or improperly constructed natural gas and oil wells.

Can methane be a problem?

Methane can become a concern when it migrates from its source in underground rock formations to the surface and enters an enclosed structure. Methane travels to low pressure points, such as floor cracks in an enclosed structure, along buried utility lines or as a dissolved component of well water. An enclosed structure could be a house, shed, well house, water well pressure tank or wellbore. Under specific circumstances, methane in an enclosed structure can deplete oxygen or become a combustion or explosion hazard.

Historically, methane has been found occasionally in water wells located across the United States, ranging from Maine to Washington. Methane-related incidents have been documented from the early 1800s through the present.

Areas with High Potential for Shallow Methane



KEY POINTS

- Methane is a naturally occurring, colorless, odorless, and tasteless gas that is the primary component of natural gas.
- Methane can become a problem when it migrates from its source in underground rock formations to the surface and enters an enclosed structure.
- Under specific circumstances, methane in an enclosed structure can deplete oxygen or become a combustion or explosion hazard.
- If you think your well water may contain methane, you should have your water tested.

How do I know if there is methane in my water?

Water containing methane can sometimes have effervescent gas bubbles similar to carbonated soda pop. It may look cloudy or milky, or there may not be any visible indication that methane is present. If you think your well water may contain methane, you should have your water tested. Detecting methane in water can be difficult, so it is important that a qualified sampler collect the water samples and a qualified laboratory perform the analytical test. You can get further information on methane and water wells by contacting your state environmental agency, state or local health department, local Cooperative Extension Service Office or the Environmental Protection Agency Water Systems Council at 888-395-1033.

How much methane does it take?

There are no known health effects from drinking water that contains methane. When water containing methane comes into contact with air, the methane quickly escapes the water into the atmosphere. If this process occurs in an enclosed space, the methane could ignite if there is a spark source, or if it accumulates, it could explode. Methane can form an explosive mixture in air at 5 to 15% concentrations by volume. For private water wells the exact concentration of methane that can form an explosive mixture depends on a number of factors including:

- Water temperature
- Actual percent composition of the gas
- Whether or not the water well is vented
- Air movement inside the home or structure

If your well water contains methane above a concentration of 28 milligrams per liter (mg/L), the U.S. Department of the Interior, Office of Surface Mining suggests you take immediate action to reduce the concentration.

Methane concentrations below 10 mg/L are generally considered safe. Wells with methane concentrations between 10 and 28 mg/L should be monitored periodically to make sure the methane concentration is not increasing.

How can I get the methane out of the water?

Well vents can provide an escape route for methane in some wells. Aeration is another method that can remove methane from well water. You should contact a water well professional to determine the best method for methane removal.

How does Chesapeake minimize the potential for methane migration?

Chesapeake Energy Corporation's drilling program meets or exceeds all state regulatory requirements in areas where we operate. Multiple layers of protective steel casing and cement seals coupled with specialized well testing procedures ensures methane from our operations does not migrate into shallow drinking water aquifers.

Chesapeake has also implemented a baseline water well testing program – even in states that do not require baseline testing – when we drill wells in areas of the country where methane problems in water wells have been identified. With this program we often identify water well locations near our drill locations that already have detectable concentrations of dissolved methane. Our baseline water test results are provided to the water well owners for their own use.

Information Sources

- Commonwealth of Pennsylvania, Department of Environmental Protection
- Kentucky Department for Environmental Protection
- Penn State College of Agricultural Sciences, Cooperative Extension, School of Forest Resources
- U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement, Appalachian Regional Coordinating Center
- U.S. Department of the Interior, U.S. Geological Survey.
- Water Systems Council

About Chesapeake

Chesapeake Energy Corporation is the second-largest producer of natural gas, a Top 15 producer of oil and natural gas liquids and the most active driller of new wells in the U.S. Headquartered in Oklahoma City, the company's operations are focused on discovering and developing unconventional natural gas and oil fields onshore in the U.S. Chesapeake owns leading positions in the Barnett, Haynesville, Bossier and Marcellus natural gas shale plays and in the Granite Wash, Cleveland, Tonkawa, Mississippi Lime, Bone Spring, Avalon, Wolfcamp, Wolfberry, Eagle Ford, Niobrara, Three Forks/Bakken and Utica unconventional liquids plays. The company has also vertically integrated its operations and owns substantial midstream, compression, drilling, trucking, pressure pumping and other oilfield service assets. For more information on Chesapeake environment initiatives, visit the environment section of CHK.com, HydraulicFracturing.com, NaturalGasAirEmissions.com, NaturalGasWaterUsage.com, AskChesapeake.com or FracFocus.com.