

# METHANE GAS MIGRATION AND YOUR WATER WELL



Methane gas has been a “hidden” problem in Northeastern Pennsylvania. The gas is typically associated with wetlands, bogs, landfills, coal-producing formations, natural saline seeps, some glacial deposits, and gas storage areas. Because of the development of the Marcellus Shale, the presence of methane gas and the potential for methane gas migration is a growing concern.

Methane is a colorless, odorless, highly flammable gas that is lighter than air. It is not considered toxic, but it is an

asphyxiant (it displaces oxygen) and dangerous in a confined or poorly vented area. Natural gas is mostly methane and carbon dioxide plus other gases. As a safety measure, the natural gas industry adds odor to produced methane gas so that gas leaks will be more readily noticed.

From the available data in the Citizen Groundwater/Surfacewater Database, it appears that the natural background level of methane in private wells in Northeastern Pennsylvania ranges from not detectable or trace levels to over 28 mg/L. You may suspect the presence of methane gas in your water if you hear a “gurgling noise,” sputtering at the tap, the water has a lot of gas bubbles, or is effervescent or fizzy.

Note: If the pumping level of water in your well starts to fall below your pump intake, ordinary air may mix with the water and produce similar symptoms. When in doubt, contact a professional to determine the nature of the observed gas.

Water hammer or pressure surge is another potential sign of a methane or entrapped gas-related problem. Methane gas typically out-gases very quickly from water. If it takes over 2 minutes for the gas and water to separate, it is most likely carbon dioxide. If you have a lot of gas and the methane content of the water is low, it may be a mixture of carbon dioxide or air entrapment within the system. If there is a strong odor and the level of methane is low, you may want to test for sulfur (hydrogen sulfide; odor of rotten eggs) or propane. Testing for propane would be advisable if you or your neighbors use propane gas.

---

Note: Some articles suggest that you should try to collect the water and allow the gas to outgas in a sealed container and then attempt to light the accumulated gas – we do not recommend this practice.

# Testing for Methane

---

Methane gas migrates naturally up through the soil, geological materials, and through the groundwater and into your home or well. If you want to test under the conditions most favorable to methane gas migration or leakage, it would be advisable to conduct testing when one or more of the following conditions exist:

- a.** barometric pressure is low and soils are saturated;
- b.** snow cover is just beginning to melt;
- c.** the ground is frozen or ice covered; or
- d.** under long-term pumping conditions for the well when the well is experiencing the lowest dynamic water level and greatest drawdown.

The level of methane gas is very site-specific so, after testing, one or more of the following may be necessary.

- 1.** Seek advice from a licensed professional.
- 2.** Conduct an assessment of the methane level in the water, space under the well cap, and in the air in your home or other confined spaces.
- 3.** Mitigate any immediate hazards that could result in an explosion.
- 4.** If possible, modify the wellhead to properly vent the gas and upgrade electrical connections to reduce the level of methane in the water. (This modification may include raising the well pump, installing a pump shroud, installing an active venting system, cement sealing a portion of the well, and any other modifications to make sure the well is properly and safely vented.)
- 5.** Conduct additional monitoring or chemical analysis.
- 6.** Install a long-term treatment system. This should include some type of aeration and degassing system. Special precautions and additional testing will be needed if disinfection will be a component of the system.
- 7.** Any time the level of methane in the water is at or greater than 7 mg/L - Contact- PADEP and the Local Natural Gas Company in Your Area – Under Oil and Gas Law- Section 78.89 – “When an operator or owner is notified of or otherwise made aware of a POTENTIAL natural gas migration incident, the operator shall immediately conduct an investigation of the incident.”

For more information, visit [www.water-research.net](http://www.water-research.net) or [www.bfenvironmental.com](http://www.bfenvironmental.com), or call 570-335-1947.