

Methane Gas and Your Water Well

Residents of the coal and natural gas producing regions of Pennsylvania need to be aware of the potential dangers from the accumulation of microbial gas, coal bed methane, or natural gas, in their water wells.

High concentrations of methane in water wells, water well enclosures and other confined spaces could cause an explosion.

What Is Methane?

Methane (CH₄) is a naturally occurring hydrocarbon gas found underground. It is present in shallow and deep coal beds as well as other rock units, and is the main hydrocarbon found in natural gas, coal bed gas. Methane can occur dissolved in the groundwater or as a gas in the soil and rock zones below the surface.

Methane migrates from areas of high pressure to areas of low pressure. Mining and well drilling operations can affect the pressure in the subsurface and cause the migration of methane to areas of lower pressure such as shallow aquifers, and water wells used as water supplies. Gas migration in the subsurface can also be influenced by an increase or decrease in the water level of an aquifer.

Active underground mining operations can lower groundwater levels, reducing pressure in aquifers occurring above and adjacent to the area of coal extraction. This reduction in pressure can allow gases within the overlying rock layers to migrate into nearby water wells. Methane can also be released from abandoned deep mines, and from abandoned gas wells that are prone to leakage. These releases can also migrate into nearby water wells.

Methane can migrate into water wells in a gaseous phase or dissolved in the ground water. At atmospheric pressure, methane is soluble in water between 26-32 mg/l. It is some times recognizable as effervescent gas bubbles in water drawn from a faucet. In some cases, the release of methane in a water well may be recognized by a sound similar to that of boiling water. However, methane is a colorless and odorless gas, and may accumulate undetected in water well bores and water well enclosures that are not properly vented. Methane may also move into basements of homes and other structures through plumbing and piping containing electrical connections. These conditions could lead to an explosion.

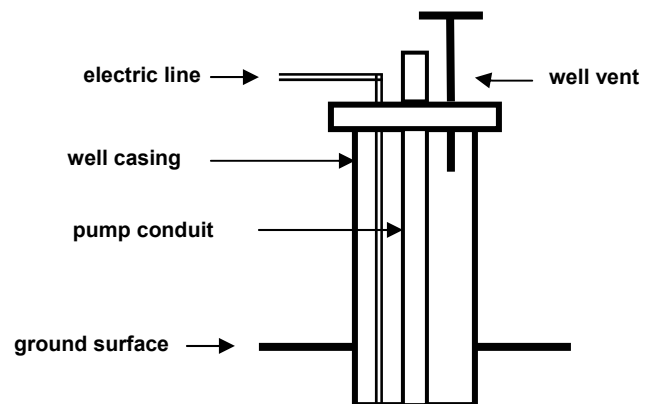
What Can You Do?

Methane is lighter than air with a specific gravity of .555. As such, methane will not accumulate in the water well bore if the water well is properly vented to the atmosphere. Venting is an inexpensive and effective way to prevent methane accumulation in water wells, water well enclosures and other confined spaces, such as basements. Proper venting eliminates the potential for methane gas to seep into homes or structures from water wells.

Recommended Venting Procedures

Proper design is extremely important. Water well vents should be installed by a qualified water well driller or plumber.

The vent should extend above any possible flood level, potential ignition sources, and areas of exposure (above the roof line for water wells adjacent to buildings), and should have watertight connections to prevent surface water from entering. The well vent should be at least one (1) inch diameter or larger to facilitate gas flow. The end of the vent pipe should have a down-turned "gooseneck" or "T" and be capped with corrosion-resistant screening. If the vent is not screened, it can become a potential entry point for debris and small animals. In addition, conduits from the water well that carry electrical lines or waterlines into the building should be sealed so that the air in the conduit does not



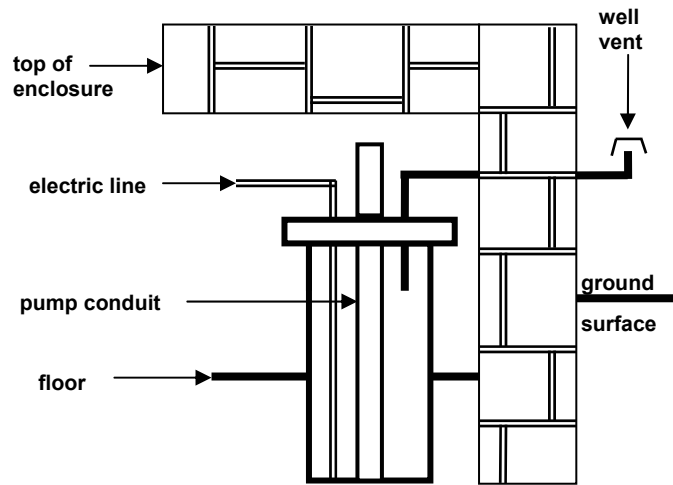
vent into the building. Well venting will not appreciably remove methane dissolved in the groundwater, however, properly designed water aeration systems are an effective way to lower the concentration of methane dissolved in the water.

Enclosed Wells

When the top of the water well is buried in a covered pit or enclosed in a basement, the vent pipe must vent gas to the outside air, as shown in the diagram below.

The vent pipe should be screened, and extend above any possible flood level, potential ignition sources, and areas of exposure.

In cases where the water well is located in an enclosure, it should have a tight-fitting well cap, and all openings through the cap should be properly sealed to prevent methane from escaping into the water well enclosure.



Play It Safe

When a water well is no longer in service, the plumbing connections should be disconnected and sealed to prevent methane from entering the home or building.

NOTE: Your water well may differ considerably from the wells depicted in the diagrams. Also, well venting requirements may vary from place to place due to differences in local plumbing codes. Therefore, water well owners are encouraged to contact a professional water well specialist or a local building code enforcement officer to determine the proper venting procedures required under the local plumbing code.

For more information on methane and water wells, please contact the DEP Office in your area.

Southwest Regional Office

400 Waterfront Dr.
Pittsburgh, PA 15222
Telephone: 412-442-4000
Counties Served: Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington and Westmoreland.

Southcentral Regional Office

909 Elmerton Avenue
Harrisburg, PA 17110
Telephone: 877-333-1904
Counties Served: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, and York.

Southeast Regional Office

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Norristown, PA 19401
Telephone: 484-250-5900
Counties Served: Bucks, Chester, Delaware, Montgomery, and Philadelphia

Northeast Regional Office

2 Public Square
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Telephone: 570-826-2511
Counties Served: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, and Wyoming

Northcentral Regional Office

208 West Third Street, Suite 101
Williamsport, PA 17701-6448
Telephone: 570-327-3636
Counties Served: Bradford, Cameron, Centre, Clearfield, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, and Union

Northwest Regional Office

230 Chestnut Street
Meadville, PA 16335
Telephone: (814) 332-6945
Counties Served: Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, Mckean, Mercer, Venango, and Warren.

For more information, visit www.depweb.state.pa.us, keyword: Wells.