



Gas in Your Water Well

The presence of dissolved gas in groundwater can affect the operation of your water well.

The presence of gas in water wells is common in Alberta. Oxygen, carbon dioxide, nitrogen, methane and hydrogen sulphide may occur naturally in some of the aquifers in which water wells are drilled (e.g. coal seams, fractured shales and sandstones).

When gas is present, it is held in groundwater under pressure. Pumping water wells completed in such aquifers can reduce the pressure, freeing the gas. Sometimes gas in groundwater can affect the operation of your well. Even if gas is present, it may still be possible to use your well in a safe manner.

How do I know if I have gas in my well water?

Spurting taps, problems priming the pump (gas locking), a gurgling noise coming from your well or milky-looking water with fine bubbles emanating from the bottom to the top (when water is poured in a glass) are all symptoms of dissolved gas in groundwater.

The ability of water to hold gas varies with temperature and pressure. As temperature increases, the amount of gas released also increases. As a result, spurting from the hot water tap is often worse than from the cold tap.

How do I find out what kind of gas is in my well water?

The type of gas can be determined by collecting a sample and having it analyzed at an accredited environmental laboratory. Laboratories are listed in the Yellow Pages. You may also hire a licenced water well contractor to collect a sample for you and transport it to the laboratory for analysis. Appropriate sample collection procedures and sample containers must be used to get an accurate result.

Is the presence of gas in my water well dangerous?

Gases such as carbon dioxide and nitrogen can displace the amount of oxygen in the air in an enclosed space such as a well pit or pump house. This can lead to an oxygen-deficient atmosphere, and anyone who enters that space could asphyxiate. Although well pits are no longer legal in Alberta, many old pits still exist. If a well is located inside a pit, the well casing should be extended above ground surface and fitted with a properly vented well cap and the pit should be removed. See the fact sheet *Upgrading Your Well in a Pit* for more details.

Wells located in pump houses or basements should be properly vented to divert any accumulated gas to the open atmosphere, particularly if the type of gas present could potentially be explosive (i.e. methane).

Methane is prevalent in many of the coal seams that contribute potable water supplies to private water wells in Alberta. When methane is present in groundwater it goes undetected because it is dissolved in the water. However, when the water is brought to surface by pumping the well, the gas can escape quickly from the water. Methane gas in drinking water does not cause health problems but, under the right conditions, can become an explosive hazard. The amount of methane produced from a water well can change over time or with an increase in the pumping rate. Methane forms an explosive mixture at volumes of 5 – 15 percent in air.

Handheld gas detectors that confirm the amount of gas present in the air can be rented from environmental equipment suppliers. Alarm meters should be installed and used to monitor accumulation of different gases in enclosed spaces if you suspect gas is present in your well water.

Hydrogen sulphide (H₂S) gas can be created, in small amounts, by sulphate-reducing bacteria that thrive in a water well environment. These anaerobic bacteria feed off of naturally occurring sulphate present in the groundwater and, as a by-product of their digestion, create small amounts of H₂S gas. A “rotten egg” odour is a telltale sign of the presence of bacteria build-up in your well. Regularly chlorinating your well will keep the growth of these bacteria in check. See the fact sheet *Shock Chlorinating Your Well* for more information.

How do I get rid of gas in my well?

If you have gas in your well, it may be possible to lower the pump intake to below the depth where the gas is entering the well, so water can be removed without locking the pump. Sometimes, a plastic gas-sleeve can be installed over the submersible pump to force the gas out of the water before it enters the pump intake.

Regardless of the method used to remove gas, it will always accumulate at the top of the well. For this reason, the well cap should be vented to divert the gas to the open atmosphere. Your licenced water well contractor can provide a vented, vermin proof well cap and recommend the most appropriate mechanism available to vent the gas from your water well, pressure tank, hot water tank, cistern and home.

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A licenced water well contractor will also be able to help you rule out any other problems with your pumping equipment. Older pressure systems are designed to add air to the pressure tank when the pump is operating. Such systems require a deep well air volume control to release excess air from the pressure tank. If this control is malfunctioning or missing, the pressure tank can become overcharged with air and cause spurting water taps in your house.

Can energy industry drilling activity interfere with my water well?

Since 2000, the development of coalbed methane (CBM) in central Alberta has gained momentum and caused rural well owners concern over the possibility of contamination to their water wells. Over 90 percent of the CBM wells drilled to date have targeted coal seams at depths of 200-800 metres that contain little water in them. However, the drilling of these wells has the potential to encounter potable groundwater aquifers used for private water wells. Therefore, strict rules have been put in place to ensure well drilling, completion and production practices are properly regulated to address handling of drilling fluids, inter-mixing groundwater from different zones and protecting potable aquifers from contamination.

Alberta Environment and Protected Areas and the Alberta Energy Regulator have also worked together to create the *Standard for Baseline Water-Well Testing for Coalbed Methane Operations*. This testing is required when a CBM well is going to target shallow coal seams and have perforations in well casings at depths that could potentially impact fresh, potable groundwater resources. Energy companies developing shallow CBM wells must also offer to test rural Albertans' water wells in accordance with this standard, prior to the start of drilling. Be sure to ask for the results of any testing done on your well.

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What can I do to protect my well?

Monitor your water well on a regular basis and build a history of your well's performance and water quality changes. Having this history allows you to compare data if you suspect changes might have occurred as a result of nearby oilfield drilling activity.

Test your well water for coliform bacteria and routine chemistry on a regular basis. Contact your local Community Health Centre (Public Health Unit) for sample bottles and instructions on how to collect and transport water samples. For a list of local Health Units visit: <https://myhealth.alberta.ca>. A Public Health Inspector can assist you in interpreting your test results.

Regularly measure the static (non-pumping) and pumping water levels of your well. Any changes in these numbers will alert you to a decline in the efficiency of your well and the amount of water available in the aquifer.

Periodically have a licenced water well contractor conduct a repeatable pump test on your well. The pumping rate should be held constant during the pumping portion of the test, at the rate of pumping recommended by the driller when the well was first constructed. This rate is reported on the drilling report form.

Monitor the water level in the well as it draws down during pumping and as it recovers after pumping stops. The data you collect from doing these tests will help you see if there are any changes in the production capability of your well over time.



Well owners who observe any changes in the quantity or quality of their well water after nearby drilling for oil, gas or CBM has occurred should first contact the energy company and then contact Alberta Environment and Protected Areas. The Department responds to all public concerns through its 24 hour environmental hotline 1-800-222-6514.

FOR MORE INFORMATION:

Water Wells that Last

<https://open.alberta.ca/publications/9781460143414>

Dissolved Gases in Water Wells

<https://open.alberta.ca/publications/3608091>

Methane Gas in Well Water

<https://open.alberta.ca/publications/3538631>

Removing Hydrogen Sulphide from Water

<https://open.alberta.ca/publications/4332081>

Baseline Water Well Testing for Coalbed Methane Operations

<https://www.alberta.ca/baseline-water-well-testing.aspx>

CONTACT US:

General Questions?

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