Well Water Quality

Volume 3 Issue 9 - Wahl H2O © 2019 | Jeff Wahl | jeff@wahlwater.com

A drilled well is a mainstay for many Canadians, with 30 percent of residents, or nine million residents, within Canada obtaining their water from a ground water source. Approximately 15 percent of this water is within rural areas and some parts of the country rely on ground water exclusively. The suitability of water for a given use depends on multiple factors such as hardness, salinity, pH, nitrates, pesticides, heavy metals, volatile organic compounds, iron, manganese, sulfates, hydrogen sulfide, turbidity, tannins, mineralized water, natural gas, methane and microbiological contaminants. Water should also be tested for hazardous chemicals whenever contamination is suspected.

The quality of well water varies tremendously because it is affected by the factors listed above as well as by human-developed influences on aquifers and ground water. Examples include petroleum products leaking from underground tanks, road salt, nitrates from overuse of chemical fertilizers or manure on farmland, accidental chemical spills, and leaching of fluids from landfills and dump sites. Additionally, there are risks for contamination from septic systems and contaminants originating from industries, manufacturing and plastics.

Well regulations vary by province and territory, although wellhead protection, procedures and policies are mandatory to ensure that there is no contamination entering the well from the surface.

Many areas of Canada have deep layers of soil that act as a natural filter, preventing contaminants from making their way into the water table below. Other areas have shallow or non-existent soil cover and permit surface water to enter easily into ground water sources.

Approximately 30% of Canadians Rely on Ground Water Exclusively

Many wells draw from aquifers, which are made up of permeable rock or loose material and can produce useful quantities of water. Aquifers come in all sizes and are of variable origin and composition. They may be very large, underlying thousands of square kilometres of the Earth's surface, or tremendously small, concealed under only a few hectares in area.

Contributing Factors

Most rural Canadian residences and cottages are served by private septic disposal systems. These systems were originally designed for houses widely separated from their nearest neighbour, typically farmhouses and the occasional rural residence. Today, individual private wells are being installed in rural subdivisions alongside septic systems at suburban densities in many parts of the country. A recent study by Laurel Schaider at the Silent Spring Institute in the United States has provided a positive link, revealing that septic systems can leach contaminants into the surrounding water supply. This can have a dramatic effect on well water quality in rural subdivisions due to the proximity of drilled wells to septic systems.

Emerging contaminants are being detected in surface water sources. Typically, they consist of pharmaceuticals and personal care products, endocrine disrupting compounds, polycyclic aromatic hydrocarbons and polychlorinated biphenyls. Examples in everyday society include veterinary and human antibiotics, human drugs and industrial or household products such as insecticides, detergents, fire retardants, fuels and steroidal hormones. Ground water can become contaminated by many of the same pollutants that contaminate surface water.

Best Practice Recommendation

In order to accurately assess the quality of a ground water source, a water sample should be taken for comparison against the Canadian Drinking Water Quality Guidelines, which provide standards for microbiological, chemical, radiological and esthetic quality guidelines. Specifically engineered for safety, water testing in relation to these parameters is the most effective way to ensure an uncontaminated ground water source.