



## WHAT YOU NEED TO KNOW ABOUT

# EVALUATING PRIVATE WELL CHEMICAL SAMPLING RESULTS

The purpose of this fact sheet is to assist Connecticut citizens in understanding private well water quality sampling results. If you have further questions, please contact the agencies listed below.



## What is the Purpose of Private Residential Well Sampling?

Private residential well sampling is conducted for a variety of purposes. Sometimes sampling is done as part of an investigation of potential ground water contamination:

- To establish a baseline water quality
- To identify contaminants
- To determine contaminant concentrations and compare to standards
- To evaluate whether a health risk exists



## How Are Water Sample Results Reported?

The laboratory reports sampling results in micrograms of a substance per liter of water (ug/L) or milligrams of a substance per liter of water (mg/L). The units of ug/L correspond to parts per billion (ppb), and units of mg/L correspond to parts per million (ppm). One ppb equals one drop of water mixed in a competition-size swimming pool. One ppm is comparable to one drop of gasoline in a tank full of gas in a full-size car. One ppm is 1000 times higher than one ppb.



## If Contamination Is Found In Sampling Results, How Do We Determine If There Is A Health Risk Or Not?

Health based standards and action levels have been established for a number of chemicals that have been found in groundwater. These standards and action levels represent the concentration of a specific contaminant below which adverse health risks are not likely. Results of private well sampling are compared to these standards and action levels to determine if the water is safe to drink.



## How Are Action Levels And Standards For Drinking Water Set?

The EPA establishes a standard called a maximum contaminant level (MCL). MCLs are protective of public health. They are set so that the levels will not be harmful *and* they have safety margins built in to protect sensitive populations (e.g., children). MCLs are established to regulate contaminants in public water systems but are widely used for evaluation of private well water results. At the request of the CT Department of Environmental Protection (CT DEP), action levels are set by the CT Department of Public Health (CTDPH) for chemicals found in private and public drinking water .

The EPA and the CTDPH use a process called “risk assessment” to set drinking water quality standards, including MCLs and Action Levels. This process estimates levels of chemical exposure that will not cause adverse health effects and then factors in extra margins of safety. These standards usually assume that people drink water from the same source for the entire life span (70 years).



## What if My Well is Contaminated Above the Action Level?

If your private well is contaminated above the action level, you may be eligible to receive bottled water and an alternative water supply or a treatment system from the CT DEP (860-424-3705). Exposure to well water at concentrations above the Action Level may not cause health effects because, as noted above, these guidelines have a safety margin built in to them. However, it is prudent for such contamination to be investigated and cleaned up. If you have health questions, contact the Toxic Hazard Assessment Program at the CT DPH (860-509-7742).

## A Short Glossary of Water Terms

**Action Level:** The contaminant level which, if exceeded, triggers further investigation or treatment or other requirements by regulatory agencies. These levels are set by CTDPH for evaluating private and public well water quality.

**Acute Health Effect:** An immediate (i.e. within hours or days) effect that typically requires exposure at levels that are many times higher than the Maximum Contaminant Level or Action Level.

**Aquifer:** A natural underground layer, often of sand or gravel, that contains water.

**Chronic Health Effect:** A health effect that takes long-term (years) exposure to be seen (such as cancer).

**Inorganic Contaminants:** Mineral-based compounds such as metals and nitrates. These contaminants are naturally-occurring in some water, but can also get into water through farming, chemical manufacturing, and other human activities. EPA has set legal limits on 15 inorganic contaminants.

**Leachate:** Water that percolates or drains through a landfill carrying pollutants from the waste.

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that EPA allows in drinking water. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. EPA sets MCLs at levels that are economically and technologically feasible to achieve in public water systems.

**Organic Contaminants:** Carbon-based chemicals, such as solvents and pesticides, which can get into water through runoff from cropland or discharge from factories. EPA has set legal limits on 56 organic contaminants.

**Semi-VOCs:** A group of chemicals similar to VOCs (below) which, among other things, do not evaporate so quickly. Examples include petroleum hydrocarbons, such as kerosene and heating oil, and polychlorinated biphenols (PCBs).

**Turbidity:** The cloudy appearance of water caused by the presence of tiny particles. High levels of turbidity may interfere with proper water treatment and monitoring.

**VOCs:** Volatile Organic Compounds: Highly evaporative chemicals found in cleaning fluids, paints and petroleum products. Examples include trichloroethylene, benzene, and methyl tert butyl ether (MTBE).



## If Multiple Contaminants Are Identified In The Same Well, How Is The Health Risk Evaluated?

MCLs and action levels are set based upon lifetime exposure to a single chemical in water. There are margins of safety built into these levels. Therefore, it is unlikely that if several contaminants are present at their respective MCLs and/or action levels, they will add up to be a health concern. However, CTDPH can review such data on a site-specific basis to ensure that this is the case.



## What Does It Mean When A Result Comes Back As “Non-Detect”?

If a compound is listed as a “non-detect” (ND), it means that chemists looked for that particular compound but could not measure the concentration. Either the compound is not present at all, or the concentration is too low to be measured (i.e., it is below the detection limit). In almost all cases, the detection limit is much lower than health-based water standards.



## What Are Laboratory Contaminants? Why Do They Show Up in Some Samples And Not In Others?

Sometimes water samples can become contaminated in the laboratory. Laboratory contaminants are compounds unintentionally added to the water after it is sampled. Leaching of chemicals from plasticware or laboratory solvents are common causes. It is sometimes important to re-sample if chemists suspect that the compound is a laboratory contaminant.



## Is Bathing and Showering A Health Risk?

In some instances, you can be exposed to water contaminants through bathing or showering. The amount of exposure depends on factors specific to each contaminant: the concentration, skin permeability (how easy does the chemical pass through the skin) and the volatility of the contaminant (how readily does it evaporate). Other factors that effect exposure include water temperature, flow rate of the water, and time spent in the shower. The actual amount of exposure is therefore hard to determine. Connecticut drinking water Action Levels include a safety factor to account for exposures other than drinking. If you have concerns about a particular chemical, please contact the CTDPH at the number below.



## Should Drinking Water Be Completely Free of Contaminants?

Advances in the instruments used to measure contaminants allow us to detect minute traces of chemicals in water. Therefore, chemicals can be found in almost all drinking water. Some of these occur naturally in the environment and some of them occur because of human activity. Some contaminants result from the chlorination process or the types of plumbing used in homes and businesses. At low levels, these substances and contaminants do not affect our health.



## How Can I Protect My Ground Water Supply?

The best way to protect ground water quality is to handle all chemicals with extreme care. In addition, owners of private wells should:

- ⇒ Periodically inspect exposed parts of the well for problems such as:
  - cracked, corroded, or damaged well casing
  - broken or missing well cap
  - settling and cracking of surface seals.
- ⇒ Slope the area around the well to drain surface runoff away from the well.
- ⇒ Install a well cap or sanitary seal to prevent unauthorized use of, or entry into, the well.
- ⇒ Have the well tested once a year for coliform bacteria, and every 3 – 5 years for chemical contamination.
- ⇒ Keep accurate records of any well maintenance, such as disinfection or sediment removal, that may require the use of chemicals in the well.
- ⇒ Hire a certified well driller for any new well construction, modification, or abandonment and closure.
- ⇒ Avoid mixing or using pesticides, fertilizers, herbicides, solvents, fuels, and other pollutants near the well.
- ⇒ Do not spill gasoline from small engines like lawn mowers or from working on cars.
- ⇒ Do not dispose of wastes in dry wells or in abandoned wells.
- ⇒ Do not cut off the well casing below the land surface.
- ⇒ Pump and inspect septic systems as often as recommended by your local health department.
- ⇒ Never dispose of hazardous materials in a septic system.



## Who Can I Call For More Information?

Contact Your Local Health Department and/or these agencies:



CT Dept of Public Health  
 Environmental and  
 Occupational Health Assessment  
 PO Box 340308, MS # 11CHA  
 410 Capitol Ave  
 Hartford, CT 06134-0308  
 (860) 509-7742

CT Department of Environmental  
 Protection  
 Water Management Division  
 79 Elm St  
 Hartford, CT 06106-5127  
 (860) 424-3705

Environmental Protection Agency  
 Northeast Region  
 1 Congress St (CCT)  
 Boston, MA 02114-2023  
 (617) 918-1554

(This fact sheet is funded in part by funds from the Comprehensive Environmental Response, Compensation, and Liability Act trust fund through a cooperative agreement with the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services.)