Village of Nelsonville - Laboratory for Infectious Disease and the Environment Test Results

Sampling Date: October 24, 2018
Results received: February 4, 2019
Results shared at Groundwater Protection Committee meeting: February 25, 2019

Private Well Testing

Recent community-wide testing of private wells in Nelsonville showed that nearly half of the wells (47%, or 28 out of 60 samples) had nitrate concentrations above the drinking water standard of 10 mg/l. Of those, 25 were sampled again by the county and analyzed for pesticides, pharmaceuticals, and personal care products (known as "source testing"). The goal of the testing was to help evaluate the source(s) of the nitrate detected in the drinking water. The results of the testing indicated that 25 samples had indications of pesticides, and 8 samples showed pharmaceuticals and personal care products. 21 of the 25 samples also showed the presence of DACT (Diaminoatrazine), with one well testing at an amount above the State of Wisconsin Groundwater Standard for safe drinking water. A summary of the results is available at villageofnelsonville.com.

In October, water samples were collected by the Laboratory for Infectious Disease and the Environment (LIDE) from four Nelsonville private wells. The samples were tested for DNA fragments originating from:

- human-specific microorganisms (viruses and bacteria that are only found in human wastewater)
- bovine-specific microorganisms (viruses and bacteria that are only found in cattle manure)
- non-specific microorganisms (disease-causing viruses and bacteria that are found in human wastewater, cattle manure, and feces from other animals), and
- a water quality indicator (indicates that there is a fast route for water to travel from the surface to the groundwater).

No DNA fragments were detected in any of the samples. A copy of each of these results can be viewed at villageofnelsonville.com. A detailed list of microorganisms tested for is also included in the test results.

Evaluation

Nitrate in the Nelsonville groundwater (drinking water) at concentrations above 2 mg/l are due to human sources. Therefore, the Nelsonville private well nitrate results indicate extensive impact by humans.

The sources of the nitrate are limited to agricultural practices and residential practices. Agricultural practices contribute nitrate to groundwater primarily via nutrient application as both manure and mineral fertilizer; residences contribute nitrate via waste disposal (septic system) and lawn and garden fertilizers. The source testing results show that both agricultural (25 wells) and residential (8 wells) sources are contributing to the groundwater nitrate.

The LIDE testing for DNA suggests that bacteria and viruses are not an *extensive* threat to Nelsonville drinking water supplies. The absence of DNA detections could be due to the lack of a source, or loss of DNA prior to reaching the wells. It is known that sources of bacteria and viruses from both animal and people are present in the Nelsonville groundwater recharge area, thus the absence of DNA is due to removal processes after release to the environment. It is likely that most of the removal is due to filtration by soil particles as the DNA moves through the environment, particularly within the unsaturated zone from the surface to the groundwater table. Degradation processes will also continue to break down the DNA into fragments that are not recognized by laboratory methods. The DNA fragments are estimated to persist for only a few months after release before they are no longer detectable by the lab.