miOttawa Department of
Public Health

Ottawa County Health Department

Why is Well Construction Important?

Because fecal contamination is intermittent, viruses and *E. coli* will only be present some fraction of the time in a contaminated well. The Environmental Protection Agency (EPA) estimates that, on average, wells with some *E. coli* occurrence have detectable concentrations only 14 percent of the time.

It is important to understand that a water sample is a *very small* part of the total water supply and *not* a protective barrier. A water sample is a "snapshot in time" and one non-detect result does not necessarily indicate that the water supply is in compliance or free of contaminants. It is like dipping a net into a fish tank without looking; sometimes the net catches fish, sometimes it does not.

> *The primary barriers to prevent contamination and protect public health are proper location, construction, operation, and maintenance of sources and water systems. Ongoing sampling is required for all noncommunity water systems. This monitoring is very important. However, periodic monitoring is not substitute for the multiple barriers (i.e. a properly located, constructed, and operated water supply) since exposure to contaminants will have already occurred by the time results from routine samples are known.*[1]

The following conditions are considered High Public Health Risk by the EPA:

1. An *E. coli* positive coliform MCL violation.
2. An incident that causes severe structural damage to a well. For example, the well is hit by a vehicle and the well casing is broken.
3. A well head is submerged or a direct cross connection of the public water supply with surface water, chemicals, sewage, or wastewater.
4. Failure of treatment required for a surface water source or groundwater under the direct influence of surface water source.
5. Improperly constructed well; in shallow fractured bedrock formation, violation of minimum depth/casing requirements.
6. A buried well head, an unprotected suction line, a well subject to flooding, and open annulus around casing, damaged well cap, or unprotected openings in well cap, or electrical conduit.
7. Cross connections—backpressure situations such as treated boilers or high pressure boilers, feed lines to equipment with a recirculating pump and cooling systems, submerged discharge lines from softeners or treatment units.
8. A well located in close proximity to a source of human or animal waste such as a sewer line, septic tank, drainfield, cesspools, lagoons, or accumulation of same.

Disease outbreaks due to well construction issues

- Walkerton, Ontario, Canada (2000)—Manure runoff after a heavy rain event contaminates a shallow well serving the town. 17 die and 2300 ill due to *E.coli* contamination.
- Washington County, New York (1999)—781 sick, 2 deaths due to contamination of a well supplying water at the county fair. The suspected cause is sewage from the seepage pit of the septic system located 36 feet from the well.

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[1] *History and Principles of Michigan's Drinking Water Supply Regulations as taken from the DEQ Reference Manual for the Noncommunity Drinking Water Supply Program (2009).*