

Recycling and Reuse Technology Transfer Center

Recycling and Reuse Technology Transfer Center



<http://www.rrttc.uni.edu>

Sherwood Well Testing

Publication: 1993 – 013

Gordon Krueger

Sherwood Well Testing

Black Hawk County Health Department
Internship
Dr. Daryl Smith and Steve Quirk

Gordon Krueger
#286974
August 13, 1993

Introduction

The residents of Sherwood Park experienced numerous episodes of flooding in 1993. In most cases not a single resident could remember such a disastrous year. Most left their homes, and in many cases the homes have been either permanently or at least temporarily abandoned. For the residents who have remained (many who cannot afford to live elsewhere but on the flood plain) will come the expensive as well as time-consuming task of rebuilding and reexamining their lives in this section of Waterloo.

With flooding of this nature, the most obvious and perhaps of concern to most residents in Sherwood is contamination of their drinking water. Most wells along the Cedar River in Sherwood Park are driven, sand point wells. Only one found was a drilled well. Driven wells are made by forcing a well point into the ground fitted to a series of pipe sections. These wells vary in depth from 14 to 40 feet (McDermott, 1988).

The combination of flooding and shallow wells has caused concern to the residents of Sherwood Park. Water laden with nitrates and bacteria could be potentially dangerous to the residents living there.

Nitrates from flooded farm fields located upstream are potentially dangerous for infants and toddlers. Methemoglobinemia or Blue Baby Syndrome is a (although rarely) potentially fatal disease for infants. This

syndrome is an intestinal deficiency and associates with an inability to reduce nitrates to nitrites. Adults can also suffer from this disease, but usually without long-term health effects (D'Itri and Wolfson, 1988).

Bacteria, viruses, and protozoa are a common cause of illnesses in untreated or unfiltered water. The most common diseases are:

1. AGI or gastrointestinal illness is group of diseases caused by bacteria, viruses, or protozoa. When health professionals cannot pinpoint the exact cause of the disease, they call it AGI. Symptoms include vomiting, nausea, diarrhea, and abdominal discomfort. These symptoms are also caused by the common cold, flu, and other common viruses; therefore, its exact cause is usually not identified.
2. Giardiasis is caused by the waterborne protozoa *Giardia lamblia*. Symptoms are similar to AGI but are more severe such as severe dehydration, weight loss, and fatigue. This disease is normally found in surface water systems and not in ground water. Giardiasis is generally filtered out by sand or gravel as it passes into the water table.
3. Shigellosis, campylobacteriosis, and salmonellosis are caused by bacteria. Symptoms are diarrhea, vomiting, and nausea.
4. Hepatitis A is often carried by drinking water and the symptoms vary from flu-like to fatal liver failure (U.S. Environmental Protection Agency, 1989).

Sherwood Well-Testing

As was said earlier, almost all water in Sherwood was obtained from driven, sand-point wells. The depth ranged from 14 to 40 feet. Many of the wells were fewer than 10 years old, since sand point wells generally plug up at a faster rate than drilled wells. Since Sherwood Park is located on the flood plain, all wells could be subjected to contamination when the Cedar River floods as it did in 1993.

As each individual well was inspected the following problems were noted.

1. Well-heads, ranging in diameter from 1.5 to 2 inches, were often located in basements that had suffered some type of structural damage from several episodes of flooding.
2. Pump compressors observed most likely be subjected to damage and infiltration by flood waters from the Cedar River.
3. Some instances of corrosion were noted, which would lead to possible breakdown and infiltration by flood waters.

Almost all the residents of Sherwood Park bring in their own drinking water, but many still treat their water to clean their clothes and to extend the service life of their well systems. Some of the systems used were:

1. Ion exchange or water softeners. The ion exchange process causes replacement of calcium or magnesium ions by sodium ions. This process takes place when the hard water laden with calcium or magnesium comes in contact with an exchange medium of synthetic resin or gel zeolites.

2. Iron Filters. These are to reduce the amount of iron bacteria in the well system.

3. Chlorination treatment. This is used to reduce the odors and tastes often associated with the water in Sherwood Park (McDermott, 1988).

Contamination Sources

Residents in Sherwood were most concerned with the potential contamination from the Cedar River. Many were concerned with the nitrates from nearby farm fields, and the disease bearing bacteria of the river. One resident complained of contaminants from Hackett industries(?) located upstream. One other resident complained about the arsenic La Bounty dumpsite in Charles City.

Lab testing

Testing of the water-samples was accomplished by North East Iowa Water Lab located in Waterloo. A total of 31 samples was collected from August 4 to August 5, 1993. The samples were taken to the lab with 24 hours of the sampling process. The actual lab work involved testing for coliform bacteria and nitrates. (Coliform testing does not indicate the actual presence of disease-bearing bacteria. Its presence is an indicator of possible fecal contamination, however, U.S. Environmental Protection Agency, 1989)

References Cited

- D'Itri, Frank M. and Wolfson, Lois G., 1988, Rural Groundwater Contamination: Chelsea, Michigan, Lewis Publishers, Inc.
- McDermott, James H., 1988, Manual of Individual Water Supply Systems: Washington, U.S. Government Printing Office.
- U.S. Environmental Protection Agency, 1989, Protecting Our Drinking Water From Microbes: Washington, U.S. Government Printing Office.