**Cryptosporidium**

Cryptosporidium is a microbial pathogen found in surface waters throughout the U.S. Ingestion of Cryptosporidium may cause the protozoan infection, Cryptosporidiosis, an abdominal infection. Some people who drink water containing Cryptosporidium may experience symptoms like diarrhea, fever, and stomach discomfort. Children, the aged, and those with severely compromised immune systems are at greatest risk. Most healthy individuals can overcome the disease within a few weeks. However, immunocompromised people are at risk of developing a potentially life-threatening illness. In 2009, the RWSD conducted a 1-year study to determine the occurrence of Cryptosporidium in the raw water source for the Crozet WTP. The monitoring did not reveal the presence of any Cryptosporidium in the Beaver Creek Reservoir. Although filtration removes Cryptosporidium, the most common used filtration methods cannot guarantee 100% removal. The RWSD makes every effort to optimize the filtration process at all of the WTPs to ensure no one would have to cause such symptoms during Cryptosporidium removal. Based on the results of this study, our water source has been placed in the lowest risk category for exposure to Cryptosporidium.

**What are the potential health risks associated with these contaminants?**

- **Total and Fecal Coliform Bacteria**
  - Not detected in 2014. Coliforms are a large group of bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Fecal coliform bacteria, in particular, indicate a likely contamination from human or animal wastes. These microorganisms can result in short-term effects such as nausea, headache, cramps and diarrhea, and they pose a special health risk for young children, the aged, and those with severely compromised immune systems.
  - Turbidity is a measure of the clarity of the water. Turbidity in excess of 5 NTU is just noticeable to the average person.
- **Cryptosporidium oocysts**
  - A measure of the clarity of the water. Turbidity in excess of 5 NTU is just noticeable to the average person.

**Raw Water Standards and Health Risk Goals**

- **Maximum Contaminant Level Goal (MCLG)**: the level of a contaminant in drinking water below which there is no known or expected health risk. MCLGs allow for a margin of safety.
- **Maximum Contaminant Level (MCL)**: the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as possible using the best available treatment technology.
- **Maximum Residual Disinfectant Level Goal (MRDLG)**: the level of a disinfectant residual allowed in drinking water. The addition of a disinfectant is necessary for control of microbial contaminants.
- **Maximum Residual Disinfectant Level (MRDL)**: the level of a disinfectant residual disinfectant allowed in drinking water below which there is no known or expected health risk to humans.

**Microbiological and Organism Related Measurements**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>MCL</th>
<th>MCLG</th>
<th>Range of detections</th>
<th>Violation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Coliform Bacteria</td>
<td>0</td>
<td>0</td>
<td>&lt;1 samples per month</td>
<td>No</td>
</tr>
<tr>
<td>Fecal Coliform Bacteria (e.g. E.coli)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>Turbidity (maximum single value)</td>
<td>a/a</td>
<td>0.15 NTU</td>
<td>a/a</td>
<td>No</td>
</tr>
<tr>
<td>Turbidity (% of monthly samples below 0.3 NTU)</td>
<td>99.9%</td>
<td>99.9%</td>
<td>99.9-100.0%</td>
<td>No</td>
</tr>
</tbody>
</table>

**Disinfectant and Disinfection By-Product Contaminants**

- **Lead**
  - 0 ppb | 15 ppb (AL) | <0.05 ppb | 0.017 ppb | No |
  - 0 ppm | 0.05 ppm | 0.02-0.09 ppb | Water additive to control microbes (algicid) | No |
- **Copper**
  - 0.3 ppm | 0.5 ppm | 0.02-0.04 ppm | No |
  - 0.05 ppm | 0.01 ppm | 0.02-0.09 ppm | No |
  - 0 ppm | 0.01 ppm | 0.02-0.09 ppm | No |
- **Fluoride**
  - 0 ppm | 0.7 ppm | 0.33 ppm | No |
  - 0 ppm | 0.3 ppm | 0.33 ppm | No |
  - 0 ppm | 0.0 ppm | 0.33 ppm | No |
- **Nitrate**
  - 0 ppm | 10 ppm | 0.05 ppm | No |
  - 0 ppm | 0.05 ppm | 0.05 ppm | No |
  - 0 ppm | 0.0 ppm | 0.05 ppm | No |

**Physiological Indicators**

- **pH**
  - 6.5-8.5 | 7.1-7.3 (monthly avg.) | No |
  - 6.5-8.5 | 7.1-7.3 (monthly avg.) | No |
  - 6.5-8.5 | 7.1-7.3 | No |
- **Sulfate**
  - 0 ppm | 20 ppm | 2.4 ppm | No |
  - 0 ppm | 20 ppm | 2.4 ppm | No |
  - 0 ppm | 20 ppm | 2.4 ppm | No |
- **Total Dissolved Solids**
  - 0 ppm | 500 ppm | 90 ppm | No |
  - 0 ppm | 500 ppm | 90 ppm | No |
  - 0 ppm | 500 ppm | 90 ppm | No |

**Health Indicator**

- **Alkalinity**
  - 250 ppm | 90 ppm | No |
  - 250 ppm | 90 ppm | No |
  - 250 ppm | 90 ppm | No |
- **Conductivity**
  - 154 micromhos/cm | 154 micromhos/cm | No |
  - 154 micromhos/cm | 154 micromhos/cm | No |
  - 154 micromhos/cm | 154 micromhos/cm | No |
- **Hardness**
  - 18 ppm | 18 ppm | No |
  - 18 ppm | 18 ppm | No |
  - 18 ppm | 18 ppm | No |
- **Sodium**
  - 21.8 ppm | 21.8 ppm | No |
  - 21.8 ppm | 21.8 ppm | No |
  - 21.8 ppm | 21.8 ppm | No |

**What do all these numbers mean?**

- **Total Coliform Bacteria**
  - Not detected in 2014. Coliforms are a large group of bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Fecal coliform bacteria, in particular, indicate a likely contamination from human or animal wastes. These microorganisms can result in short-term effects such as nausea, headache, cramps and diarrhea, and they pose a special health risk for young children, the aged, and those with severely compromised immune systems.

- **Lead and Copper**
  - The 1994 USEPA Lead and Copper Rule mandates a household testing program for these metals, and the values reported in the chart above are from samples that were collected from select households. Infants and children who drink water containing lead in excess of the Action Level could experience delays in physical or mental development. Children could show deficits in attention span and learning abilities. Adults who drink this water over many years could possibly develop kidney problems or high blood pressure. See the box for additional information on lead. Copper is an essential nutrient, but some who drink water containing copper in excess of the Action Level could experience gastrointestinal distress in a relatively short period of time. Some who drink this water over many years could develop kidney or liver damage. Individuals with Wilson’s disease should consult their doctor. Barium is a metal that is naturally occurring in the soil and rock. Some people who drink water containing barium in excess of the MCL over many years may experience an increase in their blood pressure.
  - Fluoride is an element added at the water treatment plants to promote strong teeth. Some people who drink water containing fluoride in excess of the MCL over many years could develop dental fluorosis. See the box for additional information on fluoride.
  - Nitrate is a nutrient of nitrogen found primarily in fertilizers, sewage, and runoff from natural sources. Infants below the age of six months who drink water containing nitrate in excess of the MCL could develop “blue baby syndrome” in which there is a bluish coloration of the skin and shortness of breath. The infant can become seriously ill and, if untreated, may die.
  - Chlorine is added at the treatment plant to inactivate disease-causing microbes. Some people who use water containing chlorine in excess of the MCL could experience irritation of the eyes, nose and skin. Some people who drink water containing chlorine well in excess of the MCL could experience stomach discomfort.
  - Trihalomethanes and Haloacetic Acids are compounds formed by the interaction of chlorine with naturally occurring organic matter, and they are sometimes referred to as disinfection by-products. Chlorine is added at the treatment plant to inactivate disease-causing microbes, and organic matter is naturally present from leaves and decaying plants in the reservoirs and streams. Some people who drink water containing these compounds in excess of the MCL over many years may have problems with their liver, kidneys or central nervous system, and may have an increased risk of getting cancer.