Turbidity in Manitoba Water Supplies

What is turbidity?

Turbidity is a measure of the cloudiness or murkiness of water due to suspended particles.

What water sources are most likely to have high turbidity?

- surface water (lakes, reservoirs, rivers and streams)
- shallow or poorly-built wells or springs

What causes turbidity?

Turbidity can be caused by:

- organic particles, such as decomposed plant and animal matter, or living biological organisms (ex: algae)
- inorganic particles (silt, clay and natural chemical compounds like calcium carbonate)

Turbidity in surface water bodies usually has organic and inorganic matter. It can be caused by:

- heavy rains, flooding and spring runoff
- landslides and bank erosion
- algae blooms
- people, animals or boats disturbing the waterbed
- human activities that disturb land (ex: construction)
- storm water pollution from urban areas

Shallow or poorly-built wells or springs may be contaminated from surface water, especially during heavy rains or spring runoff. Turbidity in groundwater is mostly inorganic and caused by natural geological factors.

How is turbidity measured?

Turbidity is measured in nephelometric turbidity units (NTU) using a turbidimeter. This instrument shines a beam of light at a water sample and measures the amount of light that passes through the water compared to the amount of light that reflects off particles in the water.

Turbidity can range from less than 1 NTU to more than 1,000 NTU. At 5 NTU, water is visibly cloudy; at 25 NTU, it is murky.

How does turbidity affect water quality and water treatment?

Organic and inorganic particles in water can:

- give the water a poor look, smell or taste
- carry micro-organisms and protect them from disinfection
- increase the amount of chlorine that has to be added to disinfect the water
- mix with chlorine to form harmful by-products, such as trihalomethanes (THMs)

What is the standard for turbidity in drinking water?

Drinking water systems that use surface water, or wells that could be contaminated by surface water, should filter the water. Filtering the water helps to get rid of particles that interfere with disinfection and reduces the organic matter available to react with chlorine to form harmful by-products.

The goal is to get treated water turbidity (after the filters and before adding chlorine) as low as possible. The Canadian guideline ranges from 0.1 NTU to 1.0 NTU, depending on the type of filters used. The standard for water systems in Manitoba is based on the Canadian guideline and is set by a regulation under *The Drinking Water Safety Act*. Water system operators regularly monitor turbidity levels to make sure filters are working properly.

Is turbid water a health risk?

Since a wide variety of particles cause turbidity, it is difficult to determine the health risk. The health risk is usually not the particles themselves but the impact of the suspended particles on disinfection of the water. Also, changes in turbidity can flag a potential problem and may indicate new source of contamination of the water.

Surface water or shallow wells tend to have higher levels of turbidity. Organic matter and micro-organism are often present. Micro-organisms attach themselves to the suspended particles in turbid water. This prevents the water

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from being properly disinfected, and can increase the risk of gastrointestinal illnesses. Organic matter can contribute to the formation of harmful by-products, like THMs. Particles can also carry more substances into the body, including metals like lead.

Drinking turbid water can be especially risky for people with compromised immune systems, including people who have:

- an organ transplant
- cancer and are taking chemotherapy or radiation therapy
- HIV or AIDS
- or been otherwise advised by their health care provider that they are immune-compromised and should take precautions.

Turbidity associated with groundwater from deep wells is typically low, mostly inorganic, and is not generally a health risk.

How do I know if the water I get from my supplier has high turbidity?

Water systems that rely on surface water, or shallow or poorly-built wells or springs that do not have proper filtration, may have high turbidity levels. These systems may be put on a boil water advisory if turbidity levels are increasing or there is a clear risk of contamination.

For details on the turbidity levels in your water system, contact your water supplier or the drinking water officer in your region. Large, public water suppliers must make annual reports available to the public, and post a copy of those reports on the Internet.

What should I do if I think my private water supply has high turbidity?

If water from your private well has become cloudy, or if there is a sudden change in its taste, smell or colour, you should have your well tested as soon as possible. Test the water for bacteria, chemical and physical water quality measurements, including turbidity. Tests should be done at an accredited laboratory.

If turbidity levels are higher than 1.0 NTU, have a licensed well construction specialist investigate the cause. High turbidity levels, or sudden changes in turbidity, may mean that the well has been contaminated by surface water. You may need to filter and disinfect your well water and test your water supply more often.

If you rely on a private surface water system, the water should be filtered and disinfected and tested regularly to ensure the treatment system is working properly.

How can I reduce the risk from water that has high turbidity?

Manitobans who rely on a surface water system or shallow or poorly constructed well that does not have treatment in place to reduce turbidity can:

- boil their drinking water for one minute
- switch to an alternate drinking water supply (ex: bottled water, a deeper well or a cistern)
- install a home water-treatment system

If you buy a home treatment system, look for filters or equipment that have been certified by an accredited organization to reduce turbidity. Certification standards help ensure the safety and performance of retail products for drinking water.

The turbidity reduction standards are set by NSF International (NSF) or the American National Standards Institute (ANSI). Certification organizations make sure the treatment filters and equipment meet these standards. Accredited certification organizations include:

- NSF International (NSF)
- Canadian Standards Association (CSA)
- Underwriters Laboratories Incorporated (UL)
- Water Quality Association (WQA)
- Quality Auditing Institute
- International Association of Plumbing and Mechanical Officials (IAPMO)

Always follow the manufacturer's instructions on how to use and maintain any home water treatment filters or equipment.

Where can I get more information?

Health Canada:

- drinking water turbidity: www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/turbidity/index-eng.php
- drinking water and your health: www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/health-sante/index-eng.php
- Guidelines for Canadian Drinking Water Quality: Turbidity document: www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/turbidity/turbidity-eng.pdf

For more information about drinking water in Manitoba, contact Manitoba Water Stewardship's Office of Drinking Water at 204-945-5762, or refer to the website at www.manitoba.ca/drinkingwater to find a local office near you.

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