Assessment Study of Water System at the Skawahlook First Nation Community

for the
Indian and Northern Affairs Canada
BC Region

CH2MHILL

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Appendix C
Water Quality Test Results

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Is(are) under consultation

TURBIDITY

Health Limit: 1 NTU (Nephlometeric Turbidity Unit)
Aesthetic Limit: 5 NTU'S

Observable Characteristics:

Water will have a cloudy or muddy appearance.

Sources:

Turbidity is caused by suspended matter in the water. Examples of this suspended matter include silt, clay, small microscopic animals and plants (plankton) and organic material. This material may come from a number of sources including run-off, the weathering of rocks and soils and effluent from industrial facilities.

Health Implications:

There is a health limit of 1 NTU set for turbidity. This limit is set due to the fact that high levels of turbidity can protect bacteria and viruses from disinfection processes commonly used by water treatment facilities.

There is also an aesthetic limit of 5 NTU'S for turbidity. Waters with levels above this aesthetic limit may have a cloudy or muddy appearance that is unacceptable to the consumer.

Treatment:

The main method that is used in the removal of turbidity is aluminum coagulation*. It has been found that the use of this method is very effective in reducing turbidity to acceptable levels.

* Please refer to the Guidelines for Canadian Drinking Water Quality, Water Treatment Principles and Applications, for more information regarding aluminum coagulation.

IRON

Health Limit: None
Aesthetic Limit: ~~0.03~~ 0.3

Observable Characteristics:

Water will have a dark reddish-brown colour, plumbing fixtures will become stained and water may have a metallic taste.

Sources:

Iron is a very common, naturally occurring material that is contained in rocks and minerals. It can be introduced into water supplies by **weathering**. The main use for iron is in the production of steel. The **effluent** and **tailings** from this industry as well as sewage discharge and land-fill **leachate** are other sources of iron contamination.

Health Implications:

There are no health implications that are related to iron in drinking water. In fact, iron is found in the human body and is essential in maintaining proper health. The limit of ~~0.03~~ 0.3 mg/L for iron levels in drinking water is set for aesthetic reasons. Water, with iron levels above this aesthetic limit, will have a dark reddish-brown colour that can stain plumbing fixtures and cause laundry to have a dingy or stained appearance. The presence of iron may also cause the water to have an unacceptable taste.

Iron in water supplies may also promote the growth of certain microorganisms that give the inside of the plumbing materials a slimy coating.

Treatment:

The treatment processes involved in the removal of iron vary depending on the amount and form of iron that is contained in the water supply. Generally, removal will involve precipitation steps followed by filtration. Various granular media filtration techniques can be used to remove insoluble iron. Ion exchange can also be used.

Please refer to the Guidelines for Canadian Drinking Water Quality, Water Treatment Principles and Application, for information regarding these treatment processes.

LEAD

Health Limit: 0.01 mg/L
Aesthetic Limit: None

Observable Characteristics:

Water may have a metallic taste.

Sources:

Lead is a very common, naturally occurring material. It is found as a component of rocks, soils, water and air. Due to its availability, low melting point, malleability and ability to resist corrosion, people have been mining and using lead for centuries. Some recent uses for lead include; the use in paint pigments, batteries, ammunition and plumbing materials.

The contamination of lead into raw water systems may occur naturally through the **weathering** and **leaching** of rocks and soils that contain lead. This process usually accounts for minimal levels of lead in water supplies. However, in regions of concentrated lead deposits and acidic and/or **soft** water this natural process may create localized contamination.

The majority of lead contamination in water is a result of human activities such as mining, manufacturing and industrial processes. The deposition of waste products at landfill sites is another major factor in the contamination of source waters.

Unfortunately, lead contamination is not restricted to specific areas . In fact, the water supply in any one house may be free from lead contamination, while right next door, the lead levels exceed the health limit. In most cases, high levels of lead in drinking water are not the result of a contaminated water source. Instead, they are the result of the methods of water transport and storage, and are specific to the individual point of consumption.

Plumbing methods and materials are the main cause of lead contamination in Canadian water supplies. The copper piping that is used in plumbing is held together with the aid of lead-containing solders and fluxes, and in some of the older buildings the pipes themselves were made entirely from lead. The water travelling through the plumbing may, under certain situations, dissolve these materials, resulting in the contamination of the drinking water. The ability of the water to dissolve the plumbing materials depends on many factors including an increase in the acidity (ph), softness, temperature and standing time within the pipes.

Health Implications:

Lead is a general poison to humans, with foetuses, infants, children up to six years of age and women, being the most susceptible to its adverse health effects. For this reason there is a health limit set for lead in Canadian drinking water.

Generally 10% of all ingested lead will be absorbed by the average human body. Lead is absorbed into both soft tissue (eg. spleen, kidney, blood and bone marrow) and into the skeleton. This rate of absorbtion will be higher in women and in young children or developing foetuses.

The ingestion of lead can cause a number of health implications including: severely effecting the central nervous system, causing inefficiency or failure of the kidneys and an interference in skeletal development. Signs of lead poisoning include dullness in mental capabilities, sluggishness, irritability, headaches, a poor attention span, aches in the joints, muscle tremors and the development of anemia.

Treatment:

To remove lead from raw water supplies, conventional treatment processes including settling, alum sulphate or ferric sulphate coagulation and filtration are reasonably effective. Lime softening has also proven to be effective if carried out at a high pH. There is a decrease in dissolution of lead from plumbing if water treatment plants increase the pH from below 7 to 8 or 9 and add carbonate to increase the hardness *.

The treatment of water contaminated by plumbing is somewhat different than that of raw water. If the water is suspected to have been in contact with the plumbing for more than six hours, such as overnight or during the work day, it is to be flushed before use. Flush the cold water faucet by allowing the water to run until you can feel the water get cooler. This is to be done to every faucet before drinking or using the water.

If you own a well or other water source, the water can be treated to make it less corrosive to the plumbing. This can be done with commercially available corrosion control devices including calcite filters.

If the faucet is equipped with an aerator screen, it should be regularly removed and cleaned to rid it of any solid lead particles.

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