

**WORK SESSION STAFF REPORT**  
**Work Session Item No. 1**

**Date:** January 6, 2020  
**To:** City Council  
**From:** Rick DeGardner, Public Services Director  
Greg Johnson, WSB and Associates  
**Re:** Public Water System - Manganese Test Results (UCMR4)

**Background**

The U.S. Environmental Protection Agency's (EPA) sets safe drinking water standards. There are primary standards and secondary standards. The primary standards are regulated through Maximum Contaminate Levels (MCL). Testing by the Minnesota Department of Health (MDH) shows the City's municipal water supply continues to meet all Safe Drinking Water Act standards.

The Safe Drinking Water Act requires that every five years secondary unregulated contaminants are evaluated. As a result the EPA issues a new list of 30 unregulated contaminants to be monitored by Public Water Systems (PWSs). The Unregulated Contaminant Monitoring Rule (UCMR) provides the EPA and other interested parties with scientifically valid data on the occurrence of contaminants in drinking water. This national survey is one of the primary sources of information on occurrence and levels of exposure that EPA uses to develop regulatory decisions for contaminants in the public drinking water supply.

UCMR4 monitoring is currently occurring thru 2020 and includes manganese, which was not previously identified to cause health effects. Developing research, reviewed by the MDH indicates that children and adults who drink water with high levels of manganese for an extended period time may have problems with memory, attention, and motor skills. Infants (babies under one year old) may develop learning and behavior problems if they drink water with too much manganese in it. Although MDH tested manganese levels in municipal water systems state-wide in 2011, the effects of manganese were not clearly understood or published until additional research was recently completed by MDH. The attached MDH fact sheet provides additional information:

- If you have an infant who drinks tap water or drinks formula made with tap water, a safe level of manganese in your water is 100 micrograms of manganese per liter of water ( $\mu\text{g/L}$ )\* or less.
- If you have an infant who never drinks tap water or formula made with tap water, a safe level of manganese in your water is 300  $\mu\text{g/L}$  or less.

- If everyone in your household is more than one year old, a safe level of manganese in your water is 300 µg/L or less.

City of Lino Lakes received the attached letter from the MDH regarding UCMR4 as it relates to the City’s drinking water. The City’s Well Nos. 3 and 4 were randomly selected by EPA to be tested and monitored by MDH under UCMR4. The test results from MDH, Well No. 3 contains 367 micrograms of manganese per liter of water (µg/L), and Well No. 4 contains 82.7 µg/L (1 µg/L = 1 Part Per Billion (PPB)). The City requested additional testing from MDH to obtain a uniform baseline of data.

The December 31, 2019 MDH test results for all the City’s wells:

City Well Number	Manganese Concentration (micrograms per liter)
1	158
2	527
3	322
4	84
5	143
6	408

MDH requires the test results from the UCMR4 monitoring to be published in a public water system’s annual Consumer Confidence Report (CCR) also referenced as the Drinking Water Report.

The City is working with engineering consultants and MDH professionals on short-, mid-, and long-term plans to reduce the manganese levels in the City’s municipal drinking water.

**Short Term Solution-** the City has reduced the manganese levels in the water supply by limiting the use of wells with high manganese levels. While this practice has lowered the manganese levels to below 300 ppb, a level that is safe for adult and child consumption, it is still recommended to consider bottled water for formula fed infants under the age of 12 months. The City is in the process of sending out informational letters to households and businesses that currently use the municipal water supply, and properties with private wells. The City also plans to hold a public informational meeting at 6:00 pm on Wednesday, January 22, 2020.

**Mid and Long Term Solutions-** are being evaluated to permanently reduce the levels of manganese in drinking water. These options include:

- Modifying the existing watering ban ordinance
- Utilizing water from neighboring municipal water systems
- Drilling new wells
- Constructing a water treatment plant

During the summer months, the demand for water will increase, resulting in the need to use water from additional wells. This will likely increase manganese levels and at that time all residents may want to take additional actions to protect their health.

### **Recommended Actions**

There are several things you can do to filter manganese out of your drinking water. Certain types of home water treatment units remove or reduce manganese (refrigerator water filter, pour-through pitchers, units that attach to faucet, water softeners, etc.). Minnesota Department of Health's website: [www.health.state.mn.us](http://www.health.state.mn.us) and search *Home Water Treatment* for details.

If you do not have a home water treatment device that removes or reduces manganese, you may want to consider installing one or using bottled water that is labeled as "distilled" or "purified" for drinking, cooking, and preparing infant formula.

**Private Well Owners** - Some Minnesota groundwater naturally has levels of manganese higher than the MDH guidance values. Homeowners with private wells are responsible for having their wells tested. Learn more on the Minnesota Department of Health's website: [www.health.state.mn.us](http://www.health.state.mn.us) and search *Owner's Guide to Wells*. The Anoka County Public Health and Environmental Services (ACPHES) Department ([www.anokacounty.us](http://www.anokacounty.us)) accepts water samples. The City offers free test kits that are available at Lino Lakes City Hall. ACPHES charges a \$15 to \$30 lab fee at the time of processing.

### **Requested Council Direction**

Consider a Water Supply and Treatment Feasibility Study at a future City Council work session.

### **Attachments**

1. Minnesota Department of Health UCMR 4 Results for Your Public Water System document
2. Minnesota Department of Health Manganese in Drinking Water document



DATE: November 19, 2019

TO: Community Public Water Supply Owner/Operator

FROM: Community Public Water Supply Unit, Drinking Water Protection Section

SUBJECT: UCMR 4 Results for Your Public Water System

### **Fourth Unregulated Contaminant Monitoring Rule (UCMR 4) Purpose and Background**

Attached are drinking water sampling results for your community public water system. The Minnesota Department of Health (MDH) collected these samples as part of the Fourth Unregulated Contaminant Monitoring Rule (UCMR 4). The purpose of UCMR is to collect data from across the country on contaminants that may be present in drinking water. The U.S. Environmental Protection Agency (EPA) uses this data to decide if the contaminants are found often enough and at levels high enough to need regulations in the future.

The UCMR 4 contaminants are unregulated and do not have enforceable federal standards. MDH does not use these results to determine if your system complies with regulations. These results must be kept in your files for a minimum of ten years.

### **UCMR 4 Sampling Results**

Manganese was detected in the samples at a level of 367 and 82.7 micrograms per liter, or ug/L.<sup>1</sup> Scientists' understanding of manganese and health is developing. MDH has set a health-based guidance value for manganese of 100 ug/L for formula-fed infants and infants that drink tap water. For children over one year old and adults, MDH supports the EPA Health Advisory of 300 µg/L.

Manganese occurs naturally in rocks and soil across Minnesota and is commonly found in Minnesota ground and surface water. People need some manganese to stay healthy, but too much can be harmful to the nervous system.

Your system's manganese level is higher than the health-based guidance values. Children and adults who drink water with high levels of manganese for a long time may have problems with memory, attention, and motor skills. Infants may develop learning and behavior problems if they drink water with too much manganese in it.

No other contaminants were detected in these samples.

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<sup>1</sup> One microgram per liter is the same as one part per billion (ppb).

## Next Steps

You must report all UCMR 4 sampling detections to your customers in the next year's Consumer Confidence Report (CCR). MDH will include UCMR 4 detections in the CCR template we provide to you.

Based on the level of manganese in your water, we suggest working with MDH to explore options for informing your customers and possibly taking action to address manganese.

## For More Information

Topic	Resources for more information
Manganese and drinking water	Manganese and Drinking Water ( <a href="https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/mninfosheet.pdf">https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/mninfosheet.pdf</a> )
Health-based guidance value for manganese	Human Health-Based Water Guidance Table ( <a href="https://www.health.state.mn.us/communities/environment/risk/guidance/gw/table.html">https://www.health.state.mn.us/communities/environment/risk/guidance/gw/table.html</a> )
Health questions about manganese	Sarah Fossen-Johnson, Health Risk Assessment Unit, 651-201-4080
More information about UCMR 4	MDH: Fourth Unregulated Contaminant Monitoring Rule ( <a href="https://www.health.state.mn.us/communities/environment/water/com/ucmr4.html">https://www.health.state.mn.us/communities/environment/water/com/ucmr4.html</a> )  EPA: Fourth Unregulated Contaminant Monitoring Rule ( <a href="https://www.epa.gov/dwucmr/fourth-unregulated-contaminant-monitoring-rule">https://www.epa.gov/dwucmr/fourth-unregulated-contaminant-monitoring-rule</a> )
All other questions	Lucas Martin, Community Public Water Supply Unit, 651-201-4144

Enclosure

## Manganese in Drinking Water

Manganese occurs naturally in rocks and soil across Minnesota and is often found in Minnesota ground and surface water. Your body needs some manganese to stay healthy, but too much can be harmful.

### Health Effects

Children and adults who drink water with high levels of manganese for a long time may have problems with memory, attention, and motor skills. Infants (babies under one year old) may develop learning and behavior problems if they drink water with too much manganese in it.

### How to Protect Yourself & Your Family

The Minnesota Department of Health (MDH) developed guidance values to keep your household drinking water safe. Because these are guidance values, public water systems are not required to meet these values and some do not.

- If you have an infant who drinks tap water or drinks formula made with tap water, a safe level of manganese in your water is 100 micrograms of manganese per liter of water ( $\mu\text{g/L}$ )\* or less.
- If you have an infant who never drinks tap water or formula made with tap water, a safe level of manganese in your water is 300  $\mu\text{g/L}$  or less.
- If everyone in your household is more than one year old, a safe level of manganese in your water is 300  $\mu\text{g/L}$  or less.

Drinking water with a level of manganese above the MDH guidance level can be harmful for your health, but taking a bath or a shower in it is not. Manganese in your water can stain your laundry, cause scaling on your plumbing, and make your water look, smell, or taste bad. Manganese can also create a brownish-black or black stain on your toilet, shower, bathtub, or sink.

The only way to know the level of manganese in your drinking water is to contact your public water system or have your tap water tested. All water testing should be done through an accredited laboratory. Contact an accredited laboratory to get sample containers and

instructions, or ask your county environmental or public health services if they provide water testing services (see *Search for Accredited Laboratories*).

If you have a household water treatment unit, the unit may reduce the level of manganese in your drinking water (see *Home Water Treatment Units: Point-of-Use Devices* for more information). MDH and Dakota County conducted a study in 2016 and found that water softeners can be an effective way to reduce the level of manganese in drinking water (see *The Wells and Increased Infant Sensitivity and Exposure (WIISE) Study*).

\*One microgram per liter ( $\mu\text{g/L}$ ) is the same as 1 part per billion.

### If you have a private well

Some Minnesota groundwater naturally has levels of manganese higher than the MDH guidance values. You may want to test your drinking water for manganese, especially if infants drink your tap water. You are responsible for keeping your well water safe and testing it as needed.

### If you are on a public water system

Public water systems may test their water for manganese, but they are not required to. You can contact your public water system to find out if they test the water for manganese. If your public water system does not test for manganese, you can arrange and pay for an accredited laboratory to test your water. Remember that certain types of home water treatment units may make the level of manganese lower in your tap water than what your water system detected.

## Background Information

Manganese occurs naturally in rocks and soil and can be found in water, food, and air. Your body needs some manganese to stay healthy. The recommended daily intake for manganese depends on a person's age and sex. The recommended manganese intake for children over eight years old and adults varies from 1,900 to 2,600 µg per day. Infants should consume 600 µg or less of manganese per day.

The level at which manganese benefits one person could overlap with the level at which it is harmful to another person. Adults and children get enough manganese through their diet. Infants get enough manganese from breast-milk, food, or formula. Food often has a higher manganese level than water; however, there are many types of food that can actually block manganese from getting into the body. Water does not have the same characteristics as food, so your body can more easily absorb manganese in water.

## Manganese in Minnesota's Water

Manganese occurs naturally in groundwater across Minnesota. Based on an MDH study, groundwater in southeastern Minnesota tends to have low levels of manganese (below 50 µg/L). Southwestern Minnesota tends to have higher levels—some over 1,000 µg/L. There are no clear patterns in the other parts of the state.

Although public water systems are not required to test for manganese, some Minnesota community public water systems test for manganese either before or after treating water. Based on test results and treatment practices, MDH estimates about 90 percent of Minnesotans using community public drinking water systems receive water with levels of manganese below 100 µg/L. About 3 percent of Minnesotans on community public water systems receive water with levels above 300 µg/L. It is important to remember certain types of household water treatment units may reduce manganese to safe levels.

## What MDH is Doing

MDH has health-based guidance for manganese in water (see *Human Health-Based Water Guidance Table*). MDH gathered data to find patterns of where manganese occurs in Minnesota's groundwater (see *Initial Assessment of Manganese in Minnesota Groundwater*). MDH also participated in an effort by the Minnesota Ground Water Association to create a report about manganese called *Manganese in Minnesota's Groundwaters*.

## What Other Groups are Doing

Researchers at the University of Minnesota received funding to investigate *Risks to Infants from Manganese in Drinking Water*.

## Resources

### Home Water Treatment

([www.health.state.mn.us/communities/environment/water/factsheet/hometreatment](http://www.health.state.mn.us/communities/environment/water/factsheet/hometreatment)).

### Human Health-Based Water Guidance Table

([www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html](http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html)).

### Initial Assessment of Manganese in Minnesota Groundwater (PDF)

([www.health.state.mn.us/communities/environment/water/docs/swp/mnreport.pdf](http://www.health.state.mn.us/communities/environment/water/docs/swp/mnreport.pdf)).

### Manganese in Minnesota's Groundwaters (PDF)

([www.mgwa.org/documents/whitepapers/01\\_manganese/Manganese\\_in\\_Minnesotas\\_Groundwaters.pdf](http://www.mgwa.org/documents/whitepapers/01_manganese/Manganese_in_Minnesotas_Groundwaters.pdf)).

### Risks to Infants from Manganese in Drinking Water

([consortium.umn.edu/risks-infants-manganese-drinking-water](http://consortium.umn.edu/risks-infants-manganese-drinking-water)).

### Search for Accredited Laboratories

([www.health.state.mn.us/labsearch](http://www.health.state.mn.us/labsearch)).

### The Wells and Increased Infant Sensitivity and Exposure (WIISE) Study (PDF)

([www.health.state.mn.us/communities/environment/risk/docs/studies/wiisereport.pdf](http://www.health.state.mn.us/communities/environment/risk/docs/studies/wiisereport.pdf)).

Minnesota Department of Health

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[www.health.state.mn.us](http://www.health.state.mn.us)

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