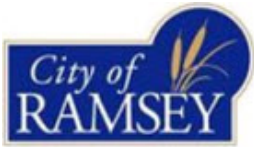


City of Ramsey
Agenda
Special City Council
Tuesday, May 7, 2019

5:30 pm
Lake Itasca Room, 7550 Sunwood Drive NW

- 1. Call to Order**
- 2. Citizen Input**
- 3. Approve Agenda**
- 4. Council Business**
 1. Discussion regarding Personnel Issue **(All or portions of this meeting will be closed to the Public pursuant to MN Statutes, Section 13D.05)**
 2. Discuss Manganese Concentration Levels in Ramsey's Municipal Drinking Water
- 5. Mayor/Council/Staff Input**
- 6. Adjournment**



Our Mission: To work together to responsibly grow our community, and to provide quality, cost-effective, and efficient government services.

CC Special Session

4. 1.

Meeting Date: 05/07/2019

By: Colleen Lasher, Administrative
Services

Information

Title:

Discussion regarding Personnel Issue **(All or portions of this meeting will be closed to the Public pursuant to MN Statutes, Section 13D.05)**

Purpose/Background:

The City Council will hold a special meeting that will be closed to the public pursuant to Minnesota Statutes, section 13D.05. This meeting will occur immediately following the regular Council meeting, is considered a separate special meeting of the Council, and will be held in the Lake Itasca Room.

All or a portion of the meeting may be closed on the following grounds:

The meeting may be closed for preliminary consideration of allegations or charges against an employee pursuant to Minnesota Statutes, section 13D.05, subdivision 2(b).

The City Council may also take action in open session at this meeting with respect to employment of an employee.

Funding Source:

Not applicable.

Recommendation:

Based on discussion.

Action:

Motion to adopt Resoution #19-103 as follows:

1. The letter setting forth the discipline of an employee is hereby approved by the City Council. (The letter will be presented to the City Council during the closed discussion.
 2. The City Administrator is authorized to sign the discipline letter on behalf of the City.
 3. The City Administrator or City Attorney is directed to serve the discipline letter and a copy of this Resolution on the employee, and to place a copy of the discipline letter and Resolution #19-103 in the employee's personnel file.
-

Attachments

Resolution 19-103

Statutue

Form Review

Inbox

Jo Thieling
Colleen Lasher (Originator)
Jo Thieling
Kurt Ulrich
Colleen Lasher (Originator)
Kurt Ulrich
Form Started By: Colleen Lasher
Final Approval Date: 05/02/2019

Reviewed By

Jo Thieling
Colleen Lasher
Kathy Schmitz
Kurt Ulrich
Colleen Lasher
Kurt Ulrich

Date

04/18/2019 03:34 PM
04/18/2019 03:41 PM
04/18/2019 03:41 PM
04/18/2019 04:38 PM
04/30/2019 10:39 AM
05/02/2019 01:43 PM
Started On: 04/18/2019 02:20 PM

Councilmember introduced the following resolution and moved for its adoption:

RESOLUTION #19-103

RESOLUTION TO CONSIDER EMPLOYEE DISCIPLINE

WHEREAS, the Council reviewed information relating to the proposed discipline of a person subject to its authority; and

WHEREAS, the Council reviewed a draft of a letter to the person informing of discipline to be imposed by the City.

NOW THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA, as follows:

- 1) The letter setting forth the discipline of an employee is hereby approved by the City Council.
- 2) The City Administrator is authorized to sign the discipline letter on behalf of the City.
- 3) The City Administrator or City Attorney is directed to serve the discipline letter and a copy of this Resolution on the employee, and to place a copy of the discipline letter and Resolution #19-103 in the employee's personnel file.

The motion for the adoption of the foregoing resolution was duly seconded by Councilmember and upon vote being taken thereon, the following voted in favor thereof:

and the following voted against the same:

and the following abstained:

and the following were absent:

Whereupon said resolution was declared duly passed and adopted by the Ramsey City Council this the 7th day of May, 2019.

Mayor

ATTEST:

City Clerk

13D.05 MEETINGS HAVING DATA CLASSIFIED AS NOT PUBLIC.

Subdivision 1. **General principles.** (a) Except as provided in this chapter, meetings may not be closed to discuss data that are not public data.

(b) Data that are not public data may be discussed at a meeting subject to this chapter without liability or penalty, if the disclosure relates to a matter within the scope of the public body's authority and is reasonably necessary to conduct the business or agenda item before the public body.

(c) Data discussed at an open meeting retain the data's original classification; however, a record of the meeting, regardless of form, shall be public.

(d) All closed meetings, except those closed as permitted by the attorney-client privilege, must be electronically recorded at the expense of the public body. Unless otherwise provided by law, the recordings must be preserved for at least three years after the date of the meeting.

Subd. 2. **When meeting must be closed.** (a) Any portion of a meeting must be closed if expressly required by other law or if the following types of data are discussed:

(1) data that would identify alleged victims or reporters of criminal sexual conduct, domestic abuse, or maltreatment of minors or vulnerable adults;

(2) active investigative data as defined in section 13.82, subdivision 7, or internal affairs data relating to allegations of law enforcement personnel misconduct collected or created by a state agency, statewide system, or political subdivision;

(3) educational data, health data, medical data, welfare data, or mental health data that are not public data under section 13.32, 13.3805, subdivision 1, 13.384, or 13.46, subdivision 2 or 7; or

(4) an individual's medical records governed by sections 144.291 to 144.298.

(b) A public body shall close one or more meetings for preliminary consideration of allegations or charges against an individual subject to its authority. If the members conclude that discipline of any nature may be warranted as a result of those specific charges or allegations, further meetings or hearings relating to those specific charges or allegations held after that conclusion is reached must be open. A meeting must also be open at the request of the individual who is the subject of the meeting.

Subd. 3. **What meetings may be closed.** (a) A public body may close a meeting to evaluate the performance of an individual who is subject to its authority. The public body shall identify the individual to be evaluated prior to closing a meeting. At its next open meeting, the public body shall summarize its conclusions regarding the evaluation. A meeting must be open at the request of the individual who is the subject of the meeting.

(b) Meetings may be closed if the closure is expressly authorized by statute or permitted by the attorney-client privilege.

(c) A public body may close a meeting:

(1) to determine the asking price for real or personal property to be sold by the government entity;

(2) to review confidential or protected nonpublic appraisal data under section 13.44, subdivision 3; and

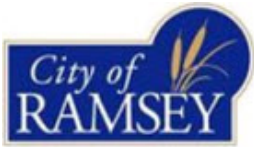
(3) to develop or consider offers or counteroffers for the purchase or sale of real or personal property.

Before holding a closed meeting under this paragraph, the public body must identify on the record the particular real or personal property that is the subject of the closed meeting. The proceedings of a meeting closed under this paragraph must be tape recorded at the expense of the public body. The recording must be preserved for eight years after the date of the meeting and made available to the public after all real or personal property discussed at the meeting has been purchased or sold or the governing body has abandoned the purchase or sale. The real or personal property that is the subject of the closed meeting must be specifically identified on the tape. A list of members and all other persons present at the closed meeting must be made available to the public after the closed meeting. If an action is brought claiming that public business other than discussions allowed under this paragraph was transacted at a closed meeting held under this paragraph during the time when the tape is not available to the public, section 13D.03, subdivision 3, applies.

An agreement reached that is based on an offer considered at a closed meeting is contingent on approval of the public body at an open meeting. The actual purchase or sale must be approved at an open meeting after the notice period required by statute or the governing body's internal procedures, and the purchase price or sale price is public data.

(d) Meetings may be closed to receive security briefings and reports, to discuss issues related to security systems, to discuss emergency response procedures and to discuss security deficiencies in or recommendations regarding public services, infrastructure and facilities, if disclosure of the information discussed would pose a danger to public safety or compromise security procedures or responses. Financial issues related to security matters must be discussed and all related financial decisions must be made at an open meeting. Before closing a meeting under this paragraph, the public body, in describing the subject to be discussed, must refer to the facilities, systems, procedures, services, or infrastructures to be considered during the closed meeting. A closed meeting must be tape recorded at the expense of the governing body, and the recording must be preserved for at least four years.

History: 1957 c 773 s 1; 1967 c 462 s 1; 1973 c 123 art 5 s 7; 1973 c 654 s 15; 1973 c 680 s 1,3; 1975 c 271 s 6; 1981 c 174 s 1; 1983 c 137 s 1; 1983 c 274 s 18; 1984 c 462 s 27; 1987 c 313 s 1; 1990 c 550 s 2,3; 1991 c 292 art 8 s 12; 1991 c 319 s 22; 1994 c 618 art 1 s 39; 1997 c 154 s 2; 1999 c 227 s 22; 2002 c 379 art 1 s 5; 2004 c 276 s 1; 2004 c 290 s 18; 2007 c 110 s 2; 2007 c 147 art 10 s 15; 2008 c 335 s 1; 2010 c 365 art 1 s 8



Our Mission: To work together to responsibly grow our community, and to provide quality, cost-effective, and efficient government services.

CC Special Session

4. 2.

Meeting Date: 05/07/2019

Submitted For: Grant Riemer, Engineering/Public Works

By: Grant Riemer, Engineering/Public Works

Information

Title:

Discuss Manganese Concentration Levels in Ramsey's Municipal Drinking Water

Purpose/Background:

Purpose:

The purpose of this case is to discuss the manganese concentrations produced by several of the city's municipal wells.

Background:

On April 2nd staff received notice from the MDH (Minnesota Department of Health) that well # 1 and well #4 had been tested as part of the UCMR (unregulated contaminant monitoring rule) project in June of 2018. These wells had been found to exceed the MDH developed health-based guidance for manganese in drinking water of 100 ppb (parts per billion). MDH guidance values are developed to protect people who are most vulnerable to the potentially harmful effects of a contaminant. A person drinking water at or below the guidance value would be at little or no risk for harmful health effects. For infants that are not drinking tap water or formula mixed with tap water, children over one year old, and adults, manganese in drinking water up to 300 ppb poses little or no health risk.

MDH uses and develops guidance values to protect people's health from contaminants in groundwater used as a source of drinking water. Because these are guidance values, public water systems are not required to meet these values and some do not.

Joining us to explain these findings and their impact will be Brian Noma, who is the Public Health Engineer assigned to our water system and Anna Arkin who is also from the MDH, who specializes in Strategic Initiatives and Communications.

Notification:

Manganese is an unregulated contaminant which does not carry a legally enforceable Minimum Concentration Limit (MCL). However, the City is required to include a note in our annual Consumer Confidence Report that several of our wells exceed the guidance limit for manganese.

To ensure all residents and businesses receive the same message, City Staff has developed a draft letter that can be mailed and posted on-line. A draft copy of this letter is attached for Council review and discussion.

Observations/Alternatives:

After we received the information on our manganese levels, we programmed our system to utilize the wells with the lowest manganese level to pump first, then to add capacity from the higher manganese level wells as needed. The wells with the lower manganese level could supply enough water to meet demand in colder/wet weather, but not over the summer months when turf irrigation significantly increases demand. Another factor to consider is that our wells with low manganese levels produce water with high iron content so while we are solving one issue by reducing manganese concentrations, we are creating another issue by increasing iron concentrations. The utility department fields numerous complaints about the iron in our system on an annual basis, especially during times of low water usage. Water high in iron is orange colored in appearance and stains clothing, sidewalks and buildings, and plugs water meters shortening their replacement cycles.

While water softeners can help remove manganese, many people choose to not connect their water softener to pipes leading to faucets used for drinking water due to the taste.

Short, medium, and long-term options for addressing this issue will be presented by Staff during the meeting.

Funding Source:

Water Utility Funds will pay for the postage to mail the letters.

Recommendation:

Based on Council Discussion

Action:

Based on Council Discussion

Attachments

Draft Letter to Residents

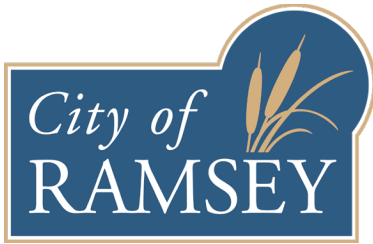
Well Data

Manganese Fact Sheet

Home Water Treatment

Form Review

Inbox	Reviewed By	Date
Bruce Westby	Bruce Westby	05/02/2019 10:49 AM
Diana Lund	Diana Lund	05/02/2019 11:04 AM
Kurt Ulrich	Kurt Ulrich	05/02/2019 01:44 PM
Form Started By: Grant Riemer		Started On: 04/30/2019 01:03 PM
Final Approval Date: 05/02/2019		



7550 Sunwood Drive NW • Ramsey, MN 55303

City Hall: 763.427.1410 • Fax: 763.427.5543

www.cityoframsey.com

May 7, 2019

Dear Ramsey resident,

The City's water supply is regularly tested by the Minnesota Department of Health. This year, the results showed that some of the City's wells have manganese levels above the Minnesota Department of Health's (MDH) guidelines.

Issue:

Manganese is a naturally occurring element found in rocks and soil and is usually present in Minnesota ground and surface water. Your body needs some manganese to stay healthy, but too much can be harmful.

The Minnesota Department of Health's guidelines state that consuming water with manganese levels above 100 parts per billion (ppb) may lead to learning and behavior problems in formula-fed infants 12 months or younger.

The MDH guidelines also stipulate that children and adults that consume water with manganese levels higher than 300 parts per billion (ppb) may notice memory, attention, and motor skill deficiencies if consumed for an extended period of time.

The City has eight wells that are regularly tested for manganese. This year, two of the City's eight wells tested above MDH safe consumption guidelines for children and adults at 320 ppb and 371 ppb. Two more tested above the recommended guidelines for bottle-fed infants (100 ppb) at 229 ppb and 223 ppb.

If you consume City water, MDH recommends considering home water treatment or bottled water for drinking, cooking and preparing infant formula.

Solution:

The Ramsey City Council is diligently working on short-, mid-, and long-term plans to address the safety of City drinking water.

Beginning immediately, the City began pumping water from the wells lowest in manganese. However, these wells test highest in Iron. Iron is safe to consume, but may cause your water to appear brown/orange in color.

The City plans to mix the water in its wells to dilute the manganese levels. This may lower the levels below 300 ppb (safe for adult and child consumption). Formula-fed infants should continue to be fed using bottled water.

The Ramsey City Council is in the process of finding a long-term solution to provide safe drinking water to its residents. Several options are being considered. Some of which include:

- Constructing a water treatment plant
- Drilling new wells
- Filtration
- Establish pipe connection to a neighboring City and purchase water from its system
- Hire a consultant to make a recommendation

What can I do?

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. Visit the Minnesota Department of Health's website: www.health.state.mn.us and search *Home Water Treatment* for details.

If you already have a home water treatment device that removes or reduces manganese, you may want to test the water levels coming from your tap. 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.

If you have your own well, you may want to test your drinking water for manganese, especially if infants drink your tap water. 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 and search *Owner's Guide to Wells*. The Anoka County Community Health and Environmental Services (ACCHES) Department accepts water samples. Free test kits are available at Ramsey City Hall, however, ACCHES will charge a lab fee of \$30 at the time of processing. For questions, contact ACCHES at 763-324-4260.

For more information, visit our website at: www.cityoframsey.com or call City Administrator Kurt Ulrich at 763-433-9845 or Utilities Supervisor John Nelson at 763-433-9861.

City of Ramsey Well Testing Results from Minnesota Department of Health

City	Location	Element	Result	Unit	Lab
Ramsey	Well #1	Manganese	320	ppb	Minnesota Department of Health--Env. Laboratory
Ramsey	Well #3	Manganese	229	ppb	Minnesota Department of Health--Env. Laboratory
Ramsey	Well #4	Manganese	371	ppb	Minnesota Department of Health--Env. Laboratory
Ramsey	Well #5	Manganese	21.8	ppb	Minnesota Department of Health--Env. Laboratory
Ramsey	Well #6	Manganese	22.6	ppb	Minnesota Department of Health--Env. Laboratory
Ramsey	Well #7	Manganese	51.5	ppb	Minnesota Department of Health--Env. Laboratory
Ramsey	Well #8	Manganese	223	ppb	Minnesota Department of Health--Env. Laboratory

* Well #2 is exclusively used for irrigation

pws_id	name	collection_date	display_location_desc	description	result	unit	measi	field_samp	lab_name
1020035	Ramsey	4/8/2019 8:35	Well #1	Manganese	320	ug/L	BN1325	Minnesota	Department
1020035	Ramsey	4/8/2019 8:55	Well #3	Manganese	229	ug/L	BN1326	Minnesota	Department
1020035	Ramsey	4/8/2019 8:50	Well #4	Manganese	371	ug/L	BN1327	Minnesota	Department
1020035	Ramsey	4/8/2019 9:05	Well #5	Manganese	21.8	ug/L	BN1328	Minnesota	Department
1020035	Ramsey	6/18/2018 7:50	E01-Well 1 Entry Point	Manganese	263	ug/L		Eurofins Eaton Analytic	
1020035	Ramsey	12/3/2018 9:40	E01-Well 1 Entry Point	Manganese	319	ug/L		Eurofins Eaton Analytic	
1020035	Ramsey	6/18/2018 8:45	E04-Well 4 Entry Point	Manganese	226	ug/L		Eurofins Eaton Analytic	
1020035	Ramsey	12/3/2018 10:45	E04-Well 4 Entry Point	Manganese	365	ug/L		Eurofins Eaton Analytic	
1020035	Ramsey	6/18/2018 9:00	E06-Well 6 Entry Point	Manganese	20.7	ug/L		Eurofins Eaton Analytic	
1020035	Ramsey	3/11/2019 9:05	E06-Well 6 Entry Point	Manganese	20	ug/L		Eurofins Eaton Analytic	
1020035	Ramsey	4/8/2019 9:05	Well #6	Manganese	22.6	ug/L	BN1329	Minnesota	Department
1020035	Ramsey	4/8/2019 9:10	Well #7	Manganese	51.5	ug/L	BN1330	Minnesota	Department
1020035	Ramsey	4/8/2019 9:10	Well #8	Manganese	223	ug/L	BN1331	Minnesota	Department

pws_id	name	collection_date	display_loc	description	result	unit	measl	lab_name
1020035	Ramsey	4/8/2019 8:35	Well #1	Iron	518	ug/L		Minnesota Department of Health--Env. Laboratory
1020035	Ramsey	4/8/2019 8:55	Well #3	Iron	689	ug/L		Minnesota Department of Health--Env. Laboratory
1020035	Ramsey	4/8/2019 8:50	Well #4	Iron	330	ug/L		Minnesota Department of Health--Env. Laboratory
1020035	Ramsey	4/8/2019 9:05	Well #5	Iron	801	ug/L		Minnesota Department of Health--Env. Laboratory
1020035	Ramsey	4/8/2019 9:05	Well #6	Iron	781	ug/L		Minnesota Department of Health--Env. Laboratory
1020035	Ramsey	4/8/2019 9:10	Well #7	Iron	868	ug/L		Minnesota Department of Health--Env. Laboratory
1020035	Ramsey	4/8/2019 9:10	Well #8	Iron	704	ug/L		Minnesota Department of Health--Env. Laboratory

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*).

Contact MDH (651-201-4700 or health.drinkingwater@state.mn.us) with questions.

*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 Units: Point-of-Use Devices](http://www.health.state.mn.us/divs/eh/water/factsheet/com/pou.html) (www.health.state.mn.us/divs/eh/water/factsheet/com/pou.html).

[Human Health-Based Water Guidance Table](http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html) (www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html).

[Initial Assessment of Manganese in Minnesota Groundwater \(PDF\)](http://www.health.state.mn.us/divs/eh/water/swp/maps/mnreport.pdf) (www.health.state.mn.us/divs/eh/water/swp/maps/mnreport.pdf).

[Manganese in Minnesota's Groundwaters \(PDF\)](http://www.mgwa.org/documents/whitepapers/01_manganese/Manganese_in_Minnesotas_Groundwaters.pdf) (www.mgwa.org/documents/whitepapers/01_manganese/Manganese_in_Minnesotas_Groundwaters.pdf).

[Risks to Infants from Manganese in Drinking Water](https://consortium.umn.edu/risks-infants-manganese-drinking-water) (https://consortium.umn.edu/risks-infants-manganese-drinking-water).

[Search for Accredited Laboratories](http://www.health.state.mn.us/labsearch) (www.health.state.mn.us/labsearch).

[The Wells and Increased Infant Sensitivity and Exposure \(WIISE\) Study \(PDF\)](http://www.health.state.mn.us/divs/eh/risk/studies/wiisereport.pdf) (www.health.state.mn.us/divs/eh/risk/studies/wiisereport.pdf).

Minnesota Department of Health
Environmental Health Division
651-201-4571
www.health.state.mn.us

6/21/2018

To obtain this information in a different format, call: 651-201-4571. Printed on recycled paper.

Home Water Treatment

Most Minnesotans do not need to install water treatment at home to protect their health. If you know your drinking water is contaminated or you are concerned about the color, taste, or odor of your water, first try to remove the source(s) of contamination or replace the contaminated water supply with a safer supply. If this is not possible, then home water treatment may be appropriate. Use this resource to help decide if home water treatment makes sense for you and what treatment options may be best for you.

Step 1: Know where your drinking water comes from

- **If you get your drinking water from a public water system**, your water system and the Minnesota Department of Health (MDH) regularly test the water for over 100 different contaminants and make sure it meets all Safe Drinking Water Act standards. You can learn more about your water quality by reading your water system's annual report (called a Consumer Confidence Report [CCR]). You can request the report from your water system or [Search for your CCR](https://mnccr.web.health.state.mn.us/index.faces) (<https://mnccr.web.health.state.mn.us/index.faces>).
- **If you get your drinking water from a private well**, you are responsible for regularly testing your well water to make sure it is safe for drinking and cooking. Learn more about testing recommendations and how to test your water at [Water Quality/Well Testing](http://health.mn.gov/wellwater) (health.mn.gov/wellwater).

Step 2: Think about why you want water treatment

Knowing what you want from water treatment will help you choose the best treatment option. Some common reasons people think about water treatment for their home:

- They do not like the way their water tastes, smells, looks, or feels.
- They are concerned about a specific contaminant (such as lead, arsenic, or nitrate) in their water. [Beware of Water Treatment Scams](http://health.state.mn.us/communities/environment/water/factsheet/beware.html) (health.state.mn.us/communities/environment/water/factsheet/beware.html).

Step 3: Select a water treatment option

There are many water treatment options. Deciding what option is best for you depends on what you want from your water treatment. This information sheet gives an overview of water treatment considerations and options. You may need to do additional research or contact a water treatment professional to find the best option for you. Below are some key questions to consider.

What contaminant would you like to remove?

Select a treatment unit certified by NSF, Underwriter's Laboratory (UL), or Water Quality Association (WQA) to remove the contaminant(s) you are concerned about, if a certification is available. These organizations do not certify treatment units for all contaminants. In this case, you may need to contact a water treatment professional.

- [Search for NSF Certified Drinking Water Treatment Units, Water Filters](http://info.nsf.org/Certified/DWTU/) (<http://info.nsf.org/Certified/DWTU/>)
- [Residential Drinking Water Standards](http://www.nsf.org/services/by-industry/water-wastewater/residential-water-treatment/residential-drinking-water-treatment-standards) (www.nsf.org/services/by-industry/water-wastewater/residential-water-treatment/residential-drinking-water-treatment-standards)
- [Find WQA-Certified Water Treatment Products](https://www.wqa.org/find-products#/) (<https://www.wqa.org/find-products#/>)



No single treatment unit can remove all contaminants in water. Depending on your water quality, or if you want to remove more than one contaminant, you may need to combine several treatment units into a treatment system.

Do you want to treat all of the water in your home or just drinking water?

There are two main types of home water treatment:

- **Point-of-use (POU)** units treat water at one faucet or one location. Examples include pour-through pitchers or units that sit on the counter, attach to a faucet, are part of a refrigerator water/ice dispenser, or are under the sink. POU is a good option for treating only the water you use for drinking and cooking.
- **Point-of-entry (POE)** units are installed on the water line as it enters the home. POE units treat all of the water in your home.

What is your budget?

Prices vary widely for treatment options—anywhere from less than twenty dollars to thousands of dollars. Things to consider for your water treatment budget include whether you want to treat just your drinking water at one tap or all of the water in your home, maintenance costs, and whether you will install the treatment yourself or hire a professional. Your household may qualify for one of the following loans (which you have to pay back) or grants (which you do not have to pay back) to help pay for water treatment.

- **AgBMP Loan Program** provides low interest loans to farmers, rural landowners, and agriculture supply businesses. Contact your local Soil and Water Conservation District or see [Agriculture Best Management Practices \(BMP\) Loan Program](http://www.mda.state.mn.us/agbmploan) (www.mda.state.mn.us/agbmploan).
- **Single Family Housing Repair Loans and Grants** provide low interest loans for homeowners with income below 50 percent of the area's median income and grants for people over the age of 62 years. See [Single Family Housing Repair Loans and Grants](https://www.rd.usda.gov/programs-services/single-family-housing-repair-loans-grants) (https://www.rd.usda.gov/programs-services/single-family-housing-repair-loans-grants).
- **Fix Up Program** provides fixed interest rate loans to homeowners. Go to [Minnesota Housing](http://www.mnhousing.gov) (www.mnhousing.gov) and click on "Homebuyers & Homeowners—Improve Your Home".

Step 4: Install water treatment

You can purchase and install a treatment unit on your own, or you can work with a water treatment professional. Search for water treatment professionals in your telephone book, online, or at [Find Water Treatment Providers](http://www.wqa.org/find-providers) (www.wqa.org/find-providers). If you work with a treatment professional, make sure they are a licensed plumber or licensed water conditioning contractor by using the Minnesota Department of Labor and Industry's [License Lookup](https://secure.doli.state.mn.us/lookup/licensing.aspx) (https://secure.doli.state.mn.us/lookup/licensing.aspx). Here are some [Recommended Questions to Ask a Water Treatment Professional](https://www.wqa.org/improve-your-water/questions-to-ask) (https://www.wqa.org/improve-your-water/questions-to-ask).

Step 5: Test and maintain water treatment

After installing treatment, test the treated water to make sure the treatment is working. Then, follow the manufacturer's recommendations for cleaning and maintenance. All water treatment units require regular maintenance to work properly. Maintenance can include changing filters, disinfecting the unit, backwashing, or cleaning out mineral build-up (scale). **Water treatment units that are not properly maintained will lose their effectiveness over time. In some cases, unmaintained units can make water quality worse and make you sick.**

Resources

- Centers for Disease Control and Prevention. [A Guide to Drinking Water Treatment Technologies for Household Use](https://www.cdc.gov/healthywater/drinking/home-water-treatment/household_water_treatment.html) (https://www.cdc.gov/healthywater/drinking/home-water-treatment/household_water_treatment.html).
- MDH. [A - Z List of Contaminants in Water](http://health.state.mn.us/communities/environment/water/contaminants/index.html) (health.state.mn.us/communities/environment/water/contaminants/index.html).
- MDH. [Home Water Softening](http://health.state.mn.us/communities/environment/water/factsheet/softening.html) (health.state.mn.us/communities/environment/water/factsheet/softening.html).
- MDH. [Water Quality/Well Testing](http://health.mn.gov/wellwater) (health.mn.gov/wellwater).
- NSF. [Drinking Water Filters, Testing and Treatment](http://www.nsf.org/consumer-resources/water-quality/water-filters-testing-treatment) (www.nsf.org/consumer-resources/water-quality/water-filters-testing-treatment).
- The Private Well Class. [Water Treatment Solutions](http://privatewellclass.org/lesson-10) (privatewellclass.org/lesson-10).

HOME WATER TREATMENT

Water treatment units and the contaminants they treat

This table shows the most common home water treatment units and the contaminants the units can remove. Learn more about the treatment units and cost estimates on the following pages.

	Adsorptive media filtration ¹	Aeration and filtration	Anion exchange ¹	Carbon filter ¹	Continuous chlorination and filtration	Distillation	Oxidizing media filtration	Ozonation and filtration	Reverse osmosis	Ultraviolet (UV) disinfection	Water softening
Color, taste, or odor issues		●		●	●	●	●	●	●		
Ammonia		●			○						
Arsenic ²	●	○	●		●	●	●	●	●		
Bacteria ³					●	●		●	●	●	
Calcium						●			●		●
Chloride						●			●		
Chlorine		●		●							
Copper						●			●		●
Fluoride	●		●	●		●			●		
Hydrogen sulfide		●		●	●		●	●			
Iron		●		●	●	●	●	●	●		●
Lead				●		●			●		
Magnesium						●			●		●
Manganese		●		●	●	●	●	●	●		●
Methane		●									
Nitrate			●			●			●		
Nitrite		○	●		●	●		●	●		
Other dissolved solids (ODS)						●			●		
Pesticides and other synthetic organic compounds (SOCs)				●		●			●		
Perfluoroalkyl substances (PFAS)				●					●		
Radium		○			○	●	●		●		●
Radon		●		●							
Selenium	●		●			●			●		
Sodium						●			●		
Sulfate	●		●			●			●		
Trichloroethylene (TCE)		●		●					●		
Trihalomethanes (THMs)		●		●					●		
Uranium	●		●			●			●		
Vinyl chloride		●							●		
Viruses ³					●	●		●	●	●	
Volatile organic compounds (VOCs)		●		●					●		

¹ The substances that these technologies reduce or remove depends on the filter media or resin.

² There are two types of arsenic in Minnesota groundwater: arsenic(III) and arsenic(V). Pre-oxidation (chlorination, aeration, or ozonation) may be needed before water treatment to make sure the treatment removes the type of arsenic present in your water. Sulfate levels above 100 parts per billion may also affect what type of water treatment will remove arsenic. MDH recommends working with a water treatment professional to make sure your treatment unit/system effectively removes arsenic.

³ If you are using a filter, make sure your filter has the necessary pore size for the bacteria or virus you are trying to remove.

Summary of home water treatment options

Treatment option	Description	Pros and cons	Point-of-use cost ⁴ estimate	Point-of-entry cost ⁴ estimate	Designed to fully or partially remove
Adsorptive media filtration	A charged media bed causes ions of the opposite charge (contaminants) to be pulled out of the water and attach to the media.	Pros: Produces very little wastewater. Does not require adding chemicals to the water. Cons: Treatment effectiveness may depend on the pH of the water.	<i>Initial:</i> \$300 to \$700 <i>Maintenance:</i> \$300 to \$500 every 6 to 12 months	<i>Initial:</i> \$2,400 to \$4,500 <i>Maintenance:</i> \$700 to \$900 every year	Depends on the type of media. The two most common media are activated alumina and iron-based. Activated alumina media removes arsenic, fluoride, selenium, sulfate, uranium. Iron-based media removes arsenic. It may not be as effective at removing arsenic if there is also phosphate in the water.
Aeration and filtration	An aerator brings oxygen into the water. The oxygen helps change dissolved contaminants into solid particles. The solid particles are large enough to be filtered out of the water. Some types of aeration cause VOCs and dissolved gases to evaporate out of the water.	Pros: Does not require adding chemicals to the water. Cons: Water with too much oxygen can be corrosive and corrode your pipes; this may be a health concern if you have copper or lead pipes.	N/A ⁵	<i>Initial:</i> \$800 to \$4,000 <i>Maintenance:</i> Extra water to backwash; replacement of the filter media.	Color, taste, or odor issues Ammonia, chlorine, hydrogen sulfide, iron, manganese, methane, other dissolved gases, radon, TCE, THMs, vinyl chloride, VOCs <i>May partially remove:</i> arsenic (only if there is also high iron), nitrite, radium.

⁴ Point-of-use and point-of-entry cost estimates are based on quotes obtained in 2017 and research in 2018; actual costs may vary. In general, the low-end cost is for a treatment unit the homeowner installs; the high-end cost is for a treatment unit installed by a water treatment professional.

⁵ N/A: Treatment technology is not typically available in this type.

HOME WATER TREATMENT

Treatment option	Description	Pros and cons	Point-of-use cost ⁴ estimate	Point-of-entry cost ⁴ estimate	Designed to fully or partially remove
Anion exchange	Anion exchange removes dissolved minerals in the water. The owner adds sodium chloride or potassium chloride (salt), which replaces negatively charged minerals in the water.	<p>Pros: Sodium chloride and potassium chloride are safe to handle and easy to buy.</p> <p>Cons: Anion exchange may affect how corrosive your water is and can corrode your pipes; this may be a health concern if you have copper or lead pipes. If treatment is not maintained properly, high concentrations of the contaminant can be dumped back into the water. Salt use can negatively affect the environment.</p>	N/A ⁵	<p><i>Initial:</i> \$1,500 to \$2,500</p> <p><i>Maintenance:</i> \$700 to \$900 every 8 to 10 years</p>	<p>Depends on the resin.</p> <p>Resins may be certified to remove arsenic, fluoride, nitrate, nitrite, selenium, sulfate, uranium.</p>
Carbon filter (This includes granular activated carbon filters—GAC)	Contaminants accumulate on the filter while water passes through.	<p>Pros: Point-of-use carbon filters are inexpensive and easy to find and use.</p> <p>Cons: Harmful bacteria can grow if you do not regularly maintain and replace the filter according to the instructions. If the filter is not replaced according to the instructions, it can become saturated and begin to release contaminants into the water.</p>	<p><i>Initial:</i> \$10 to \$100</p> <p><i>Maintenance:</i> \$10 to \$100 every few months to replace the filter.</p>	<p><i>Initial:</i> \$500 to \$3,000</p> <p><i>Maintenance:</i> Extra water to backwash or adding a disinfectant to kill bacterial growth. Replacement of the filter.</p>	<p>Color, taste, or odor issues</p> <p>Contaminant removal depends on the filter's pore size.</p> <p>Some filters are certified to remove chlorine, fluoride, hydrogen sulfide, iron, lead, manganese, radon, TCE, THMs and other disinfection by-products, VOCs.</p> <p>An MDH study showed that GAC filters are effective at removing PFAS.</p> <p><i>POE</i> units may also treat pesticides and other SOCs.</p>

HOME WATER TREATMENT

Treatment option	Description	Pros and cons	Point-of-use cost ⁴ estimate	Point-of-entry cost ⁴ estimate	Designed to fully or partially remove
Continuous chlorination and filtration	The owner adds chlorine bleach (a disinfectant that kills bacteria and viruses) to a holding tank. A pump feeds chlorine into the water, which helps change dissolved contaminants into solid particles. The solid particles are large enough to be filtered out of the water.	<p>Pros: Use of chlorination helps prevent microbial growth throughout the plumbing system.</p> <p>Cons: Chlorination systems are complex, may take up a lot of space, and require frequent maintenance and monitoring. May create chemicals (by-products) in the drinking water. If the levels are high enough, by-products can cause long-term health issues. An additional carbon filter may be needed to remove the chlorine taste from drinking water.</p>	N/A ⁵	<p><i>Initial:</i> \$500 to \$2,500</p> <p><i>Maintenance:</i> Cost of bleach; extra water to backwash; replacement of the filter media.</p>	<p>Color, taste, or odor issues</p> <p>Arsenic (only if there is also high iron), bacteria, hydrogen sulfide, iron, manganese, nitrite, viruses</p> <p><i>May partially remove:</i> ammonia, radium.</p>
Distillation	Distillers boil water, which makes steam. The steam rises and leaves contaminants behind. The steam hits a cooling section, where it condenses back to liquid water.	<p>Pros: Removes a wider variety and greater amount of contaminants than many other treatment options. Kills 100% of bacteria, viruses, and pathogens, so you can still drink your water during boil water advisories or if your well becomes contaminated.</p> <p>Cons: Heating the water to create steam can be expensive. Water may taste 'flat' because oxygen and minerals are reduced.</p>	<p><i>Initial:</i> \$300 to \$1,200</p> <p><i>Cost consideration:</i> Energy cost to boil water.</p>	N/A ⁵	<p>Color, taste, or odor issues</p> <p>Arsenic, bacteria, calcium, chloride, copper, fluoride, iron, lead, magnesium, manganese, nitrate, nitrite, ODS, some pesticides and other SOCs, radium, selenium, sodium, sulfate, uranium, viruses</p>

HOME WATER TREATMENT

Treatment option	Description	Pros and cons	Point-of-use cost ⁴ estimate	Point-of-entry cost ⁴ estimate	Designed to fully or partially remove
Oxidizing media filtration	A media bed changes dissolved contaminants into solid particles. The solid particles are large enough to be filtered out of the water.	<p>Pros: More effective than other oxidation and filtration methods at removing iron, manganese, arsenic, and radium. Does not require a continuous chemical feed.</p> <p>Cons: Requires periodic regeneration of the media (backwashing or soaking with a chemical solution to make the media work again). Regeneration can be messy, and the chemicals can be harmful, so they must be handled and stored carefully.</p>	N/A ⁵	<p><i>Initial:</i> \$1,500 to \$3,000</p> <p><i>Maintenance:</i> Extra water to backwash; cost for chemicals; replacement of the filter media.</p>	Color, taste, or odor issues Arsenic (only if there is also high iron), hydrogen sulfide, iron, manganese, radium
Ozonation and filtration	Ozone (a disinfectant that kills bacteria and viruses) is generated using electricity and then injected into the water. The ozone changes dissolved contaminants into solid particles. The solid particles are large enough to be filtered out of the water.	<p>Pros: Does not require handling of chemicals. Ozone rapidly degrades, so no ozone reaches the consumer through the drinking water.</p> <p>Cons: Uses a lot of energy.</p>	N/A ⁵	Call a water treatment professional to get a quote.	Color, taste, or odor issues Arsenic (only if there is also high iron), bacteria, hydrogen sulfide, iron, manganese, nitrite, viruses
Reverse osmosis (RO)	RO uses energy to push water through a membrane with tiny pores. The membrane stops many contaminants while allowing water to pass through.	<p>Pros: Removes a wider variety and greater amount of contaminants than many other treatment options.</p> <p>Cons: Can create a lot of wastewater. May require pretreatment to prevent the membrane from getting clogged.</p>	<p><i>Initial:</i> \$300 to \$1,500</p> <p><i>Maintenance:</i> \$100 to \$200 every 1 to 2 years</p>	<p><i>Initial:</i> \$5,000 to \$12,000</p> <p><i>Maintenance:</i> \$250 to \$500 every 1 to 2 years</p>	Color, taste, or odor issues Arsenic, bacteria, calcium, chloride, copper, fluoride, iron, lead, magnesium, manganese, nitrate, nitrite, other dissolved solids, pesticides and other SOCs, PFAS, radium, selenium, sodium, sulfate, other metals, TCE, THMs, uranium, vinyl chloride, viruses, VOCs

HOME WATER TREATMENT

Treatment option	Description	Pros and cons	Point-of-use cost ⁴ estimate	Point-of-entry cost ⁴ estimate	Designed to fully or partially remove
Ultraviolet (UV) disinfection	A UV lamp shines UV rays through the water. The UV rays kill bacteria, viruses, and other pathogens.	<p>Pros: Does not require adding chemicals to the water. UV disinfection can be more effective than chlorination.</p> <p>Cons: May require pre-filtration if your water has some cloudiness (turbidity is above 1 NTU).</p>	<p><i>Initial:</i> \$150 to \$300</p> <p><i>Maintenance:</i> \$50 to \$100 per year</p>	<p><i>Initial:</i> \$250-\$800</p> <p><i>Maintenance:</i> about \$100 per year</p>	Bacteria, viruses
Water softening (cation exchange)	<p>Water softeners remove dissolved minerals in the water. The owner adds sodium chloride or potassium chloride (salt), which replaces positively charged minerals in the water. This makes the water softer.</p> <p>Water softeners are sometimes installed to treat only some water in the home. The water softener may not be connected to cold water plumbing or kitchen faucet plumbing.</p>	<p>Pros: Sodium chloride and potassium chloride are safe to handle and easy to buy. Water softening is the cheapest option for removing hardness (calcium and magnesium).</p> <p>Cons: Water softening with sodium chloride adds sodium to the water, which may be a health issue for some people. Water softening may affect how corrosive your water is and can corrode your pipes; this may be a health concern if you have copper or lead pipes. Salt use can negatively affect the environment.</p>	N/A ⁵	<p><i>Initial:</i> \$200 to \$3,000</p> <p><i>Maintenance:</i> \$50 to \$300 per year for salt</p>	Calcium, copper, iron, magnesium, manganese, radium

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