



## Office of the Mayor

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### Frequently Asked Questions About Manganese

#### **What is Manganese?**

Manganese is a naturally occurring element found in rock formations, soil, water and air. It is an essential nutrient in all forms of life, important for the function of many enzymes. People get the manganese they need to stay healthy primarily from foods, including many fruits, vegetables, nuts and whole grains. Manganese is also provided in most multivitamin tablets. The recommended daily intake for adults is 2,000 to 11,000 micrograms. For children, the recommended daily intake is 1,000 to 3,000 micrograms.

#### **Why is it present in my drinking water?**

Madison gets its water from a deep ground water aquifer. This provides many advantages over communities that get their water from surface water sources (lakes, rivers, etc.). Ground water is generally cleaner, better protected from contaminants and requires far less treatment than drinking water from surface water sources. Ground water, however, contains more minerals than surface water because it is drawn from underground rock formations. The mineral content of our water generally improves its quality and taste for drinking and consumption. But, when certain minerals (iron and manganese in particular) are present at excess levels, they can cause problems such as staining of laundry and discolored water at the tap. Manganese consumed at very high levels over extended periods of time can also cause health problems in infants and people of all ages with liver disease.

As the water flows through the distribution system of water mains, manganese settles out and builds up fine sediment in water pipes, so that the amount of manganese that reaches customers' taps is usually less than what is produced at the well. When there is a hydraulic disturbance in the system, such as a water main break, use of fire hydrants, or a flushing operation to clean the pipes, such mineral sediment may get stirred up and drawn into home plumbing. Such water will have higher-than-normal levels of iron and/or manganese and will appear visibly discolored.

#### **What levels of Manganese are unhealthy?**

The level of manganese that might cause aesthetic problems such as discolored or bad tasting water is 50 micrograms per liter or parts per billion (ppb). Above this level, manganese may stain laundry and plumbing fixtures.

Health problems have been shown to occur among people with long-term exposure to drinking water with manganese levels above 1000 ppb. The EPA has set 300 ppb as the "lifetime health advisory value" for long-term drinking water in the United States to provide for a large margin of safety. The EPA also identifies infants younger than 6 months and people of any age with liver disease as high risk and recommends that, even in the short term, they should not be exposed to drinking water with greater than 300 ppb.

#### **Where is it in our water system?**

Madison's water system consists of 24 deep wells located throughout the City. Three of those wells pump water that regularly includes manganese levels above the 50 ppb aesthetic standard. These wells are located on the near west side, on the east end of the Isthmus, and on the far east side. None of the 24 wells produce manganese at levels that are of health concern; however, when manganese sediment becomes stirred up in the distribution systems and is drawn into homes, levels above the EPA lifetime health advisory level may occur.

**Does the well that serves my neighborhood have manganese in it?** Which well serves your home depends on where you live and may change with changing demand for water. The Utility has a map of flushing areas posted at its website, which approximates the well service areas. Customers can call the Utility at 266-4654 or 266-4665 to inquire about the well serving their home.

### **What is the Water Utility doing about the manganese problem?**

The Utility is taking multiple actions to address the manganese problem. It is reducing to the extent possible the use of wells that produce manganese, monitoring levels of manganese in the distribution system, and conducting a comprehensive water main flushing program. Flushing is a normal, routine procedure the Utility conducts every year to cleanse water mains of mineral buildup in the pipes (primarily iron and manganese). This year, however, the Utility is implementing a new flushing technique called uni-directional flushing. This method has proven to do be much more effective than traditional methods.

### **What areas of the city will be flushed?**

All 800+ miles of water main in the City will be flushed and cleaned over the next six months. The Utility has started in the areas where manganese levels in the system are the highest, and expects to be finished with these areas by August. Then it will move on to areas of the City where manganese is not a problem.

### **How do I find out when the flushing will occur in my neighborhood?**

The Utility advertises the areas of the City it will be flushing in both the Capital Times and the Wisconsin State Journal on the first Monday of each month. Look for the hydrant-shaped display ad that describes areas of the City that will be flushed over the next month. More detailed information, updated at least weekly, can be found on the Utility webpage (<http://www.cityofmadison.com/water/mainten.html>) or by calling the Flushing Information Line at 261-9178. The website also contains a link to a map showing approximate dates of flushing for the entire City.

### **What can I expect when the mains in my neighborhood are flushed?**

When Utility crews are in your neighborhood, they will open fire hydrants and flush water into the street. The flushing operations are designed to dislodge and flush mineral sediments out of the mains through the hydrants. It is expected that sediment-laden, highly discolored water will flow from the hydrants. If customers use water while flushing is in progress or soon after it is completed they may draw discolored water into their homes. This is not unusual and should not be cause for alarm. Do not drink or cook with discolored water. Open a cold water tap (preferably closest to the water meter) and run the water until it clears. If it does not clear within several minutes, contact the Utility at 266-4665.

### **Why was a health advisory issued just recently when we've known about high Manganese levels for months?**

Several hundred samples of water that have been collected from flushed hydrants and analyzed in the last few weeks have given us new information about manganese levels in clear water. These samples show that even relatively clear water may have manganese above the EPA recommended standard for long-term exposure (300 micrograms/liter). Because of this new information, we have issued a temporary advisory for two groups of people identified as high risk by the EPA who get water from two specific wells until we are able to test the water coming out of people's taps.

### **Who does the health advisory apply to?**

The advisory applies to infants less than 6 months old and people with liver disease who live in the well 3 or well 10 service areas. You will receive a post card in the mail from the Water Utility if your home is served by these two wells. Formula fed infants should be fed premixed, ready to feed formula or concentrate or powdered formula mixed with bottled water. People who have liver disease that interferes with their liver function may not be able to process and excrete the manganese in tap water and therefore should drink bottled water. Families affected by the advisory who need financial assistance in purchasing bottled water should contact the Water Utility at 266-4652.

Map of well 3 service area: <http://www.madisonwater.org/pdf/MnStudyMapWell3.pdf>

Map of well10 service area: [http://www.madisonwater.org/pdf/MnStudyMapWell10\\_area.pdf](http://www.madisonwater.org/pdf/MnStudyMapWell10_area.pdf)

### **How long will the health advisory be in effect?**

By August in the well 10 service area and possibly sooner for the well 3 service area we will have collected and analyzed sufficient tap water samples to know the results of the flushing program. We are hopeful that the flushing program will successfully clean the water mains of mineral sediments and we can rescind the current health advisory.

### **What is being done to ensure my tap water is safe to drink?**

The Madison Water Utility samples the water system daily and takes bacteriological samples twice a week at between 30 and 40 locations. Chlorine is added to the water to kill any bacteria or viruses that may be present.

During the flushing operation, crews will be taking samples of water from the hydrants being flushed and analyzing those

samples onsite to determine the turbidity or clarity of the water. This tells the Utility how much mineral sediment is in the water being flushed. The crews will continue to flush the hydrant until testing indicates that the pipes are clean. Utility crews also will be collecting samples from outside hose bibs at homes to test for manganese levels. Initially, sampling will focus on the Well 3 and 10 areas because of the higher levels of manganese at the well. Water will be collected from a sample of households from around the City as flushing is completed. Customers whose homes are selected for this sampling program will be notified by mail. Results of these samples will be mailed to customers whose homes were sampled. Based these results, Water Utility and Public Health staff will determine if additional testing at kitchen taps is necessary. The Utility will continue to take samples at all wells on a periodic basis to monitor iron and manganese levels.

### **What can be done if Manganese levels don't decrease after the flushing?**

The Utility's sampling and monitoring program is designed to provide information about how often each area of the city needs to be flushed in order to prevent elevated manganese levels in that area. If levels do not decrease to acceptable levels or do not remain at acceptable levels in a particular area, more frequent flushing may be needed. If we find that the flushing program is not resolving the problem, other solutions will be pursued. These may include modifying well operations, flushing of service lines, replacement of aging water mains, or installation of a \$2 million filter system at the well.

### **Why use a well if it has manganese in it?**

All of the high capacity wells in the Madison system are critical to providing the needed water pressure and level of service required for our city. Water demand increases during the summer months as people irrigate their lawns and gardens. Demand is further increased by fire fighting requirements. It is during this high demand time, for reliability reasons, that all of our wells are on line. If a well with manganese in it were removed from service, it would have to be replaced to maintain the level of service required. Siting a new well in a developed urban area takes years and costs millions of dollars. Also, drilling a new well could result in the same problem with manganese, since the water would come from the same aquifer.

### **Will a home water filter help?**

A filter rated to remove particles smaller than one micron in size will remove the particulate form of manganese, which comprises most of the manganese found in our drinking water. Activated carbon carafe-type filters are less effective for removal of manganese. More information about filters can be obtained from the Wisconsin Department of Commerce, Plumbing Product Review Section, at 267-1401 or by email at [productech@commerce.state.wi.us](mailto:productech@commerce.state.wi.us).

### **How can I get my water tested?**

Testing is available at the Public Health Department (266-4821) at a cost of \$25. If a household includes an infant younger than six months of age or a person diagnosed with liver disease, the Water Utility will reimburse the resident for the cost of testing.

### **Where can I get more information?**

More information is available on the Madison Water Utility web page [www.madisonwater.org](http://www.madisonwater.org) or the USEPA web page <http://www.epa.gov/safewater>. Or you can contact the Madison Health Department at 294-5315 or visit their web page [www.ci.madison.wi.us/health](http://www.ci.madison.wi.us/health).