A report from the Minnesota Department of Health

Safe Drinking Water in Minnesota:

Drinking Water Protection

A summary of Drinking Water Protection Activities in Minnesota for 2008

Issued May 2009
Minnesota Department of Health
Division of Environmental Health

MINNESOTA MDH DEPARTMENT OF HEALTH

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This report is available on the World Wide Web at

http://www.health.state.mn.us/divs/eh/water/com/dwar/report08.html

Reports from previous years (through 1995) are also available at this site

Minnesota Department of Health

Drinking Water Protection Section Web Page:

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Introduction

Ensuring the safety of our drinking water is one of the most fundamental, and most critical, responsibilities of modern public health. In fact, safe drinking water has been a key ingredient in some of the greatest public health achievements of the last half-century, including the dramatic reduction in disease and increased longevity that we now tend to take for granted. Along with other basic public health measures like immunization, drinking water protection has played a crucial role in building a safer and healthier society.

We need to remain vigilant if we are to protect those past gains. The Minnesota Department of Health (MDH) is strongly committed to safeguarding the quality of our drinking water, and as part of that commitment, we routinely monitor all of our state's public water supply systems for a broad range of chemical, radiological, and biological contaminants.

MDH believes that educating the public about water quality issues is an important element of drinking water protection. Since 1995, we have been releasing annual summary reports, like this one, to help us achieve that goal. Like previous reports in the series, this year's report covers test results and actions taken during the preceding calendar year.

The main body of the report provides information about Minnesota's community water supply systems—that is, systems that provide people with drinking water in their places of residence.

The section on Emerging Issues contains information on rules that are being revised and an update on some communities that are dealing with contaminated sources of water.

We hope this information will provide the people of Minnesota with a clearer picture of what is being done to protect the quality of their drinking water, and what our monitoring efforts have revealed about the success of those efforts. We believe that the picture is a positive one, and we hope this report will build Minnesotans' confidence in both the safety and the quality of their drinking water.

Executive Summary

The Minnesota Department of Health is responsible for enforcing the federal Safe Drinking Water Act and safeguarding the quality of drinking water in our state. This includes the responsibility of regulating approximately 7,200 public water supply systems statewide. This figure includes 957 community systems, which provide drinking water to people in their places of residence. The community systems include 726 municipal systems, serving towns or cities.

The Major Elements of Drinking Water Protection

Minnesota's drinking water protection strategy includes three major elements:

- ***Prevention*** measures are used to protect the quality of drinking water at the source by controlling potential sources of pollution, regulating land use, reviewing plans and providing advice on construction of water treatment and distribution facilities, and inspecting these facilities on a regular basis.

- ***Treatment*** measures, including routine disinfection, are used to make the water palatable and safe to drink.

- ***Monitoring*** of water supplies for potentially harmful contaminants, on a routine basis, is the critical element of the state's enforcement responsibilities under the Safe Drinking Water Act.

The Monitoring Process

Minnesota's community water supply systems are monitored for the following types of contaminants:

- **Pesticides and Industrial Contaminants.** Each community water system may be tested regularly for more than 100 pesticides and industrial contaminants, including both synthetic organic chemicals (SOCs) and volatile organic chemicals (VOCs). The list of chemicals to be tested, and the testing schedule, may vary from one system to another. Testing requirements depend on factors such as whether a particular chemical is likely to be present in the local environment and how vulnerable the system is to contamination. If a system exceeds the applicable federal or state drinking water standard for a particular chemical, it must notify the people who use the water and take appropriate steps to correct the problem.

- **Bacterial Contamination.** Larger community water systems are tested monthly, and smaller systems are tested quarterly, for contamination by coliform bacteria. The coliform test is used as a general indicator of water quality in the system, in terms of potential microbial contamination.

  Total coliform bacteria are common in the environment (such as in soil) and the intestines of animals, and are generally not harmful. Fecal coliform and *Escherichia coli (E. coli)* bacteria are found in greater quantities than total coliform in animal fecal matter.

If fecal coliform or *E. coli* is detected along with total coliform in drinking water, there is strong evidence that sewage is present; therefore, a greater potential for harmful organisms exists. In these cases, immediate corrective actions must be taken. The actions include a notice to residents to boil their water before using it for cooking and drinking. The water system will be disinfected, flushed, and retested to ensure that any contamination problems are eliminated.

If only total coliform is detected (without the presence of fecal coliform or *E. coli*), the source is most likely contamination from the environment, introduced during construction or while repairs to plumbing or a water main were underway. The system will identify the source of the contamination, correct the problem, and thoroughly disinfect its system. The public will also be notified of the situation; however, unless unusual circumstances exist to cause particular concern about the safety of the water, a boil water notice will not be issued.

- **Nitrate.** Each system must be tested annually for nitrate. Nitrate occurs naturally in the environment, but elevated nitrate levels in drinking water are usually associated with the use of fertilizer, or the breakdown of human and animal waste. It is a health concern primarily for infants under the age of six months. If the federal standard for nitrate is exceeded, an advisory is issued regarding consumption of the water by infants. The advisory remains in effect until steps can be taken to correct the problem.

- **Inorganic Chemicals and Radioactive Elements.** Each system is typically tested once every nine years—although, in some cases, it could be as often as once a year—for 13 additional inorganic chemicals. Systems are normally tested every three years for a number of radioactive elements. Both inorganic chemicals and radioactive elements may be naturally present in the water. If the water exceeds health standards for either type of contaminant, people who use the water are informed, and steps are taken to correct the problem.

- **Disinfection By-products.** Disinfection rids drinking water of microbiological organisms, such as bacteria, viruses, and protozoa, that can cause and spread disease. The most common method of disinfection is the addition of chlorine to drinking water supplies. However, chlorine can combine with organic materials in the raw water to create contaminants called trihalomethanes (THMs) and haloacetic acids (HAAs). Repeated exposure to elevated levels of THMs over a long period of time could increase a person's risk of cancer. All community water systems that add a disinfectant to the water must regularly test their treated water to determine if THMs and HAAs are present. If the THMs or HAAs exceed the limits set by the U. S. Environmental Protection Agency (EPA), the water system must take action to correct the problem. The corrective actions include notifying all residents served by the water system.

- **Lead and Copper.** For the last several years, community water supply systems have participated in efforts to reduce lead and copper contamination in drinking water. Lead and copper are not typically present in the water when it leaves the treatment plant. Lead and copper differ from other contaminants in that they are rarely present in source waters. Rather, they enter the water through contact with plumbing components, usually in individual homes. If more than 10 percent of the homes in a community exceed the federal "action level" for lead or copper, based on the results of community-wide monitoring, the water system must do additional testing and take steps to reduce levels. Systems that exceed the action level for lead must also perform an ongoing program of public education.

Note: Any time a drinking water standard is violated, the affected water system must take corrective actions that include notifying its residents of the violation. In addition to this notification, all community water systems issue an annual **Water Quality Report** (sometimes referred to as a **Consumer Confidence Report**) that lists the source of the system's drinking water as well as a list of all regulated contaminants that were detected, even in trace amounts well below the legal standard, during the previous calendar year.

A Current Profile of

Minnesota's Drinking Water Protection Program

Since 1974, the U.S. EPA has been responsible for regulating the nation's public water supply systems, under the provisions of the federal Safe Drinking Water Act. However, almost all states, including Minnesota, have now assumed responsibility for enforcing the act within their own borders. Minnesota became one of the first states to achieve primacy, and to begin regulating public water supply systems at the state level, in 1976.

The definition of "public water supply system," for purposes of the Safe Drinking Water Act, is a broad one. To be considered "public," a water supply system must have its own water source and provide water to 25 or more people, or have 15 or more service connections.

Minnesota currently has 7,236 public water supply systems. Of those systems, 957 are community systems, which provide water to people in their homes or places of residence. Most of these community systems use groundwater from underground sources, tapped by wells, as their source of water. However, 22 of these systems, including the municipal systems that serve the state's largest cities, use surface water, drawn from lakes or rivers.

Of the state's 957 community water systems, 726 are municipal systems, serving towns or cities. The rest of the community systems provide water to people in a variety of residential locations, including manufactured home parks, apartment buildings, housing subdivisions, colleges, hospitals, and correctional facilities.

The remainder of the state's public water supply systems are noncommunity systems. Some of these noncommunity systems provide water to an ever-changing "transient" population at places such as restaurants, resorts, and highway rest stops. Other noncommunity systems may provide water to relatively stable population groups in nonresidential locations such as schools, places of employment, and day-care facilities.

The Major Elements of Drinking Water Protection

Three basic strategies are used to safeguard the quality of our drinking water:

- **Prevention.** Preventing contamination of the source water used by public water supply systems—lakes, rivers, and water wells—is an important component of drinking water protection. This aspect of drinking water protection includes measures such as regulating land use, regulating the construction of water treatment facilities, and controlling potential sources of pollution.

- **Treatment.** Most community water supply systems use some form of treatment, so the water will be palatable and safe to drink. Many systems require routine disinfection as a safeguard against potential problems with bacterial contamination. Groundwater systems are less likely to require disinfection, because contaminants tend to be filtered out of the water as it moves downward through the earth from the surface to the underground sources tapped by wells.

- **Monitoring.** Monitoring is the critical element of compliance activities under the Safe Drinking Water Act (SDWA). Under provisions of the act, public water supply systems are required to sample treated—or "finished"—water on a regular basis, and submit the samples to the MDH lab for analysis. The samples are tested for a broad range of potential contaminants. If unacceptable levels of contaminants are found, the water supply owner or operator is legally responsible for informing the people who use the water and for taking steps to eliminate potential health hazards.

  Under the provisions of the SDWA, the individual public water supply system is responsible for taking water samples and submitting them to certified laboratories for analysis. To lessen the burden on water supply operators, most of the required samples are collected by field staff from MDH. Minnesota's public water supply operators have one of the best records in the nation regarding compliance with these sampling and testing requirements.

Note: *The monitoring requirements and test results described in this report apply primarily to community water supply systems.*

Monitoring: What We Test For—and Why

Minnesota's community water supplies are tested for a number of different types of contaminants. The reasons for testing—and how often the testing is done—depends on the type of contaminant and other factors. The type of contaminant also determines what actions will be taken, if unacceptable levels are found in the water.

The major types of contaminants we test for include:

Pesticides and Industrial Contaminants. Minnesota's community water supply systems are routinely tested for more than 100 different pesticides and industrial contaminants, including synthetic organic compounds (SOCs) and volatile organic compounds (VOCs). Systems may be tested anywhere from four times a year to once every six years, depending on the specific chemical and the vulnerability of the system to contamination (see ***Assessing Vulnerability to Contamination*** on page 9). Some systems may not need to do any testing for a particular contaminant. A formal *use waiver* is sometimes granted, specifically exempting a water supply system from testing for a particular contaminant, if that chemical or pesticide is not commonly used in the immediate area.

The EPA has developed legal standards known as maximum contaminant levels (MCLs) for 60 of the more than 100 pesticides and industrial contaminants. Advisory standards have been developed for the other pesticides and industrial contaminants, and those are used in the same way as the MCLs in assessing test results.

Any time a community water system exceeds the MCL for one of these contaminants, the water supply operator, with the assistance of MDH, must immediately take steps to notify the people who use the water. Appropriate steps are then taken to reduce the contamination to acceptable levels.

In some cases, the MCL or advisory standard is calculated to prevent immediate or short-term health effects. More often, however, these standards are designed to reduce the long-term risk of developing cancer or other chronic health conditions. They are calculated very conservatively. If the concern is long-term health effects, the standards are calculated to keep the risk of illness at levels most people would regard as negligible—even if they drink the water every day, over an entire 70-year lifetime.

Bacterial Contamination. Community water supply systems serving more than 1,000 people are tested one or more times per month for coliform bacteria. Smaller systems are tested four times a year. The coliform test is used as a general indicator of water quality in the system, in terms of potential microbial contamination. If the coliform test is negative, it is an indication that the system is adequately protected against contamination from other types of disease-causing organisms. However, if coliform bacteria are found in the water, it is assumed that the system may be compromised, and steps are taken to protect the people who use the water.

As noted in the Executive Summary, total coliform bacteria (without the detection of fecal coliform or *E. coli*), are generally not harmful. In these cases, the system will identify the source of the contamination, correct the problem, and thoroughly disinfect its system. The public will also be notified of the situation; however, unless unusual circumstances exist to cause particular concern about the safety of the water, a boil water notice would not be issued as would be if fecal coliform or *E. coli* were found.

Nitrate/Nitrite. Community water supply systems in Minnesota are tested once a year for nitrate, a chemical which may occur naturally in the environment but which can also enter the water from sources like fertilizer run-off, decaying plant and animal wastes, or sewage. Nitrate is a health concern primarily for infants under the age of six months. The infant's digestive system can convert the *nitrate* to *nitrite,* which can interfere with the ability of the infant's blood to carry oxygen. The result is a serious illness know as methemoglobinemia, or "blue baby syndrome." Methemoglobinemia can be fatal if nitrate levels in the water are high enough, and the illness isn't treated properly.

The MCL for nitrate in drinking water is 10 parts per million (ppm). If a water supply system exceeds the standard, the people who use the water are notified and advised not to use the water for mixing infant formula, or other uses that might result in consumption of the water by infants under six months of age. The advisory is kept in place until steps can be taken to reduce nitrate levels in the water. Possible remedial measures include treating the water to remove the nitrate, or drilling a new water well.

Older children and adults are generally not at risk from drinking nitrate-contaminated water. In fact, the average adult consumes about 20-25 milligrams per day in food, primarily from vegetables. Because of changes that occur after six months of age, the digestive tract no longer converts nitrate into nitrite. However, some adults—including people with low stomach acidity and people with certain blood disorders—may still be at risk for nitrate-induced methemoglobinemia.

Inorganic Chemicals. Community water systems in Minnesota are tested for 13 other inorganic chemicals in addition to nitrate. The testing is usually done once every nine years, but it may be done as often as once a year. The list includes antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, sulfate, and thallium. In some cases, these chemicals may be naturally present in the groundwater. If a water supply system were to exceed the MCL for one of these chemicals, the people who use the water would be notified, and appropriate steps would be taken to reduce levels of these chemicals in the water.

Radioactive Elements. Community water systems in Minnesota are also usually tested once every three years—or as often as once a year, in some cases—for a list of radioactive elements. These radioactive elements, or radiochemicals, are present in the water from natural sources. If a system were to exceed the federal MCL for one of these radioactive elements, the people who use the water would be notified, and steps would be taken to correct the problem.

Disinfection By-products. Disinfection rids drinking water of microbiological organisms, such as bacteria, viruses, and protozoa, that can cause and spread diseases. The most common method of disinfection is the addition of chlorine to drinking water supplies. Not only is chlorine effective against waterborne bacteria and viruses in the source water, it also provides residual protection to inhibit microbial growth after the treated water enters the distribution system. This means it continues working to keep the water safe as it travels from the treatment plant to the consumer's tap.

However, even though chlorine has been a literal lifesaver with regard to drinking water, it also has the potential to form by-products that are known to produce harmful health effects. Chlorine can combine with organic materials in the raw water to create contaminants called trihalomethanes (THMs) and haloacetic acids (HAAs). Repeated exposure to elevated levels of THMs over a long period of time could increase a person's risk of cancer.

The formation of disinfection by-products is a greater concern for water systems that use surface water, such as rivers, lakes, and streams, as their source. Surface water sources are more likely to contain the organic materials that combine with chlorine to form THMs and HAAs.

All community water systems that add a disinfectant to the water must regularly test their treated water to determine if THMs and HAAs are present. If the THMs or HAAs exceed the limits set by the U. S. EPA, the water system must take action to correct the problem. The corrective actions include notifying all residents served by the water system.

Lead and Copper. Some public water supply systems in Minnesota are required to test their water, on a regular basis, for lead and copper. All public water systems in the state took part in an initial round of lead and copper testing that ended in 1994. The water was tested in a number of homes within each system, to determine if they exceeded the federal "action level" of 15 parts per billion (ppb) for lead or 1,300 ppb for copper. If a system exceeded the action level for lead or copper in more than 10 percent of the locations tested, it was required to take corrective action and do further testing. Current testing requirements are based partly on the results of that initial round of testing and of the success of subsequent efforts to reduce risk of lead contamination in systems that have previously exceeded the action level.

Lead in drinking water is not an environmental contamination problem in the conventional sense. Water is almost never contaminated with lead at the source, or when it first enters the distribution system. However, water can absorb lead from plumbing components used in individual homes. Possible sources of lead contamination include lead pipe, lead plumbing solder, and brass fixtures. Lead exposure is a potentially serious health concern, especially for young children. However, the water must usually be in contact with lead plumbing components for an extended period of time, usually by standing in the system overnight, before it can absorb potentially hazardous levels of lead. Consumers can usually protect themselves simply by turning on the faucet and letting the water run for 30 seconds, or until it runs cold, before using it for drinking or cooking. Those in homes with lead service connections should run the water an additional 30 seconds after it turns cold.

While most people are subject to lead exposure from a number of possible sources—and drinking water typically accounts for a relatively small proportion of a person's total lead exposure—it is also one of the easiest sources of lead exposure to control and eliminate. Some Minnesota water supply systems are addressing the lead issue by treating their water, so it will be less likely to absorb lead from plumbing.

Assessing Vulnerability to Contamination

Monitoring requirements for individual public water supply systems depend partly on how vulnerable the system is to contamination. MDH does vulnerability assessments of water supply systems, taking into account a number of factors. If the system uses groundwater, the way in which the wells are constructed can serve to increase or decrease the risk of contamination. In some systems, natural geologic barriers may serve to protect the source water from contamination. Systems with a past history of contamination problems may be at higher risk.

Compared to surface water systems, groundwater systems tend to be less vulnerable to certain types of contamination. Water tends to be naturally filtered as it moves downward through the earth, making its way from the surface to the underground aquifers tapped by water wells. That process tends to remove certain kinds of contaminants, including bacteria and parasites such as *Cryptosporidium*. For that reason, many groundwater systems do not routinely include disinfection as part of their normal water treatment procedures.

Monitoring Test Results

for calendar year 2008

This is a summary of results of monitoring performed in 2008. In the case of a violation, a water system takes corrective actions. These actions include public notification to inform affected residents of the situation and if there are any special precautions they should take. In all cases noted here, residents were advised directly by the water system at the time the violation occurred.

Pesticides and Industrial Contaminants

During 2008, MDH conducted 23,510 tests for pesticides and industrial contaminants in community water systems. No systems exceeded drinking water standards for these contaminants.

Bacterial Contamination

Fourteen community systems, including 8 municipal systems, tested positive for bacterial contamination in 2008. All but two of the affected systems serve fewer than 1,000 people.

The municipal systems that had confirmed coliform bacteria contamination in 2008 were Cleveland (population 713, Le Sueur County), Dalton (pop. 256, Otter Tail County), Dumont (pop. 120, Traverse County), Floodwood (pop. 501, St. Louis County), Kasota (pop. 687, Le Sueur County), Lake City (pop. 4,950, Wabasha County), Milan (pop. 310, Chippewa County), and Otsego (pop. 3,500, Wright County).

Standard procedures were followed. Systems were disinfected, flushed and retested to ensure that any contamination problems had been eliminated. All of the residents served by the affected systems were informed of the situation.

Nitrate/Nitrite

No community systems exceeded the standard for nitrate by the end of 2008.

Arsenic

Approximately 40 community water systems had arsenic levels above 10 parts per billion (ppb) when the maximum contaminant level was modified in January of 2006. By the end of 2008, 13 community water systems—including nine municipal systems—still exceeded that level. The affected municipal systems are Buffalo Lake (population 751, Renville County), Dalton (pop. 256, Otter Tail County), Dilworth (pop. 3,500, Clay County), Dumont (pop. 120, Traverse County), Elizabeth (pop. 175, Otter Tail County), Lake Lillian (pop. 241, Kandiyohi County), McIntosh (pop. 616, Polk County), Norcross (pop. 61, Grant County), and Stewart (pop. 564, McLeod County).

Arsenic occurs naturally in the environment and, as a component of underground rock and soil, can work its way into groundwater, and is found in many areas of Minnesota. For many years, the standard for arsenic was 50 ppb. A revision to the Arsenic Rule, which was finalized in January 2001, lowered the limit to 10 ppb. The new standard took effect in 2006.

Previous testing indicated that approximately 40 community water systems in Minnesota had arsenic levels that would exceed the revised standard. Working with MDH, these water systems studied alternatives, and approximately 20 of these systems reduced their levels to under 10 ppb prior to the new standard taking effect. They did this by adding treatment processes, replacing existing wells, or connecting to other water supplies.

Those remaining systems in exceedance are working with MDH to come into compliance and are also communicating regularly with their residents about the situation.

Radioactive Elements

Radiation occurs naturally in the ground. Some radioactive elements may work their way into drinking water.

Radium 226 & 228/Gross Alpha Emitters

Nineteen community water systems—including 17 municipal systems—exceeded the standard for radium 226 & 228 and/or Gross Alpha Emitters during 2008. The affected municipal systems are Anoka (population 18,172, Anoka County), Brook Park (pop. 156, Pine County), Claremont (pop. 608, Dodge County), East Bethel (pop. 88, Anoka County), Glenville (pop. 729, Freeborn County), Goodview (pop. 3,373, Winona County), Hinckley (pop. 3,301, Pine County), Isanti (pop. 4,500, Isanti County), LaCrescent (pop. 5,158, Houston County), Lewiston (pop. 1,507, Winona County), Lonsdale (pop. 2,401, Rice County), Medford (pop. 1,107, Steele County), Pipestone (pop. 4,356, Pipestone County), Rushford Village (pop. 260, Fillmore County), St. Louis Park (pop. 44,126, Hennepin County), Spring Lake Park (pop. 6,623, Anoka County), and Watson (pop. 211, Chippewa County). No restrictions were placed on water consumption although residents were notified of the situation. Residents were told that this was not an emergency situation and were advised to consult with their doctors if they have any special concerns. Each of these systems has either started or completed infrastructure changes or is studying alternatives to meet the maximum contaminant level.

Other Inorganic Chemicals

One nonmuncipal water system exceeded the standard for cyanide in 2008 and is studying alternatives to remedy the issue.

Disinfection By-products

One community water system exceeded the standards for total trihalomethanes in 2008. The affected community is Strandquist (population 76, Marshall County).

Trihalomethanes are a by-product of the disinfection process. The addition of chlorine, which rids the water of microbiological organisms that could cause immediate illness, may combine with organic matter in the water and create by-products, such as trihalomethanes. This could increase the cancer risk for people drinking water with elevated levels of such by-products over a long period of time.

Strandquist has discontinued chlorination and has reduced trihalomethanes to acceptable levels.

Lead and Copper

Minnesota's community water supplies started their lead/copper testing programs in 1992 and 1993. The testing was done by taking first-draw water samples from a number of consumers' taps in the system. If more than 10 percent of the samples exceeded the federal action level of 15 parts per billion (ppb) for lead or 1.3 parts per million (ppm) for copper, the entire system was considered to be "in exceedance." Communities that exceeded the action level(s) were required to do additional testing and take steps to reduce the absorption of lead/copper into the water from the water distribution system and/or household plumbing; in addition, the system was required to initiate a public-education program for lead within 60 days of the exceedance and continue the public-education program for as long as the system remained in exceedance.

Since 1992, more than 250 community water systems in Minnesota have exceeded the lead and/or copper action levels at one time or another. More than 150 of these systems have installed corrosion-control treatment to minimize the lead/copper levels in their consumers' taps, and the majority of them have been deemed by MDH to have optimized their corrosion-control treatment. Corrosion-control treatments proved to be very effective in lowering the lead and/or copper levels in Minnesota's public water supplies. Among the various treatment approaches, the most widely adopted was the use of phosphate-based corrosion control inhibitors, which accounts for about 90 percent of the treatment installed for lead/copper corrosion control in Minnesota. By maintaining a consistent treatment and adequate level of corrosion inhibitor residuals in the water distribution system, both lead and copper levels can be effectively reduced.

Each year between four and five new systems join the list of systems required to install corrosion-control treatment due to treatment process changes, new water sources, and other factors that brought changes in finished-water chemistry and/or characteristics, causing the system to exceed the lead or copper action level. Fortunately, with corrosion-control treatment and treatment optimization, the number of systems exceeding the lead and/or copper action level in Minnesota has not increased.

In 2008, four community water supplies exceeded the lead action level and 28 community water systems exceeded the copper action level. Due to unique characteristics of Minnesota's groundwater with its tendency to absorb copper, exacerbated by the iron-removal treatment process commonly used by groundwater systems, Minnesota experienced the highest rate of copper action level exceedances in the United States. About 200 systems have exceeded the copper action level since 1992. Although corrosion-control treatments are effective in lowering the lead and copper levels, the results for copper control are less impressive than those for lead. In general, corrosion-control treatment brought reduction in copper levels by 50 to 70 percent, and about 80 percent of the systems achieved compliance after treatment installation and optimization. Of the 28 systems not meeting the copper action level, 10 have a 90^{th} percentile copper value greater than 2.0 parts per million. The Minnesota Department of Health continues to work with these systems to bring them into compliance through the effort of corrosion-control treatment and treatment optimization.

Copper is an essential element for living organisms, including humans, and—in small amounts—necessary in our diet to ensure good health. However, too much copper can cause adverse health effects, including vomiting, diarrhea, stomach cramps, and nausea. It has also been associated with liver damage and kidney disease.

Emerging Issues

Federal Stimulus Plan: Effects on Minnesota Drinking Water Systems

The American Recovery and Reinvestment Act, commonly called the Federal Stimulus Plan, will be providing money for public water system infrastructure projects. The money will be distributed through the Minnesota Drinking Water Revolving Fund program. The Drinking Water Revolving Fund provides below market rate loans for public water system improvements. The program's basic requirements and procedures will apply along with additional requirements and features that pertain to this additional money.

More information is available at http://health.state.mn.us/divs/eh/water/dwrf/stimulus.html.

MDH Performs Sampling Related to Perfluorochemicals in Class B Firefighting Foam

In 2008, the Minnesota Department of Health began working with the Minnesota Pollution Control Agency (MPCA) to sample groundwater, soil, and public water systems in the state for perfluorochemicals (PFCs) that result from the use of Class B firefighting foam, which are used for petroleum fires that threaten public health and safety.

Perfluorochemicals are a family of manmade chemicals that have been used for decades to make products that resist heat, oil, stains, grease and water. Studies show that nearly all people have some PFCs in their blood, regardless of age. The way PFCs get into human blood is not well understood at this time. People could be exposed through food, drinking water, commercial products or from the environment. Some PFCs stay in the human body for many years. PFCs may be toxic to the liver and thyroid gland and may also affect fetal and neonatal development. MDH has developed health-based exposure limits, the level considered safe for people to drink over a lifetime, for three PFCs.

PFCs have unique chemical characteristics which make them especially useful for firefighting foams. However, at several fire-training facilities, where repeated use of these foams has occurred, PFCs have been found in the soil and groundwater. Thus, use of Class B firefighting foams may have an impact on drinking-water supplies, especially if the training facility is near a well.

Based on preliminary testing by the MPCA at locations where firefighting foams have been used in training, MDH developed a list of priority sites for testing of public water suppliers. The systems tested were Apple Valley, Bemidji, Brooklyn Center, Burnsville, Cloquet, Goodview, Luverne, North Mankato, Perham, Pierz, Pine River, Randall, Richfield, Rochester, and Winona. In addition, two sites, North St. Paul and Cottage Grove, have already been sampled as part of earlier monitoring.

The testing was performed in February and March of 2009, and the results were known by early spring. Many of the cities sampled showed no detections of PFCs while some of them had samples showing only trace amounts at some of their wells (in the range of 20 to 40 parts per trillion, approximately 1/10th of the health-based exposure limit). Often, the water in the wells with trace amounts ends up being blended with water from other wells (which are completely free of PFCs), diluting the trace amounts further before the water is delivered to people's homes.

Most of the water systems that had trace amounts of PFCs found have agreed to allow MDH to perform quarterly sampling for at least one year as an added precaution. A list of results is available at http://health.state.mn.us/divs/eh/hazardous/topics/pfcs/classbresults.html.

Other information on PFCs and Class B firefighting foam is at http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/classbfoam.html.

Center for Emerging Contaminants Proposed

A Center for Emerging Drinking Water Contaminants is being proposed as a result of last fall's approval by Minnesota voters of the Clean Water, Wildlife, Cultural Heritage and Natural Areas Amendment to the state constitution.

The purpose of the Center will be to understand and interpret occurrences and health risks from exposures to contaminants that are poorly understood or for which new health risk information is emerging. The Center will expand upon and enhance what the Minnesota Department of Health can accomplish in researching and assessing risks from emerging contaminants, substances that have not yet been studied or detected in Minnesota drinking water and for which no Minnesota drinking water standards have been established.

MDH will identify potential emerging contaminants for study, develop research on candidate contaminants, and communicate what is learned about emerging contaminants. The work of identifying emerging contaminants will include developing and maintaining collaborative relationships with other state agencies, academic and industry researchers, nonprofit environmental groups, organizations associated with drinking water, and federal programs.

Once MDH becomes aware of an emerging issue in drinking water, the department will have many options to study the scope and impact of emerging contaminants. Environmental studies may be necessary to determine whether a contaminant is present in drinking water. Exposure studies may be necessary to measure whether Minnesotans are exposed to a contaminant. Research on the toxicity of the contaminant may be necessary to evaluate risks from exposures. Risk management research might range from cumulative risk assessments to alternatives assessment.

MDH anticipates that research on exposures and health impacts will result in new risk assessments for emerging contaminants. MDH will develop new water level standards and advice based on current scientific research on the toxicology and epidemiology available for emerging contaminants. This work will also involve public education to communicate the results and to share details of the work.

Information about environmental levels, human exposure, toxicology, and resulting health risks will become available as research is conducted.

Conclusion

Monitoring test results for 2008 tend to reinforce the conclusions of previous years. Although we need to remain vigilant, Minnesotans can continue to have confidence in their drinking water.

MDH remains committed to protecting the high quality of our drinking water. The safety of our drinking water should never be taken for granted—but Minnesotans can be assured that their local water supply system is making every effort to ensure that their water is safe. And they can also be assured that the Minnesota Department of Health—and the broader public health community—are working to ensure that their confidence is well placed.

Appendix

Summary of Safe Drinking Water Monitoring Results for Minnesota

Includes Results for Both Community and Non-Community
Public Water Supply Systems in Minnesota for 2008

The following is a summary of drinking water monitoring test results for all public water supply systems in Minnesota for calendar year 2008. Public water supply systems include all systems that serve 25 or more people on a regular basis, or that have 15 or more service connections. There are 7,236 such systems in Minnesota, including:

- *957 community systems, which provide water to consumers in their places of residence, including 726 municipal systems.*
- *6,279 noncommunity systems, which provide drinking water in settings like factories, schools, restaurants, and highway rest stops.*

A report that lists all violations of the Safe Drinking Water Act in Minnesota for calendar year 2008 is available from the Drinking Water Protection Section, Minnesota Department of Health, Box 64975, St. Paul, MN 55164-0975. This is also available on at:

http://www.health.state.mn.us/divs/eh/water/cinfo/dwar/summary2008.pdf
http://www.health.state.mn.us/divs/eh/water/cinfo/dwar/pwsid2008.pdf
http://www.health.state.mn.us/divs/eh/water/cinfo/dwar/contaminant2008.pdf

Individual water systems produce an annual report listing contaminants that were detected, even in trace amounts, during the previous calendar year. Please contact the individual water system if you would like a copy of this report.