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Safe Drinking Water in Minnesota:

A Partnership with the People

Drinking Water Protection

A summary of

Drinking Water Protection Activities

in Minnesota for 1999

Issued May 2000
Minnesota Department of Health
Division of Environmental Health

MINNESOTA MDH DEPARTMENT OF HEALTH

Safe Drinking Water in Minnesota:

A Partnership with the People

Drinking Water Protection in Minnesota—1999

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Foreword

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 reductions in disease and improvements in 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. More detailed information about community systems in the state, as well as noncommunity systems, is included in the appendix.

We hope this information will provide the people of Minnesota with a clearer picture of what's 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 the both the safety and the quality of their drinking water.

Executive Summary

The Minnesota Department of Health (MDH) is responsible for enforcing the federal Safe Drinking Water Act—and safeguarding the quality of drinking water—in our state. That includes responsibility for regulating 8,900 *public water supply systems* statewide. That figure includes 956 *community* systems, which provide drinking water to people in their places of residence. Those community systems include 710 *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, and 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 system may be tested regularly for up to 118 pesticides and industrial contaminants—including both synthetic organic chemicals (SOCs) and volatile organic chemicals (VOCs). The list of chemicals to be tested for—and the testing schedule—may vary from one system to another. Testing requirements depend on factors like 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 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.

  Standard procedures are followed whenever potential bacterial contamination is detected. Systems are disinfected, flushed, and retested to ensure than any contamination problems are eliminated. All of the residents served by the system are also informed of the situation. In some cases, boil water notices are issued, advising residents to boil their water before using it for drinking or cooking.

- **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 nitrate problem.

- **Inorganic Chemicals and Radioactive Elements.** Each system is typically tested once every three years—or as often as once a year, in some cases—for a list of 13 additional inorganic chemicals, and 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.

- **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 local water supply system must do additional testing and take steps to reduce levels. Systems that exceed the action level for lead must also perform a regular program of public education.

A Current Profile of

Minnesota's Drinking Water Protection Program

Since 1974, the U.S. Environmental Protection Agency 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 begin regulating public water supply systems at the state level—in 1977.

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 more than 25 people or have more than 15 service connections.

Minnesota currently has 8,900 public water supply systems—more than all but six other states. Of those systems, 956 are *community* systems—that is, systems which provided water to people in their homes or places of residence. Most of these community systems use *groundwater* from underground sources, tapped by water wells, as their source of water. However, 23 of these systems—including the municipal systems that serve the state's largest cities—use *surface water,* drawn from lakes or rivers.

Only 710 of the state's community systems 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, often at restaurants, resorts, or highway rest stops. Other noncommunity systems may provide water to relatively stable population groups, but in non-residential locations—like schools, factories and other 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 like 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—but not all—require routine disinfection, to address 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 water wells.

- **Monitoring.** Monitoring is the critical element of enforcement 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 MDH. 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 taking steps to eliminate potential health hazards.

  Under the provisions of the SDWA, the individual water supply system is responsible for taking water samples and submitting them to MDH for testing. To lessen the burden on water supply operators, some of the required samples are collected by field staff from MDH. Minnesota's 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 up to 118 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 8). 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 U.S. Environmental Protection Agency (EPA) has developed legal standards known as *maximum contaminant levels (or MCLs)* for 60 of the 118 chemicals on the list. *Advisory* standards have been developed for the other 58 chemicals on the list, and those are used in the same way as the MCLs in assessing test results.

Any time a community water supply exceeds the applicable standard for one of these contaminants, the water supply operator must immediately take steps to notify the people who use the water—with the assistance of MDH. 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 monthly 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 assumed that the system has also been adequately protected against contamination with other types of disease-causing organisms. However, if any detectable amount of coliform is 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. Standard procedures are followed whenever potential bacterial contamination is detected. Systems are disinfected, flushed, and retested to ensure than any contamination problems are eliminated. All of the residents served by the system are also informed of the situation. In some cases, boil water notices are issued, advising residents to boil their water before using it for drinking or cooking.

Bacterial contamination problems are most commonly found in smaller water supply systems. Most of these smaller systems use groundwater, and many do not routinely disinfect the water as part of the treatment process.

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 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 current standard (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. 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 also tested for a list of 13 *other inorganic chemicals,* in addition to nitrate. The testing is usually done once every three years, but may be done as often as once a year, or as seldom as once every nine years. 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 federal 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*—may be 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.

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 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 for lead or 1,300 parts per billion for copper. If a system exceeded the action level for lead or copper—in more than 10 percent of the locations tested—the system 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 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 in the system 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.

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 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 like *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 1999

Pesticides and Industrial Contaminants

During 1999, MDH conducted 30,517 tests for pesticides and industrial contaminants in community water systems. One of the tests exceeded the drinking water standards for any of these contaminants. The violation occurred in the city of Caledonia (population 2,846, Houston County) for tetrachloroethylene.

Bacterial Contamination

Nineteen systems—including 11 municipal systems—tested positive for bacterial contamination in 1999. All but three of the affected systems served fewer than 1,000 people.

The municipal systems that had confirmed coliform bacteria contamination in 1999 were Big Falls (population 350, Koochiching County), Browns Valley (pop. 758, Traverse County), Cosmos (pop. 610, Meeker County), Green Isle (pop. 357, Sibley County), Halstad (pop. 690, Norman County), Lake Elmo (pop. 550, Washington County), Melrose (pop. 2,600, Stearns County), North St. Paul (pop. 14,000, Ramsey County), Perham (pop. 2,297, Otter Tail County), Sabin (pop. 506, Clay County), and Taconite (pop. 331, Itasca County).

Standard procedures were followed in all of these cases. The system was disinfected, flushed, and retested to ensure that any contamination problems had been eliminated. All of the residents served by the affected systems were also informed of the situation. In some cases, boil water notices were issued, advising residents to boil their water before using it for drinking or cooking.

Nitrate

Two municipal systems exceeded the nitrate standard in 1999. The affected systems are Hastings (pop. 16,387, Dakota County) and Chandler (pop. 314, Murray County). Both systems had one well that produced a level of nitrate slightly over the maximum contaminant level of 10 parts per million. Both took the well with the high nitrate level out of service while they study alternatives available for reducing the nitrate levels in the well.

A small manufactured housing development, Stensrud's Court, in Hubbard County also exceeded the nitrate standard. The system implemented treatment to reduce the nitrate levels. Stensrud's Court serves 25 residents.

Radioactive Elements

Gross Alpha Emitters

Five systems—including three municipal systems—exceeded the standard for gross alpha emitters in 1999. The affected municipal systems are Butterfield (population 578, Pine County), Hinckley (pop. 1,203, Pine County), and Savage (pop. 14,502, Scott County). No restrictions were placed on water consumption although residents were notified of the situation. Residents were told that this is not an emergency situation, advised to consult their doctors if they have any special concerns, and told of home treatment units that they could use to reduce the levels of gross alpha emitters. The systems will study alternatives to correct the problem.

Radium 226 & 228

Thirteen systems—including nine municipal systems—exceeded the standard for radium 226 & 228 in 1999. The affected municipal systems are Butterfield (population 578, Pine County), Hinckley (pop. 1,203, Pine County), LaCrescent (pop. 4,557, Houston County), Lucan (pop. 262, Redwood County), Medford (pop. 770, Steele County), North Mankato (pop. 11,561, Nicollet County), Norwood-Young America (pop. 2,456, Carver County), Red Wing (pop. 15,770, Goodhue County), and Savage (pop. 14,502, Scott County). No restrictions were placed on water consumption although residents were notified of the situation. Residents were told that this is not an emergency situation, advised to consult their doctors if they have any special concerns, and told of home treatment units that they could use to reduce the radium levels. The systems will study alternatives to correct the problem.

The large number of systems exceeding the standard is not a result of increased levels of contamination but rather a result of a regulatory decision by MDH.

In 1991, the EPA had proposed a rule revision that would have raised the maximum contaminant level (MCL) from 5 picoCuries/liter (pCi/l) for combined radium 226 and 228 to a maximum contaminant level of 20 pCi/l for radium 226 and 20 for radium 228. Minnesota decided not to enforce the existing lower standard in anticipation of the new standard.

However, in December 1997, EPA announced that the radium MCLs would probably not be changed to the 20/20 as proposed in 1991 but would remain at a combined radium level of 5 pCi/l. As a result, MDH began enforcing radium at 5 pCi/l for radium 226 and 228 combined, which resulted in 12 community water systems being in violation.

It is not known what the MCL for radium 226 and 228 will be when the rule is finalized late in 2000. Until a new standard is officially established, it is unclear as to the specific types of treatment water systems will need to reduce the levels in the water of naturally occurring radium. Meanwhile, the systems are studying alternatives.

Lead and Copper

Minnesota's community water supply systems are continuing with efforts, begun during the early part of this decade, to reduce lead and copper levels in their drinking water.

Minnesota's community water supply systems were originally tested for lead and copper during the early 1990s. The testing is done by taking water samples from a number of points in the system. If more than 10 percent of the samples exceed the federal action level of 15 parts per billion (ppb) for lead or 1,300 ppb for copper, the entire system is considered to be "in exceedance." Communities that exceed the action level are required to do additional testing, and take steps to reduce the absorption of lead into the water from the distribution system or household plumbing.

When these systems were first tested several years ago, 87 exceeded the action level for lead. Eighty-four of those systems have since completed follow-up monitoring or retested; the other three are scheduled to complete follow-up monitoring in 2000. Of the 84 that already have retested, 12 are still in exceedance of the action level for lead.

Results of recent testing reveal the following picture:

Large Systems (serving 50,000 or more people). Over the past few years, the number of systems serving 50,000 or more people has increased from five in 1992 to the current number of 12. Initial testing revealed unacceptable lead level in two systems and unacceptable copper levels in three systems. All five of these systems have instituted corrosion control measures, which reduced the ability of water to absorb lead and copper from plumbing. Follow-up tests have shown significant reduction in lead and copper levels for all five systems. However, one system still exceeds the lead action level and one exceeds the copper action level. These two systems are continuing to minimize the lead and copper levels through the optimization of the corrosion control treatment process.

Medium-Sized Systems (serving 3,300 to 50,000 people). When the state's 128 medium-sized systems were initially tested in 1992, 21 were found to exceed the action level for lead. Seventeen of these systems have retested and were found to be in compliance. The Minnesota Department of Health had required the other four systems to comply with some specific water quality parameter values relating to optimal corrosion control treatment, hoping to bring these systems into compliance through the effort of treatment optimization.

Of 29 systems that exceeded the action level for copper, 20 have successfully retested. The remaining nine systems have been specified with corrosion control related water quality parameter values to optimize the treatment to further lower the copper levels.

Smaller Systems (serving fewer than 3,300 people). Sixty-four of the state's 818 smaller systems exceeded the action level for lead when they were initially tested in 1993. Fifty-four of the affected systems have successfully retested; seven systems exceeded the action level for lead during the retesting; the other three systems are scheduled to complete the retesting in 2000.

Of 113 systems that initially exceeded the action level for copper, 108 have completed follow-up testing with thirty-one of them still exceeding the action level for copper. The Minnesota Department of Health is working with these systems to further lower the copper levels. The other five systems are scheduled to complete the retesting in 2000.

Other Inorganic Chemicals

No community water systems exceeded the standards for inorganic chemicals in 1999.

Emerging Issues

Minnesota Leads the Way in Compliance for Consumer Confidence Reports

In 1999, community water systems were required for the first time to issue annual water quality reports to their systems. These reports, officially known as Consumer Confidence Reports, were mandated by one of the key provisions of the 1996 amendments to the federal Safe Drinking Water Act.

Minnesota water systems achieved a 99 percent compliance rate in 1999, one of the highest (if not the highest) in the nation, as nearly all of its 958 community water systems produced a report and performed the required distribution of it.

The high compliance rate is in part a result of the active role that MDH took in assisting the state's community water suppliers with the information necessary to produce their reports. MDH sent the results of monitoring from the previous year to each system along with the other information that is required in each report.

Many water systems went beyond the minimum requirements of the rule and include additional information—such as a description of their treatment and distribution processes—that enhanced their customers' awareness of what is involved in the delivery of safe drinking water and the importance of protecting water resources.

A contest was held to pick the best report issued by a Minnesota system. A citizens panel, convened to judge the reports on their appearance and readability in additional to how well the report helped citizens to learn more about drinking water in general and the individual water system in particular, selected the report issued by the city of Worthington as the best in the state.

The reports are a tool to encourage dialogue between consumers and utilities, get consumers more involved in decisions, and provide a starting point for consumers to obtain more information.

Minnesota Adopts Capacity Development Program

Through a combination of legislative action, rule adoption, and integration of a variety of related regulatory programs, Minnesota in 1999 initiated a capacity development program for new water supply systems.

Capacity refers to the overall capability of a public water supply system to reliably produce and deliver water that complies with all National Primary Drinking Water Regulations (NPDWRs) either currently in effect or likely to be in effect in the near future. Capacity encompasses the technical, managerial, and financial capabilities which enable the water supply to plan, achieve, and maintain compliance with all NPDWRs.

Activities that help ensure capacity include sanitary surveys of water supply systems, analysis of water samples, technical assistance, construction review, certification of system operators, source water protection activities, emergency response plans, financial and audit reports, and capital improvement plans.

Minnesota has entered the second phase of its capacity development for water systems and is developing a strategy for existing systems. As part of the process, the Minnesota Department of Health is soliciting input from water utilities and other affected parties through a questionnaire. The questions deal with problems systems are having in complying with state and federal requirements, how activities of the Minnesota Department of Health encourage or impair the ability of utilities to operate their water systems, and problems systems may be having in locating safe drinking water sources. The MDH plans to have the questionnaire on its web site by mid-May.

The responses to these questions will be considered by MDH and by a stakeholders' workgroup in developing an initial capacity development strategy for existing systems. After this, the process will be an on-going one, with annual assessment of results and consideration of modifications to the strategy.

Standard Review and Revisions

In the next few years, it is likely that Minnesota water suppliers will have to deal with an anticipated change in standard for arsenic as well as an anticipated change that may not be made in radium.

Arsenic

A revision to the Arsenic Rule is now being finalized with the current federal standard of 50 parts per billion (ppb) being lowered to somewhere between 3 ppb and 10 ppb.

The reduction in the maximum contaminant level has been anticipated for several years. Water systems in Minnesota that have measurable levels of arsenic in their water have been studying treatment alternatives preparing for the possibility of having to add treatment processes to comply with the new, more stringent standard. However, the systems will be unable to make firm decisions until the new standard is officially established.

Arsenic occurs naturally in the environment and, as a component of underground rock and soil, can work its way into groundwater. Adverse health effects associated with long-term exposure to elevated levels of arsenic include problems to the skin, the circulatory system, and the nervous system.

Radon

Radon is a radioactive byproduct of uranium decay that is present in the ground. It can work its way through soil into basements and also into groundwater. The National Academy of Sciences says airborne radon gas is the second-leading cause of lung cancer in the United States.

People can be exposed to radon from two primary sources: groundwater and air (both indoor and outdoor air). Most of the radon in indoor air comes from soil underneath the home. Radon in soil seeps into the house and in the air. In addition, outdoor air contains background levels of radon from soil gas. As for radon in water, exposure occurs through ingestion as well as through breathing radon released from the water into the air when the water is running.

Radon gas is also found in groundwater. Exposure occurs by breathing airborne radon resulting from using water—for showering, washing dishes, cooking, and drinking water—which contains radon. Exposure from radon in groundwater causes approximately 168 cancer deaths per year in the United States.

Radon is prevalent in the ground in western and southern Minnesota, including much of the Twin Cities metropolitan area. During 1999, the Minnesota Department of Health performed a survey to determine the occurrence of radon in approximately 200 public water systems. The systems chosen to be surveyed provided a variety of geological settings, system configurations, and geographical distributions. The purpose of the survey was to identify from a statewide perspective the levels of radon occurring in public water systems. As a result of the survey, MDH estimated that approximately one-third of the community water systems in the state would have to take action to reduce the levels of radon in their water.

The U. S. Environmental Protection Agency has proposed a Radon Rule which addresses radon occurrence in both air and water. In addition to a maximum contaminant level of 300 picoCuries per liter (pCi/L), the rule proposses an Alternative Maximum Contaminant Level for radon in drinking water of 4,000 pCi/L for those states that adopt a multi-media mitigation program that compels citizens, homeowners, schools, and communities to reduce radon threats from both indoor air and water. For those states that do not adopt the mitigation program, the 300 pCi/L standard will apply.

The EPA rule on radon is expected to be finalized later this year. If the mitigation plan remains part of the final rule, the state of Minnesota plans to adopt it.

Radium

One standard that wasn't revised, contrary to expectations, was for radium. Following an extensive review by EPA, it was determined that a proposed reduction in the standard would probably not be implemented. The old standard is still in effect; however, the rule revision process continues and no final decision has been made at this time on the numerical value of the radium standard and other associated rule requirements. EPA has set a deadline of November 2000 to have the rule revisions completed. See page 10 for a list of Minnesota systems that did not meet the current standard.

Conclusion

Monitoring test results for 1999 tend to reinforce the conclusions of previous years: The quality of Minnesota's drinking water is very high. Even as our monitoring activities have expanded, we have rarely found any detectable contamination. Contaminant levels that exceed applicable health standards have been rarer still. 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.

Summary of Safe Drinking Water Monitoring Results for Minnesota

Includes Results for Both Community and Non-Community Public Water Supply Systems in Minnesota for 1999

The following is a summary of drinking water monitoring test results for **all public water supply systems** *in Minnesota for calendar year 1999. 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 approximately 8,900 such systems in Minnesota, including:*

- *approximately 950* **community** *systems, which provide water to consumers in their places of residence. These 950 community systems include approximately 700* **municipal** *systems.*
- *approximately 8,000* **non-community** *systems which provide drinking water in settings like factories, schools, restaurants, and highway rest stops.*

During calendar year 1999, Minnesota had:

- 2 community systems with a total of 2 violations of the MCL of 10 parts per million (ppm) for nitrate.
- 19 noncommunity systems with a total of 19 violations of the MCL for nitrate.
- 7 community systems with a total of 7 violations of the monitoring requirements for nitrate.
- 19 community systems with a total of 20 violations of the MCL for total coliform.
- 248 noncommunity systems with a total of 249 violations of the MCL for total coliform.
- 44 community systems with a total of 48 violations of the monitoring requirements for total coliform.
- 23 noncommunity systems with a total of 35 violations of the monitoring requirements for total coliform.
- 22 noncommunity systems with a total of 36 treatment technique violations of the Surface Water Treatment Rule.
- 1 community system with a total of 1 violation of the MCL of 5 parts per billion for tetrachloroethylene.
- 5 community systems with a total of 5 violations of the MCL of 15 picoCuries per liter (pCi/L) for gross alpha emitters, excluding radon and uranium.
- 13 community systems with a total of 13 violations of the MCL of 5 pCi/L for combined radium (radium-226 and radium-228)

- 7 community systems with a total of 7 violations of the requirements for the consumer confidence reports.

- 22 community systems with a total of 22 violations of the monitoring requirements for lead and copper.

- 5 noncommunity systems with a total of 5 violations of the monitoring requirements for lead and copper.

A full report of monitoring activities for calendar year 1999 is available from the Drinking Water Protection Section, Minnesota Department of Health, Box 64975, St. Paul, MN 55164-0975.