State of Iowa
Public Drinking Water Program
2005 Annual Compliance Report

Environmental Services Division
Water Quality Bureau
Water Supply Engineering & Operations Sections

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Iowa Department of Natural Resources
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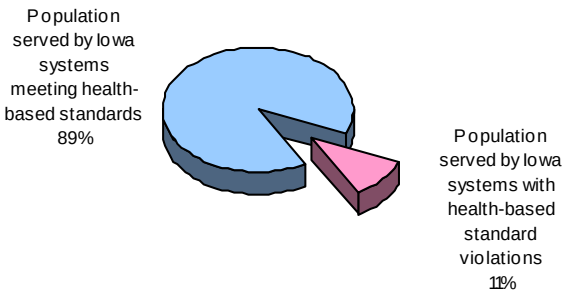
Introduction

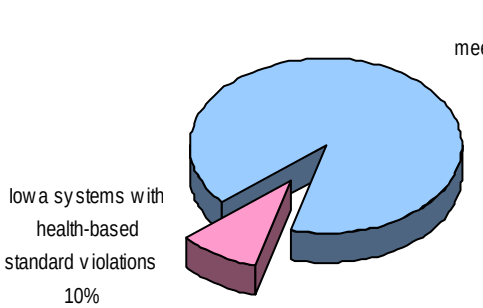
The Iowa Department of Natural Resources (IDNR) administers the Public Drinking Water Program in Iowa under delegation of authority from the United States Environmental Protection Agency (EPA). The 1996 re-authorized Safe Drinking Water Act (SDWA) requires that each state that has been granted primary implementation authority prepare an annual report on violations of national primary drinking water regulations within the state, make the report readily available to the public, and submit it to the EPA. This report fulfills this responsibility in Iowa for the 2005 calendar year, and includes violations of maximum contaminant levels, maximum residual disinfectant levels, treatment technique requirements, major monitoring or reporting requirements, action level exceedances, and operation certification requirements.

The 2005 Report Highlights

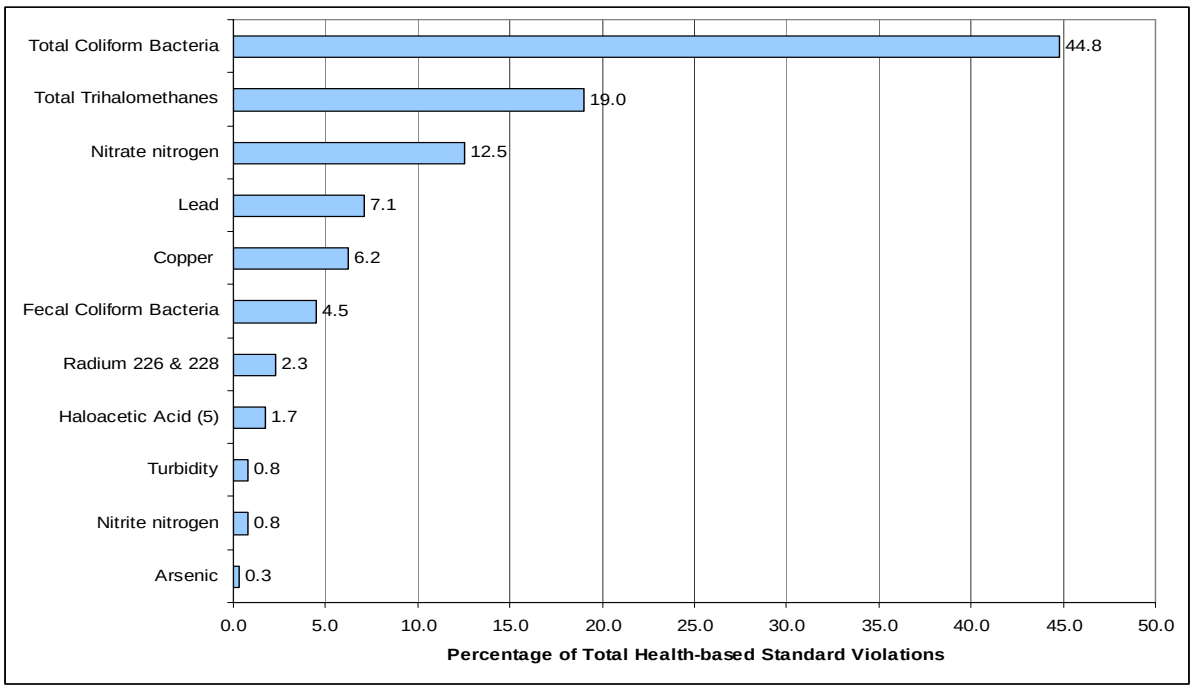
Compliance with Health-Based Standards

- No waterborne diseases or deaths were reported from Iowa public water supply systems (PWS) in 2005.
- Over 2.50 million people (of the 2.79M people served by PWS) regularly received water from systems meeting all health-based drinking water standards.

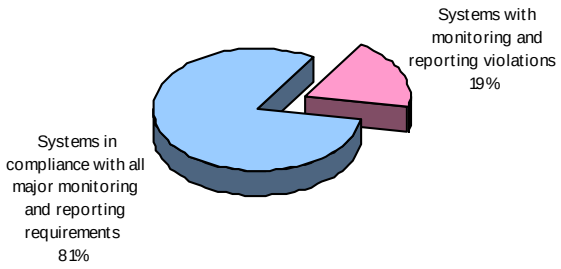




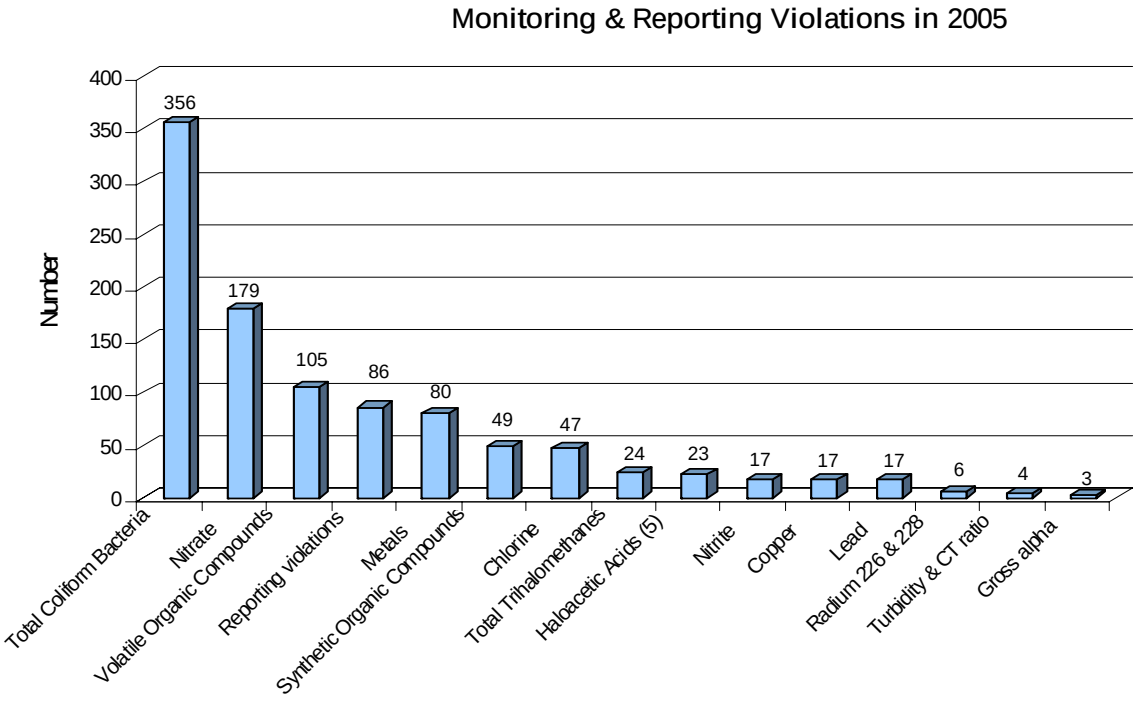
- Health-based drinking water standards were met by 90.0% of the 2,047 regulated public water supplies. There were 198 public water supplies that had 353 violations of a health-based drinking water standard: maximum contaminant level (MCL), maximum residual disinfectant level (MRDL), treatment technique (TT), or action level (AL).
- Eleven of the more than 80 regulated contaminants were found at levels that exceeded the health-based standards during 2005. Those 11 contaminants are listed below, along with the percentage each contributed to the total number of health-based standard violations.



Compliance with Monitoring & Reporting Requirements



- About 2.6 million people regularly received water from Iowa systems that complied with all major monitoring and reporting requirements.
- Major monitoring and reporting requirements were met by 81.2% of the 2,047 regulated public water supply systems.
- There were 938 major monitoring violations in 2005. A major monitoring violation is incurred when a sample is not collected for a specific contaminant. There were 333 systems that had at least one major monitoring violation in 2005. The contaminants for which at least one major monitoring violation was issued are listed below, along with the percentage each contributed to the total number of monitoring violations.
  - Coliform bacteria: 38.0%
  - Nitrate: 19.1%
  - Volatile Organic Compounds: 11.2%
  - Metals: 8.5%
  - Synthetic Organic Compounds: 5.2%
  - Chlorine: 5.0%
  - Total Trihalomethanes: 2.6%
  - Haloacetic Acids: 2.5%
  - Nitrite: 1.8%
  - Copper: 1.8%
  - Lead: 1.8%
  - Other (3 other analytes): 2.5%
- At least one reporting violation was incurred by 81 systems, for a total of 86 reporting violations. These violations were comprised of the following (both the actual number of violations and the percentage of total reporting violations are listed):
  - Failure to provide a consumer confidence report: 35 (40.7%)
  - Failure to obtain a certified operator: 27 (31.4%)
  - Failure to submit the required monthly operation report: 9 (10.4%)
  - Failure to meet a compliance schedule: 8 (9.3%)
  - Failure to obtain a construction and/or operation permit: 6 (7.0%)
  - Failure to conduct Lead public education: 1 (1.2%)



The National Public Drinking Water Program: An Overview

The United States Environmental Protection Agency (EPA) established the Public Water System Supervision Program under authority of the 1974 Safe Drinking Water Act (SDWA), which was most recently amended in 1996.

- To ensure the water is safe for human consumption, EPA sets national limits on allowable contaminant levels in public water supply systems. These limits are known as maximum contaminant levels and maximum residual disinfectant levels.
- Because certain contaminants are difficult to measure, EPA establishes treatment techniques or action levels in lieu of a maximum contaminant level to control unacceptable levels of those specific contaminants in public drinking water.
- EPA specifies how often systems must monitor for contaminants and requires those monitoring results be reported to the state. Generally, the larger the population, the more frequent the monitoring and reporting requirements.
- EPA requires systems to notify the public they serve when violations of the drinking water regulations occur. Public notification must include a clear and understandable explanation of the nature of the violation, potential adverse health effects resulting from the violation, steps the system is taking to correct the violation, and the availability and necessity of using alternative water supplies until the violation is corrected.
- EPA also has requirements for certification of water distribution and water treatment operators, environmental laboratory certification, and development of systems' technical, financial, and managerial capacity, to ensure that systems are properly operated.

The SDWA applies to all 50 States, the District of Columbia, Native American Indian Lands, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands and the Republic of Palau.

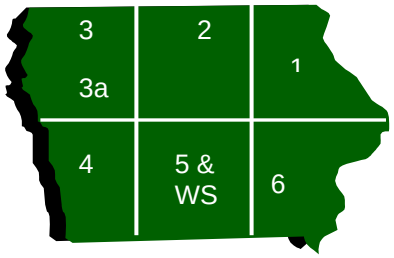
The SDWA allows States and Territories to seek EPA approval to administer the Public Water Supply Supervision Program within their state or territory, which is called primacy. To receive primacy, States must meet certain requirements set forth in the SDWA regulations, including adoption of drinking water regulations which are at least as stringent as federal regulations, and must demonstrate that the state or territory can enforce the program requirements. Of the states and territories, all but Wyoming and the District of Columbia have primacy. The EPA Regional Offices administer the PWSS programs within those two jurisdictions.

Native American tribes must meet the same requirements as a state in order to receive primacy. The three public water supplies operated by Native American tribes in Iowa have not received primacy and are overseen directly by EPA: Winn-A-Vegas Casino in Sloan; CasinOmaha in Onawa; and, the Sac & Fox Community in Tama.

EPA regional offices report to the states any enforcement actions taken by EPA within their jurisdiction. All SDWA data for a state is stored in an automated database called the Safe Drinking Water Information System (SDWIS). This database currently contains an inventory of public water supply systems and violation records.

The IDNR Drinking Water Program Components

The Iowa public drinking water program has the following responsibilities, conducted by staff located centrally in Des Moines (Water Supply and Region 5), as well as in six other cities around the state: Manchester (Region 1), Mason City (Region 2), Spencer (Region 3), Storm Lake (Satellite Office 3A), Atlantic (Region 4), and Washington (Region 6). The offices are shown on the map at the right.



On-Site Inspection

- conducts site surveys for well and treatment facility placement,
- inspects every public water supply system in the state at least every five years (three years for surface water CWS), which includes examination of the operation and maintenance of the entire system,
- provides technical assistance to water supply operators,
- responds to complaints from the public,
- provides emergency response to spills that may threaten water resources

Operation Permitting

- issues the operation permits for each system at least every three years, which lists the system-specific monitoring and operation requirements,
- monitors the compliance by each system with the drinking water program requirements,
- prepares violation notices, compliance schedules and enforcement actions

Construction Permitting

- issues construction permits for projects,
- reviews preliminary engineering reports, viability assessments and source water protection plans,
- assists systems and consulting engineers in selecting various treatment technologies for specific water quality problems.

Water Allocation and Use Permitting

- allocates and tracks the withdrawal of water from Iowa's aquifers and surface waters,
- issues and renews water use permits that are effective for ten years, and
- reviews water conservation plans.

Drinking Water Operator Certification

- evaluates applicants qualifications to determine eligibility for examination,
- certifies operators that successfully complete a written exam,
- renews certification of operators that earn continuing education units,

Environmental Laboratory Certification

- certifies laboratories that analyze samples,
- contracts with the University Hygienic Laboratory to inspect environmental laboratories every two years and check the accuracy of annual proficiency testing samples.

Drinking Water State Revolving Loan Program

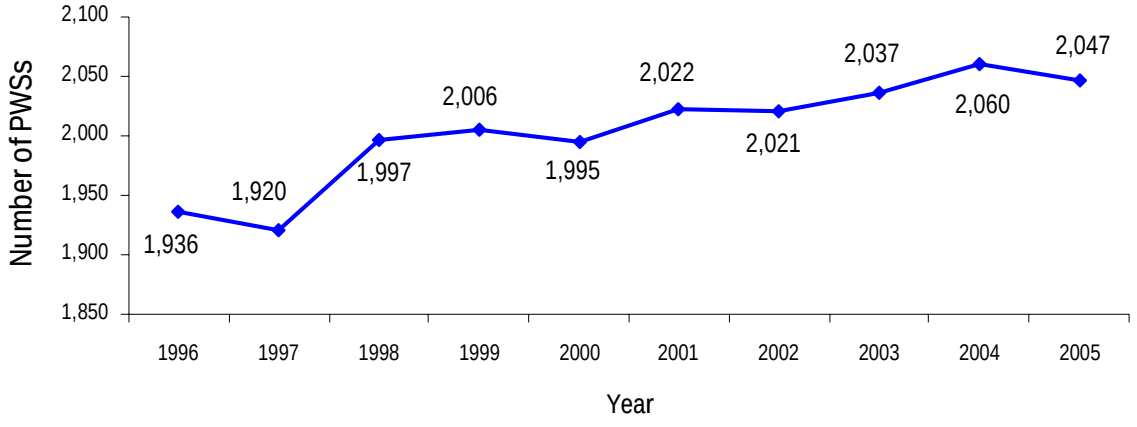
- makes loans to drinking water systems for construction of drinking water sources, treatment, storage and distribution systems to ensure public health and provide safe drinking water,
- makes loans for implementation of source water protection projects,
- scores and ranks applications based on whether the projects addresses health risks, rule compliance, infrastructure needs, and source water protection including criteria for loan eligibility.

Iowa also provides a variety of assistance to public water systems through the following four programs:

- Capacity Development The department continues to employ a capacity development strategy (also called viability assessment) to improve the financial, technical, and managerial capabilities of all water systems. New systems must be viable when they first serve water to the public. Existing systems are required to conduct self-assessments based upon various performance factors.
- Source Water Protection The first step in a multiple-barrier approach to drinking water protection is preventing contamination of drinking water sources. Iowa continues to perform source water assessments for new public water sources, but the primary emphasis of the Source Water Protection program focuses on the implementation of local and regional source water protection activities and projects. Iowa also coordinates with regional and local governmental and non-governmental entities to provide source water protection assistance and education to interested communities. All existing public water supplies had a source water delineation and contaminant source inventory completed by the IDNR's Geological Survey Section (groundwater systems) or other providers (for surface water systems) by July 2004. The systems then use this base document to develop their system-specific source water protection plans. As of May 2005, 115 systems have approved final source water protection plans.
- Public Water System Security The department provides information, consultation, and training to public water systems and operators regarding drinking water security.
- Technical Assistance Contracts The department administers contracts for projects that provide technical assistance to water operators and to systems serving less than 10,000 persons.

The number of public water supply systems in Iowa declined slightly in 2005 from the previous year but continues the overall increasing trend, as indicated below. Any system that was active for a single day during the year is included in that year's total.

Number of Regulated Iowa PWSs from 1996 - 2005



Iowa's Public Water Supply Systems

Definition of a PWS

A public water supply system is a system that provides water to the public for human consumption. The system must have at least 15 service connections or regularly serve an average of at least 25 individuals daily at least 60 days out of the year. An example of a system that is not a public water supply (a private water supply) would be a well serving a farmstead or rural home with 6 residents.

A public water supply system (PWS) is either a community water system, a non-transient non-community system, or a transient non-community system.

- A community water system (CWS) is a PWS that meets the above definition for year-round residents. Examples of CWSs include municipalities, subdivisions, and mobile home parks.
- A non-transient non-community water system (NTNC) is a PWS that regularly serves at least 25 of the same people four hours or more per day, for four or more days per week, for 26 or more weeks per year. Examples of these systems are schools, day-care centers, factories, and offices. Other service-oriented businesses, such as hotels, resorts, hospitals, and restaurants, are classified as NTNCs if they employ 25 or more people and are open for 26 or more weeks of the year.
- A transient non-community water system (TNC) is a PWS other than a CWS or NTNC that regularly serves at least 25 individuals daily at least 60 days out of the year. Examples of TNCs are convenience stores, bars, restaurants with fewer than 25 employees, golf courses, camps, parks, and recreation areas.

Public Water Supply Systems in Iowa

Number of Systems

In 2005, over 2.65 million Iowans were served by community public water supplies, or 90.6% of the total state population (2000 census), with the remaining 9.4% of the population served by private water supplies. Iowa's 2,047 public water supply systems in 2005 included 1,153 CWS, 142 NTNC, and 752 TNC systems.

System Size

Iowa is a small-system state, as indicated in the following table, with 94% of our systems each serving fewer than 3,300 people.

Population Served	EPA Classification	Number of PWS	Percentage of Total PWS
25 – 500	Very Small	1,468	71.7
501 – 3,300	Small	454	22.2
3,301 – 10,000	Medium	82	4.0
10,001 – 100,000	Large	40	1.9
Over 100,000	Very Large	3	0.2
	Total	2,047	100.0

System Source Water

Iowa's drinking water is obtained from three sources:

- Groundwater from deep or shallow wells,
- Surface water from rivers, lakes, and reservoirs, and
- Groundwater that is under the direct influence of surface water as determined through testing by the presence of insects, bacteria, algae, pathogens, and/or significant and relatively rapid shifts in physical and chemical water characteristics.

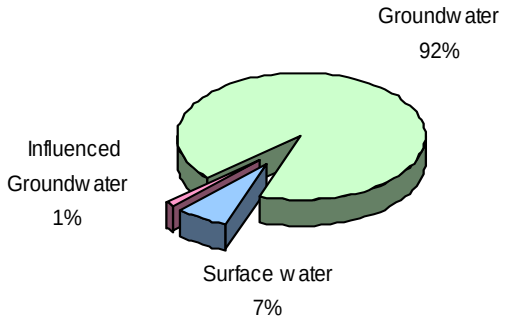
Since a PWS can use any combination of water sources in its system, the PWS is classified by the source that is most vulnerable to contamination. Surface water systems are most vulnerable to contamination, followed by influenced groundwater systems. As indicated in the following tables, 92% Iowa's systems are served by groundwater sources, which serve 57% of the population. Surface water and influenced groundwater sources are used in the remaining 8% of systems, yet they serve 43% of the population.

Source of Water	Number of PWS	Percentage of Total PWS	Percentage of Total Population Served
Surface water	140	6.8	33.5
Influenced Groundwater	26	1.3	9.5
Groundwater	1,881	91.9	57.0

Systems using surface water or influenced groundwater sources have more complex operational and monitoring requirements than do groundwater systems, because of the greater treatment requirements of their source water.

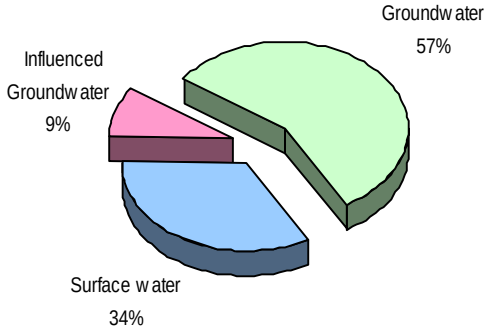
System Source Water in Iowa:

The vast majority of Iowa's systems are supplied by groundwater.



Population Served by the various Source Waters:

Even though 92% of Iowa's systems use groundwater, only 57% of the state's population is served by groundwater systems. The more populated areas of the state are generally served by surface water or influenced groundwater sources.



Maximum Contaminant Levels (MCLs) and Maximum Residual Disinfectant Levels (MRDLs)

All systems classified as public water supplies are required to test periodically for coliform bacteria, nitrate, and nitrite. Inorganic and organic chemical testing are only required in community and non-transient non-community systems. With the exception of chlorine, chloramines, and chlorine dioxide, the contaminants are regulated by a specific maximum contaminant level (MCL). An MCL is defined as the maximum permissible level of a contaminant in water that is delivered to any user of a PWS. Chlorine, chloramines, and chlorine dioxide are regulated by a maximum residual disinfectant level (MRDL), defined as the level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects.

With both the MCL and MRDL, if the drinking water meets that limit for a specific contaminant, it is considered to be safe.

In this section, the requirements for each group of contaminants are described, including the type of violation, common sources of contamination, specific health effects, how a violation is incurred, and how the system returns to compliance. The rules pertaining to MCLs and MRDLs are listed in the Iowa Administrative Code 567—Chapters 40, 41, 42, and 43.

Contaminants posing an immediate risk to human health (Acute)

There are five regulated contaminants that may pose an immediate, or acute, risk to human health if they are found in drinking water: fecal coliform bacteria, *E. coli*, nitrate, nitrite, or chlorine dioxide.

Coliform Bacteria, including fecal coliform bacteria and *E. coli*—567 IAC 41.2(1)

Sources of Contamination: Total coliform bacteria are common in the environment and are generally not harmful themselves. Fecal coliform bacteria and *E. coli* are generally not harmful themselves, but their presence in drinking water is serious because they usually are associated with sewage or animal waste. The presence of these bacteria in drinking water generally is a result of a problem with water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease (pathogens).

Health Effects: At greatest risk are children, pregnant women, infants, elderly persons, and persons with compromised immune systems. Disease symptoms may include diarrhea, cramps, nausea, headaches, and fatigue. Chlorinating the drinking water will provide disinfection. Boiling water in the home is also an effective method of sterilizing the drinking water.

Acute MCL: When total coliform bacteria are present in any sample, that sample is also analyzed for fecal coliform bacteria or *E. coli.* Any confirmed fecal coliform bacteria or *E. coli* sample is a violation of the MCL for total coliform bacteria. To meet this MCL, all drinking water samples must be free of these bacteria.

Violation: A PWS incurs a violation when the MCL is exceeded in any one monthly or quarterly compliance period. A violation of the acute coliform bacteria MCL is an acute violation and public notification must be started within 24 hours of notification of the violation.

Compliance Achieved: The system returns to compliance when all analytical results are below the MCL for a period of six consecutive months, and all required samples are collected as directed.

Nitrate and Nitrite—567 IAC 41.3

Source of Contamination: Nitrate and nitrite contamination can occur from several sources: the natural decay of organic materials such as leaves and crop residue, use of commercial fertilizers, contamination by human sewage and wastes from farm animals, and the nitrification of ammonia in the treatment and distribution system.

Health Effects: Excessive levels of nitrate and nitrite in drinking water can cause serious illness and sometimes death in infants less than six months of age. Nitrate converts to nitrite, which interferes with the oxygen-carrying capacity in the child's blood (methemoglobinemia or blue-baby syndrome). This is an acute disease because symptoms can develop rapidly in infants. In most cases, health deteriorates over a period of days. Symptoms include shortness of breath and blueness of the skin. Expert medical advice should be sought immediately if these symptoms occur. Boiling the water will only concentrate nitrates in drinking water, and should not be attempted. Alternative sources of water should be used, such as Food and Drug Administration (FDA) approved bottled drinking water with low levels of nitrate clearly listed on the packaging.

Acute MCL: The MCL for nitrate is 10 mg/L as N and the MCL for nitrite is 1.0 mg/L as N.

Violation: A system incurs a violation when the MCL is exceeded in any one compliance period, assigned either as a monthly, quarterly, or annual requirement. Violation of the nitrate or nitrite MCL is an acute violation.

Compliance Achieved: The system returns to compliance when all analytical results are below the MCL for a period of six consecutive months, and all required samples are collected as directed.

Chlorine Dioxide—567 IAC 41.6

Source: Chlorine dioxide is a chemical added to drinking water for the purposes of microbial disinfection and oxidation of dissolved organic carbon (to reduce formation of disinfection byproducts).

Health Effects: Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur to the fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure.

Acute MRDL: The MRDL for chlorine dioxide is 0.8 mg/L as ClO_2, and only applies to those systems using chlorine dioxide in their treatment processes. An acute MRDL occurs when too much of the chlorine dioxide is applied during the treatment process at the treatment plant.

Violation: A system incurs an acute violation when the daily monitoring results in the distribution system exceed the MRDL on the day following an elevated chlorine dioxide level at the entry to the distribution system.

Compliance Achieved: The system returns to compliance when the analytical results are below the MRDL for a period of six consecutive months, and all required samples are collected as directed.

Contaminants posing a long-term risk to human health (chronic or non-acute)

Total Coliform Bacteria—567 IAC 41.2(1)

Source of Contamination: Total coliform bacteria are common in the environment and are generally not harmful themselves, but their presence in drinking water is serious because it indicates a pathway of contamination. The presence of these bacteria in drinking water generally is a result of a problem with

water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease.
Health Effects: At greatest risk are children, pregnant women, infants, elderly persons, and persons with compromised immune systems. Disease symptoms may include diarrhea, cramps, nausea, headaches, and fatigue. Chlorinating the drinking water will provide disinfection. Boiling water in the home is also an effective method of sterilizing the drinking water.
Non-Acute MCL: Compliance with the MCL is determined by the presence or absence of total coliform bacteria in a sample. Any confirmed total coliform sample, with no detection of fecal coliform or *E. coli*, is a violation of the MCL for total coliform bacteria. To meet this MCL, all drinking water samples must be free of total coliform bacteria.
Violation: A system incurs a violation when the MCL is exceeded in any one compliance period assigned either as a monthly or quarterly requirement.
Compliance Achieved: The system is returned to compliance when all results are below the MCL for a period of six consecutive months, and all samples are collected as directed.

Inorganic Chemicals—567 IAC 41.3 (not including lead & copper)

Source of Contamination: Inorganic contaminants can leach into drinking water after dissolving from naturally-occurring minerals in the ground, or from runoff from industrial sources or landfills. Chlorite and bromate are byproducts of disinfection.
Health Effects: These contaminants may damage organs such as the kidneys and liver, damage the cardiovascular system and central nervous system, and are sometimes associated with high blood pressure and cancer. High levels of fluoride may cause dental and skeletal fluorosis.
Non-Acute MCL: Compliance with the MCL is determined based upon the sampling frequency:

- For systems collecting a sample every month or quarter, compliance with the MCL is determined using a running annual average.
- For systems collecting a sample annually or longer in frequency, compliance with the MCL is determined using the average of the initial sample and a confirmation sample.

Compliance with the chlorite requirements for systems using chlorine dioxide is determined from both source/entry point and distribution system samples.
Violation: A PWS incurs a violation when the MCL is exceeded in the average of the required samples.
Compliance Achieved: The system is returned to compliance when it has no monitoring or MCL violations for a period of six consecutive months.

Organic Chemicals—567 IAC 41.5

Organic chemicals are classified as a volatile organic chemical [VOC] or a synthetic organic chemical [SOC].
Sources of Contamination: Organic contaminants come from petroleum solvents, paint removers, degreasers, cleaning fluids, pesticides, gasoline, electrical transformers, manufacturing processes, chemical production, byproducts from disinfection, and the production of plastics. Agricultural runoff, improper waste disposal, and improper handling and storage techniques contribute to drinking water contamination via percolation of the contaminant through the soil into the groundwater.

Health Effects: These contaminants may damage organs such as the heart, liver, and kidneys, damage the central nervous and immune systems, and cause cancer.
Non-Acute MCL: Compliance with the MCL is determined based upon the sampling frequency:

- For systems collecting a sample annually or longer in frequency, compliance with the MCL is determined using the average of the initial sample and a confirmation sample.

- For systems collecting a sample every month or quarter, compliance with the MCL is determined using a running annual average.

For contaminants with an established Health Advisory (HA) level but no established MCL, the PWS is required to conduct public notification each quarter in which the HA is exceeded.

Violation: A PWS incurs a violation when the MCL is exceeded in the average of the required samples.

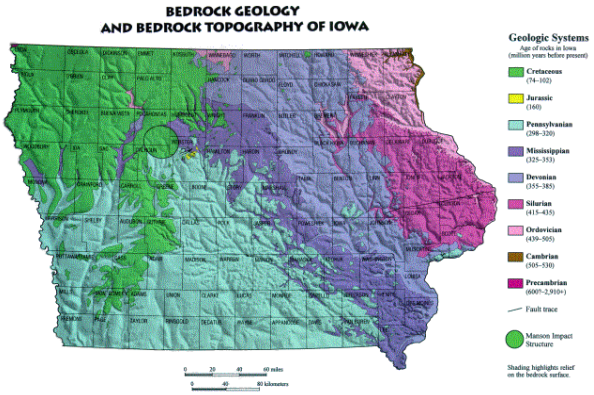
Compliance Achieved: The system is returned to compliance when it has no monitoring or MCL violations for a period of six consecutive months.

Radionuclides—567 IAC 41.8

Source of Contamination: Alpha emitters, which include radium and uranium, occur naturally in certain groundwaters in the state due to the geological formations, particularly in the deeper aquifers. Beta emitters are usually the result of manmade sources or activities.

Non-Acute MCL: Compliance with the MCL is determined from the annual average of four quarters of sampling, either four separately analyzed samples or four temporally composited aliquots.

Health Effects: Radionuclide contaminants may cause cancer.



Map courtesy of IDNR Geological Survey

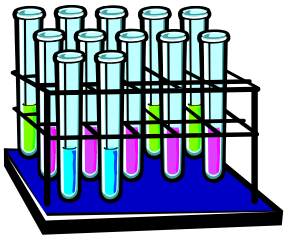
Violation: A PWS incurs a violation when the MCL is exceeded in the average of the required samples.

Compliance Achieved: The system is returned to compliance when it has no monitoring or MCL violations for a period of six consecutive months.

Disinfectants—567 IAC 43.6

Disinfectants are chemicals added to the drinking water during treatment to provide disinfection at the treatment plant and in the distribution system. They are regulated by a maximum residual disinfectant level, MRDL, which is the maximum amount of disinfectant allowed in the system.

Health Effects: Health effects for chlorine and chloramines include irritating effects to the eyes and nose, stomach discomfort, and (chloramine only) anemia. Chlorine dioxide can cause nervous system effects and anemia. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL.



Non-Acute MRDL: Compliance with the chlorine and chloramine maximum residual disinfectant level (MRDL) is determined from the annual average of twelve months of sampling. Compliance with the chlorine dioxide maximum residual disinfectant level is determined from the comparison of the source/entry point and distribution system samples to the MRDL. Chlorine dioxide can be either an acute (found in the distribution system above the MRDL) or a non-acute health risk (only found at the treatment plant above the MRDL), depending upon the duration and location of the elevated levels in the system.

Violation: A system incurs a violation for chlorine or chloramines when the MRDL is exceeded in the annual average of the required samples. A non-acute violation is incurred for chlorine dioxide when the source/entry point sample exceeds the MRDL for two consecutive days and the distribution system samples are all below the MRDL.

Compliance Achieved: The system is returned to compliance when all results are below the MRDL for a period of six consecutive months, and all samples are collected as directed.

Action Level and Treatment Technique Requirements

Certain systems are required to meet action level and treatment technique requirements. All NTNC and CWS systems are required to comply with the lead and copper action levels. All systems using surface water or influenced groundwater are required to comply with the treatment techniques.

In this section, the requirements for each group of contaminants are described, including the type of violation, common sources of contamination, specific health effects, how a violation is incurred, and how the system returns to compliance. If the drinking water from these systems meets the stated requirements, it is considered to be safe.

Action Level (AL) Requirements

Lead/Copper Action Levels—567 IAC 41.4

Action Level Exceedance: Lead and copper are regulated by action levels (AL) rather than MCL standards. Compliance with the action level is based upon the number of samples collected. The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period is greater than 0.015 mg/L (i.e., if the "90th percentile" lead level is greater than 0.015 mg/L). The copper action level is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during any monitoring period is greater than 1.3 mg/L (i.e., if the "90th percentile" copper level is greater than 1.3 mg/L). If the action level at the 90th percentile is exceeded for either lead or copper, it represents a long-term risk to health.

Source of Contamination:

- Lead is a common metal found in lead-based paint, household dust, and certain types of pottery, porcelain, and pewter. It can be found in drinking water due to leaching from lead pipes, from lead solder on indoor plumbing, or from brass faucets and fixtures.
- Copper is often used to plumb residential and commercial structures that are connected to water distribution systems. Leaching of copper from these sources can result in contamination of the drinking water.

Health Effects: Lead builds up in the body over many years and can cause damage to red blood cells and kidneys, as well as damage to the brain, causing mental retardation. Copper at high levels can cause stomach and intestinal distress, liver and kidney damage, and anemia.

Violation: A PWS is out of compliance when the action level is exceeded for either lead or copper in any one compliance period, assigned either as a six-month, annual, or triennial requirement. Once the action level is exceeded, the PWS must collect water quality parameters, develop a corrosion control treatment study, implement steps to control the corrosion in the water, and collect additional samples to demonstrate return to compliance with the action level standard.

Compliance Achieved: A system is returned to compliance when the sample results for two compliance periods are below the action levels for both lead and copper. This can take several years to accomplish due to the time needed to refine corrosion control processes, which is then followed by a year of sampling. Those results must below the action level before the violation is considered to be compliance achieved.

Treatment Technique Requirements (TT)

EPA established treatment techniques in lieu of MCLs to control unacceptable levels of some contaminants. If a system using surface water or influenced groundwater exceeds the turbidity limit, does not meet the residual disinfectant requirements, or does not meet the disinfection contact time ratio (CT), that system incurs a treatment technique violation. The violation could be either an acute or non-acute violation, depending upon the specific situation.

Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule, and Long-term 1 Enhanced Surface Water Treatment Rule—567 IAC 43.5, 43.9, and 43.10

This rule establishes criteria under which water systems supplied by surface water (SW) or groundwater under the direct influence of surface water (IGW), must filter and disinfect the water during the treatment process. These required treatment techniques are in addition to the other requirements of groundwater systems. All SW/IGW systems have filtration treatment in Iowa.

Treatment Techniques: For purposes of this report, treatment techniques are specified for SW/IGW systems to reduce or remove contaminants that must be monitored at the system and cannot be feasibly or economically measured in a laboratory. The definition of a treatment technique is a treatment process that leads to a reduction in the level of a contaminant sufficient to meet drinking water standards. Examples of treatment techniques for SW/IGW systems are turbidity removal, disinfectant residual maintenance, and sufficient disinfectant contact time.

Turbidity—567 IAC 43.5 and 43.9

Treatment Technique: All SW/IGW systems, regardless of size, must meet the treatment techniques for turbidity. Turbidity (or cloudiness) of drinking water is a measure of the minute particles suspended in the water that can interfere with disinfection and testing for bacteria. It can also prevent maintenance of an effective disinfectant residual throughout the distribution system. Systems are required to remove 99% (2-log) of the *Cryptosporidium* oocysts through filtration. In addition, systems using conventional or direct filtration must meet the following two treatment techniques for turbidity:

- the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, and
- no single sample result may exceed 1 NTU.

Sources of Contamination: The major source of turbidity contamination is soil runoff.
Health Effects: Turbidity by itself has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms such as bacteria, viruses, and parasites such as *Giardia lamblia* and *Cryptosporidium* that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches and can result in death.
Violation: A PWS incurs a treatment technique violation when either standard is exceeded in any month.
Compliance Achieved: A system is returned to compliance when turbidity results consistently meet the standards.

Residual Disinfectant (minimum)—567 IAC 43.5

All SW/IGW systems must provide disinfection to provide inactivation or removal of 99.9% *Giardia lamblia* cysts and 99.99% viruses. The chlorine residual in drinking water is a measure of the amount of available

chlorine in the water. It also allows the maintenance of an effective disinfectant agent throughout the distribution system.

- The disinfectant entering the distribution system cannot be lower than 0.3 mg/L free residual chlorine for more than four hours.
- The disinfectant within the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, cannot be undetectable in more than 5% of the samples each month for any 2 consecutive months. This also applies to heterotrophic plate counts (HPC) which can be measured in lieu of disinfectant monitoring. The HPC must be less than or equal to 500 colony forming units per milliliter of sample in order to have acceptable disinfectant residual.

CT Ratio—567 IAC 43.5

All SW/IGW systems must determine their CT value on a daily basis.

- The CT in drinking water is determined by multiplying the disinfectant concentration by the amount of time that the disinfectant is in contact with the water. Each system must achieve a specific CT prior to the treated water entering the water distribution system. The amount of CT required depends on water quality parameters, which include the pH and temperature of the water.
- Insufficient CT can allow disease-causing organisms such as *Giardia lamblia* or viruses to survive and thereby be distributed throughout the system.

Health Effects: CT has no health effects, however, insufficient CT levels can allow disease-causing organisms that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches to survive and enter the distribution system.

Violation: A system incurs a treatment technique violation when the CT ratio or residual disinfectant requirement is insufficient.

Compliance Achieved: A system is returned to compliance when the CT ratio is sufficient and the residual disinfectant requirements have been met. The violation could be returned to compliance in the following month, or the time period could be longer, depending upon the action needed to correct the violation.

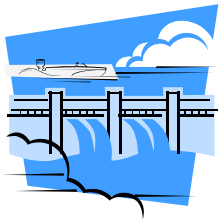
Disinfection Byproduct Precursor Removal—567 IAC 43.6

All SW/IGW systems using conventional filtration treatment must determine the removal percentage of disinfection byproduct precursors (organic carbon) on a monthly basis. Failure to remove an adequate percentage is a treatment technique violation. There are alternative compliance criteria that may be used by the system if it is unable to remove the required percentage of total organic carbon. Compliance is determined on running annual average.

Health Effects: Total organic carbon has no health effects, however, it provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes and haloacetic acids. Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver, or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer.

Violation: A system incurs a treatment technique violation when the precursor removal percentage is insufficient, and an alternative compliance criteria cannot be used.

Compliance Achieved: A system is returned to compliance when it can meet the precursor removal requirements.



Violation Data for Health-based Standards: MCL, MRDL, AL, and TT

In 2005, approximately 2.50 million people received water served by Iowa public water supply systems that complied with all health-based standards, including MCL, MRDL, AL, and TT standards. In 2005, 89.6% of the population served by community public water supply systems received water that met all drinking water standards adopted by the department. This was a 1.3% improvement from 2004, but didn't meet the 2005 goal of 95 percent. The disinfection byproducts violations of the Stage 1 Disinfectants/Disinfection Byproducts Rule, effective in 2004, occurred in several CWS for the first time in 2005. Without those violations, the compliance rate for CWS would have been 92.9%.

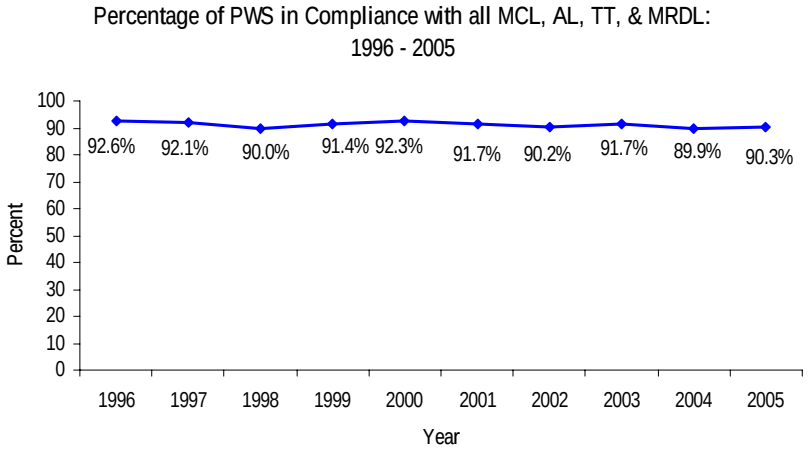
Of the 2,047 regulated PWSs in Iowa, 90.3% were in compliance with all MCL, MRDL, AL, and TT standards. There were 198 PWSs that had at least one violation of an MCL, AL, or TT standard. There were no MRDL violations in 2005. There were 353 violations of eleven contaminants in Iowa in 2005, as indicated in the following table. The most frequent standard that was not met in Iowa is coliform bacteria, which, because all systems must monitor for coliform bacteria at least each quarter, is also the most frequently sampled contaminant in the state.

Analyte	Number of PWS	Number of Violations	Percentage of the Total Number of Violations	Number of Samples Collected in 2005	System Population*
Arsenic	1	1	0.3	252	300
Total Coliform Bacteria	105	158	44.8	52,396	88,626
Fecal Coliform Bacteria	13	16	4.5	1,358	1,007
Copper	19	22	6.2	5,359	12,429
Haloacetic Acids 5 (HAA5)	4	6	1.7	1,290	13,761
Lead	24	25	7.1	5,353	11,205
Nitrate nitrogen	19	44	12.5	3,980	80,437
Nitrite nitrogen	3	3	0.8	551	2,174
Radium 226 & 228	4	8	2.3	170	1,851
Total Trihalomethanes (TTHM)	27	67	19.0	1,292	87,873
Turbidity	2	3	0.8	Not applicable	11,117
Total:	198**	353	100%	72,001	294,967**

* The population for a system with multiple violations in a single category was only included once in this total.

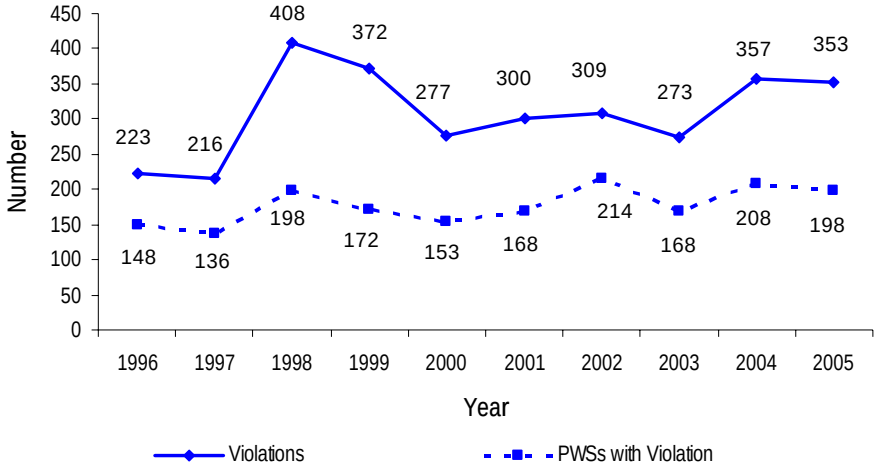
** Each PWS is only included once in the total, even though they may have multiple violations. Likewise, the population of a system is only included once in the system population, even though multiple violations may have occurred in a system.

The number of public water supply systems in compliance with all health-based standards continued a similar trend in 2005 as it has over the past decade, as shown in this chart, with the average compliance rate over the ten-year period at 91.2%. However, the number of regulations that the community systems are required to meet has increased substantially during that same time period.



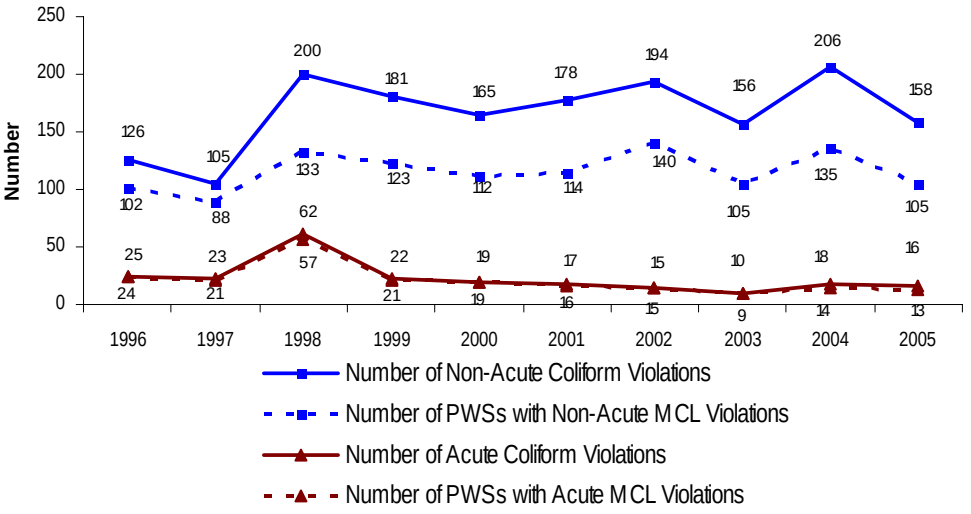
Health-Based Standards Violations: 1996 - 2005

In 2005, both the number of systems with violations of health-based standards and the number of violations decreased from 2004 although increased from 2003. The majority of the violations occurred in coliform bacteria, nitrate, and disinfection byproducts standards.



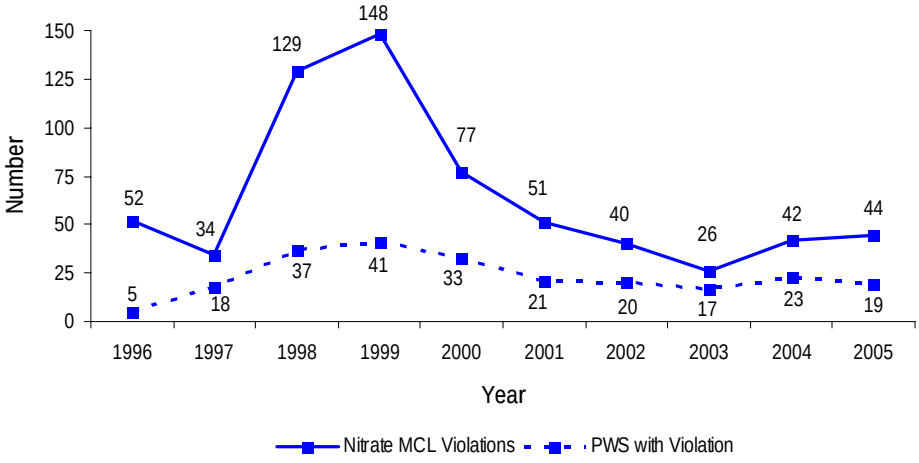
Coliform Bacteria MCL Violations: 1996 - 2005

The number of coliform bacteria MCL violations and the number of systems with those violations decreased in 2005. Acute coliform MCL violations are those that have confirmed presence of fecal coliform or *Escherichia coli*, while non-acute coliform MCL violations are those with confirmed coliform bacteria presence that is not of fecal origin.



Nitrate MCL Violations: 1996 - 2005

The number of nitrate MCL violations increased from 2004, although the number of systems with violations decreased. In 2005, there were 7 CWS that had 21 violations; 1 NTNC with 1 violation; and 11 TNC with 22 violations.



Major Monitoring & Reporting Violations

Monitoring and Reporting (M/R) violations for this report were based on the guidelines briefly described in the next table. EPA deems these violations to be classified as major violations. Minor monitoring violations are those in which at least some of the required monitoring was completed. They are not listed in this report. Systems are assigned the monitoring requirements for each contaminant in an operation permit that is issued at least every three years. The monitoring requirements vary by contaminant, from sampling every four hours (turbidity) to sampling once every nine years (inorganic chemicals). The specific requirements are listed in the Iowa Administrative Code (567) Chapters 41, 42, and 43.

Monitoring Guidelines by Rule:

Rule	Violation Type	Description
Total Coliform Rule	M/R, Routine Major	No samples collected during a compliance period
	M/R, Repeat Major	No follow-up samples collected after a positive sample
Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule, and Long-term 1 Enhanced Surface Water Treatment Rule	M/R, Routine Major	Collected less than 10% of samples required during a compliance period
Lead and Copper Rule	M/R Routine Tap	Failure to collect the initial tap samples followed by a failure to correct that omission within 3 months for large systems, 6 months for medium systems, and 12 months for small systems, or the failure to submit the associated report.
	M/R Routine Tap	Failure to collect any required samples.
Phase I, II, IIB, and V Rules (Inorganic and organic chemicals)	Regular Monitoring	Failure to collect any required samples
Stage 1 Disinfectants & Disinfection Byproducts Rule	M/R, Routine Major	Failure to collect any required samples
Radionuclides	M/R, Routine Major	Failure to collect any required samples
Any Inorganic or Organic Chemical	Confirmation/Check Major	Failure to collect the required confirmation sample.

Out of Compliance: A violation is incurred when the PWS fails to collect, have analyzed, and report the required number of samples in any one compliance period. One violation is issued for each analyte when samples are not collected, analyzed, and reported in accordance with the system's operation permit.

Compliance Achieved: A system is returned to compliance when the samples are collected and the results are reported to the IDNR.

Major Monitoring and Reporting (M/R) Violation Data

Almost 2.6 million people received water served by Iowa's systems that met the major monitoring and reporting requirements. Of the 2,047 regulated PWSs in Iowa, 81.2% (1,662 PWSs) were in compliance with all major monitoring and reporting requirements. There were 385 PWSs serving a total population of 277,231 that incurred 1,024 monitoring and reporting violations in 2005. The IDNR assigns violations by contaminant for each system, which can result in a single system incurring several monitoring violations.

Listed below are the contaminants with a major monitoring or reporting violation in 2005. The majority of violations were for failure to collect coliform bacteria samples (38.0%), failure to collect nitrate samples (19.1%), and failure to collect VOC samples (11.2%). Coliform bacteria and nitrate are the two contaminants that are required to be sampled by all systems.

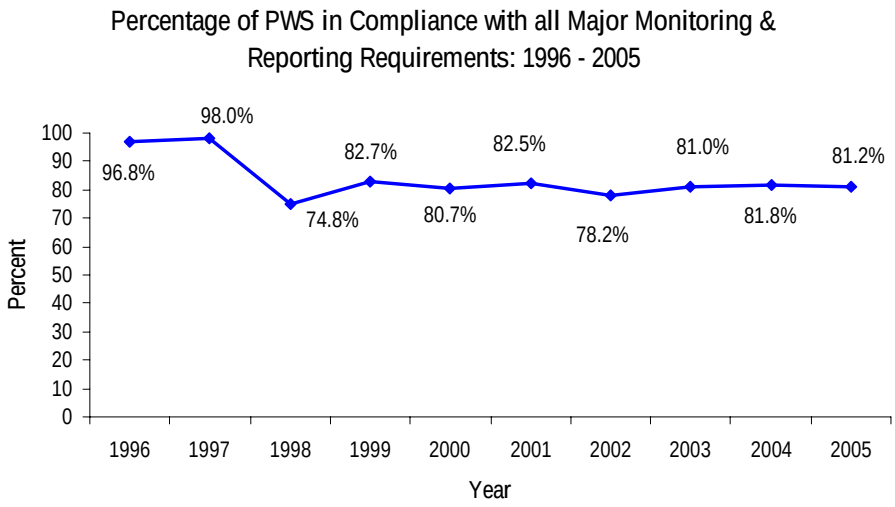
Contaminant	Number of PWS	Number of Violations	Population Affected *
MONITORING			
Antimony	4	8	1,259
Arsenic	6	11	1,918
Barium	4	8	1,259
Cadmium	4	8	1,259
Chlorine	27	47	66,327
Chromium	4	8	1,259
Coliform Bacteria, Total	221	356	40,461
Copper	17	17	3,193
Fluoride	6	10	1,599
Gross alpha, excluding radon & uranium	3	3	5,878
Haloacetic Acids (5)	23	23	12,662
Lead	17	17	3,193
Mercury	4	8	1,259
Nitrate	124	179	58,669
Nitrite	14	18	3,189
Radium 226 & 228	5	6	6,074
Selenium	4	8	1,259
Sodium	9	13	17,715
SOC (synthetic organic chemicals)	3	49	1,040
SWTR/IESWTR/LT1	2	4	2,511
Thallium	4	8	1,259
Total Trihalomethanes	24	24	12,711
VOC (volatile organic chemicals)	3	105	1,316
Monitoring Total:	333**	938	200,047**
REPORTING			
Failure to provide consumer confidence report	35	35	40,906
Failure to submit monthly operation report	7	9	8,579
Failure to obtain a construction or operation permit	6	6	25,982
Failure to obtain a certified operator	27	27	9,962
Failure to comply with a compliance schedule	8	8	2,554
Failure to conduct Lead public education	1	1	493
Reporting Total:	81**	86	87,442**
Monitoring & Reporting Total:	385**	1,024	277,231**

* The population of each PWS is only counted once for each contaminant.

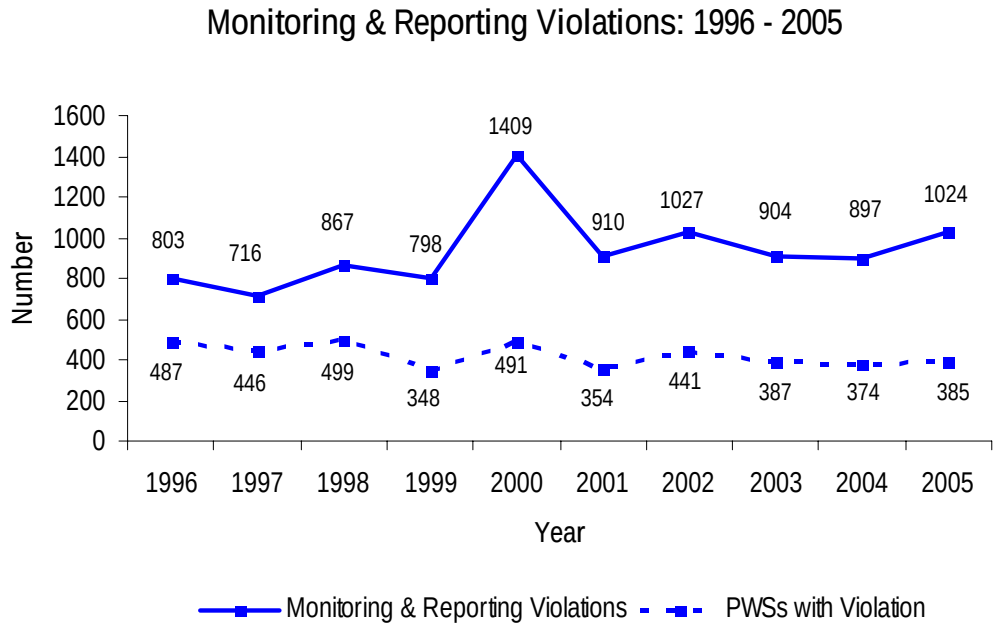
**Each system with a violation is only included once in the number of systems total and the affected population total. To summarize, 385 systems had a total of 1,024 major monitoring or reporting violations, affecting a total population of 277,231.

Monitoring & Reporting Compliance Rates: 1996 - 2005

The number of public water supplies in compliance with all major monitoring and reporting requirements has fluctuated between 74.8% and 82.7% over the past eight years. The first two years of this report only included major significantly non-compliant systems, which are a subset of the systems with a major monitoring and reporting violations, and is not fully comparable to the more inclusive data reported since 1998. This chart indicates the percentage of PWS in compliance with all major monitoring and reporting requirements, which was 81.2% in 2005.



In 2005, the number of systems with monitoring and reporting violations remained steady from the past two years, while the number of violations increased by 127 from 2004. Although this can be influenced by the fluctuation of monitoring schedules over a several year period, the increase in 2005 can be mostly attributed to three systems that did not collect VOC or SOC samples, which contributed 154 violations to the total.



Enforcement Actions

Any time a system incurs a violation, enforcement actions are taken. All systems are issued a notice of violation (NOV), which requires that the public be notified about the violation and any possible health effects. Operation permits are used to list the monitoring and reporting requirements, and also any compliance schedule that the system must meet in order to remedy a violation. The operation permit is termed a "bilateral compliance agreement", because the system has a legal right to appeal the document for 30 days, after which time it is binding.

If a system is unable or unwilling to mitigate a violation, an administrative order (AO) is the next enforcement action. An AO may be issued with a monetary penalty, or more commonly, without a monetary penalty. The next level of escalation in enforcement actions is to refer the system to the Iowa Attorney General for enforcement.

All violations remain "open" until the system satisfies the requirements to return it to compliance. In the case of a monitoring violation, returning to compliance may be as simple as collecting the sample that was missed and conducting public notification. In the case where a system has an ongoing health-based standard violation, the system may have to install treatment processes to be able to successfully remove the contaminant from the water. These types of situations can take many months to remedy, and the system is required to conduct public notification at intervals throughout the time period when they are not in compliance with the health standard.

IDNR tracks the corrective actions for all violations at all PWSs. All violations and corrective actions are reported to EPA. When the criteria for compliance are met, the specific violation is coded "Compliance Achieved". Failure to achieve compliance in a timely manner may result in the issuance of an administrative order. These are the most commonly used enforcement actions:

- NOV issued: A notice of violation has been issued to the system by the department.
- PN requested: Public notification for the violation must be done by the system.
- PN received: Public notification has been done by the system and a copy has been received by the department.
- BCA issued: A bilateral compliance agreement between the system and the department has been issued.
- AO w/Penalty: An administrative order with a penalty has been issued by the department.
- AO w/o Penalty: An administrative order without a penalty has been issued by the department.
- AG Case Referred: The system has been referred to the Attorney General's Office for enforcement action.
- Compliance Achieved: The system is now in compliance and the specific violation is "closed".

Most violations have a predefined set of enforcement actions, which include the following four actions at a minimum: notice of violation issued, public notification requested, public notification received, and compliance achieved. Once the PWS has successfully met the compliance achieved criteria, the system is returned to compliance in the department's computer tracking system.

Variances and Exemptions

Iowa does not use the variance and exemption allowances from EPA.

Public Notification, Lead Public Education, and Consumer Confidence Report—567 IAC Chapter 42

The SDWA requires a system to notify both the people who consume the system's water and the department whenever the following violations occur:

- a Maximum Contamination Level (MCL) has been exceeded,
- a Maximum Residual Disinfectant Level (MRDL) has been exceeded,
- a required Treatment Technique (TT) has not been achieved,
- the lead action level is exceeded in at least 10 percent of the tap water samples,
- a Compliance Schedule has not been met,
- an EPA Lifetime Health Advisory (HA) has been exceeded,
- a waterborne emergency has occurred,
- a certified operator has not been retained for CWS and NTNC systems, or
- other situations where the department determines that public notification is needed.

MCL, MRDL, or Treatment Technique Violation

To comply with the MCL, MRDL, and TT public notification requirements, the PWS must:

- notify the department within 48 hours after the violation occurred (24 hours for acute violations);
- notify the consumers by the required public notification procedures; and
- provide proof of such public notice including a certification to the department.

Monitoring or Reporting Violation

All PWSs must issue public notification for failure to:

- monitor and report the required data to the department;
- comply with established testing procedures; or
- meet the public notification requirements.

Public Education for a Lead Action Level Exceedance

A PWS must notify the IDNR and the population served by the PWS when the 90th percentile exceeds the action level for lead. This lead public education requires that mandatory language be provided to the consumers every twelve months as long as the action level is exceeded, in the following forms:

- newspaper announcement;
- pamphlets and brochures to doctors, clinics, schools, daycare facilities, etc.;
- attachments to customers' water bills;
- a notice printed directly on the water bill; and
- a public service announcement must be issued to television and radio for broadcasting.

In addition to the annual notice, a public service announcement must be issued every six months to local television and radio broadcast outlets.

Consumer Confidence Reports

All CWS must notify the public by July 1 of every year with information on the quality of the water delivered by the system in the previous calendar year, and to characterize the risks (if any) from exposure to contaminants in the drinking water. This report, called a Consumer Confidence Report (CCR) or a Water Quality Report, must be prepared by each CWS and made available to their public. The CCR must include the following information:

- source water information;
- definitions of terms used in the report;
- information on detected contaminants (if any were detected), including mandatory language and additional health information where applicable; and,
- whether the system is not in compliance with any other requirement, including monitoring, public notification, operation, administrative order, or operator certification.

Each CWS must mail or otherwise directly deliver one copy of the report to each customer. Mailing waivers are issued to CWS having fewer than 10,000 persons, provided the system had no violations for the covered calendar year. A CWS serving fewer than 500 persons and having a mailing waiver is allowed to publicly post their CCR.

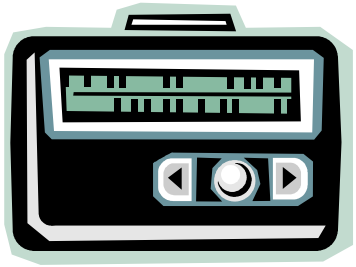
In 2005, 35 CWS failed to prepare and distribute their CCR for calendar year 2004. Each CWS received a reporting violation for this failure. The compliance rate for Iowa's CWS with the CCR requirements in 2005 was 97.0%.

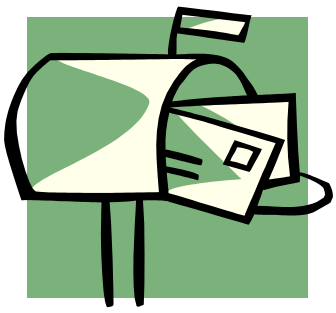
Health Effects

If a public notification or public education requirement is not met, the public health is placed at risk because the public is unaware of the potential health effects of the water being consumed. Children, pregnant women, the elderly, and persons with compromised immune systems are at the greatest risk from most contaminants.

Public Notification or Public Education Violation

A system is in violation of the public notification or public education rules when it does not issue public notification specific to its violation and does not provide proof of notification to the IDNR. A system is returned to compliance when it publishes the appropriate public notification or public education language within the required amount of time and provides the proof to the IDNR.





Operator Certification—567 IAC Chapter 81

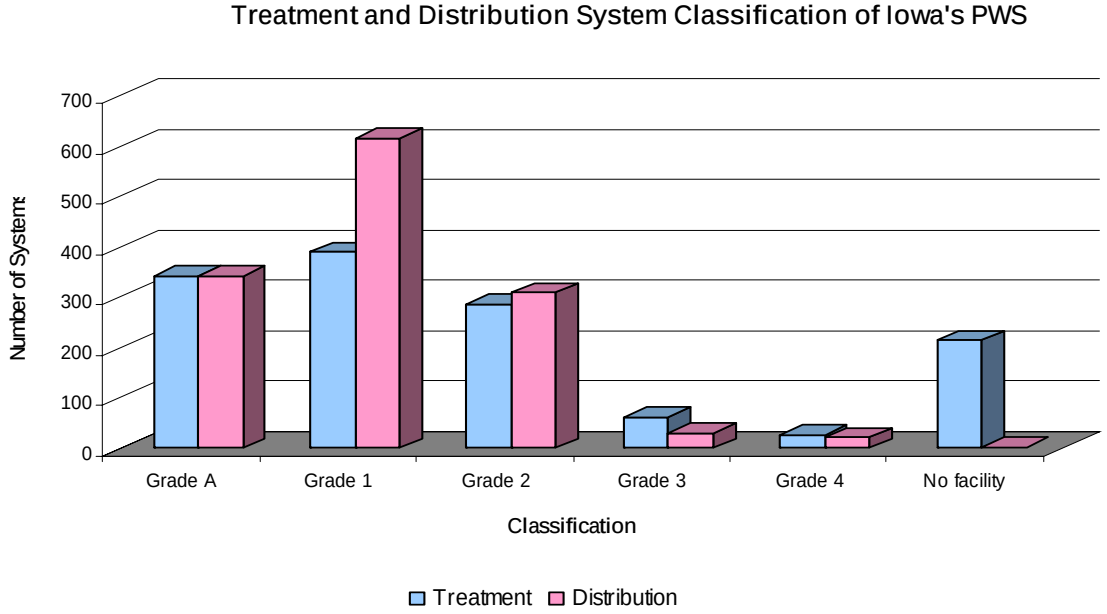
All CWS and NTNC are required to have a certified operator in direct responsible charge of the water treatment and water distribution systems. The operators must be certified by the department at the same classification of the plant or water distribution system at a minimum.

The Iowa Operator Certification Program reporting time frame is July 1 through June 30. For the certification year of July 1, 2005 through June 30, 2006, the program efforts included:

- accessibility of the operator certification database to all DNR drinking water program staff,
- continued implementation of the new certified operator requirements for community and nontransient noncommunity water supplies, and
- soliciting bids and monitoring contracts for operator training.

Classification of Systems and Facilities

All CWS and NTNC were required in 2002 to designate a certified operator in direct responsible charge of the water treatment and water distribution systems. The facilities are classified according to complexity, with Grade 4 being the most complex. Listed below are the Iowa CWS and NTNC systems in all classification levels, as of May 25, 2006.



Classification	Treatment Facility	Distribution Facility
Grade A	343	343
Grade 1	391	617
Grade 2	286	310
Grade 3	62	31
Grade 4	26	21
No facility	214	1
Total	1322	1322

Classification Grades for Operator Certification

The Iowa Operator Certification program is predicated on three principles: Education, Experience, and Examination. A certified drinking water operator in Iowa must meet these requirements:

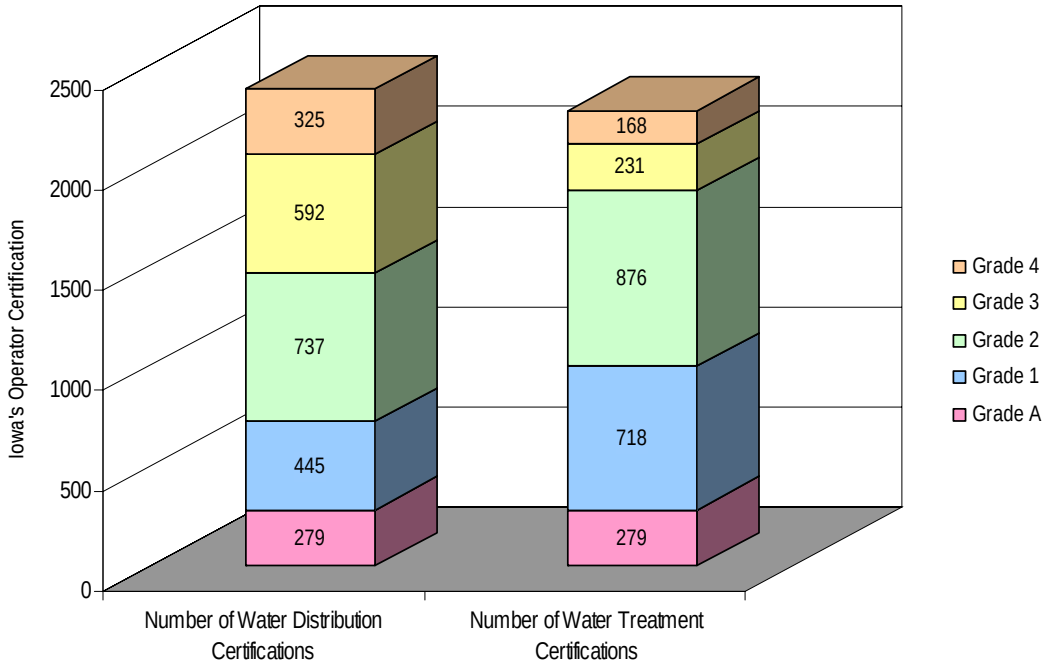
1. Meet the initial education and experience requirements and pay the examination fee
2. Successfully pass the examination for the specific type of certification
3. Maintain the certification by successfully attaining the required continuing education credits during each two-year certification period and paying the bi-annual certification fee

The requirements are based upon the level of complexity of the various facility grades, with Grade A being the least complex and Grade 4 being the most complex.

In 2005, there were 279 small system Grade A certifications, which is a substantial increase over the 2004 level of 219 small system Grade A certifications. Grade A certification includes both water treatment and water distribution. In this reporting period, there were 2,099 active water distribution certifications and 1,993 active water treatment certifications, both of which increased from 2004 levels.

Certification Grade	Number of certified Water Distribution Operators	Number of certified Water Treatment Operators
Grade A	279 (combined WT and WD)	
Grade 1	445	718
Grade 2	737	876
Grade 3	592	231
Grade 4	325	168

The following chart depicts the makeup of the two types of drinking water certifications. Note that Grade A is included in both certifications, since it is a combined water distribution and water treatment certification.



Enforcement

Compliance actions were directed at 27 public water supply systems that failed to have a certified operator in charge of their water supply. The certification for water treatment and water distribution was revoked from the license of one operator during this reporting period.

Certification Renewal

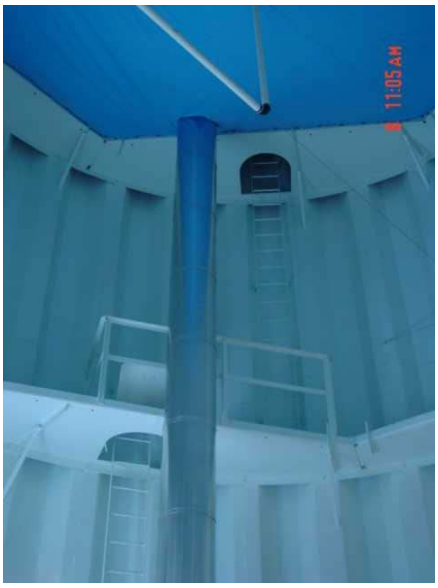
Operator certifications are renewed every two years, with the next renewal period ending in June 30, 2007. Continuing education requirements must be met by March 31, 2007 in order for the operator to renew for the next period. Operators holding a Grade A, 1 or 2 certification are required to earn 1.0 continuing education unit (10 contact hours). Operators holding a Grade 3 or 4 certification must earn 2.0 continuing education units (20 contact hours).

Shown below are various components of water treatment and distribution systems in Iowa.

Pump & pipe gallery

Contact basin

Office with computerized remote system-wide monitoring capability (typically called a SCADA system, or *Supervisory Control And Data Acquisition* system).



Interior of an elevated water storage tower

Abbreviations

AG	Attorney General of Iowa
AL	action level
AOP	administrative order with penalty
AOWP	administrative order without penalty
BCA	bilateral compliance agreement
CCR	consumer confidence report
CT	contact time
Cu	chemical symbol for copper
CWS	community public water supply
EPA	U.S. Environmental Protection Agency
FDA	U.S. Food and Drug Administration
GW	groundwater
IGW	groundwater under the direct influence of surface water
HA	Health Advisory
HAA5	haloacetic acids (5)
HPC	heterotrophic plate count
IAC	Iowa Administrative Code
IDNR	Iowa Department of Natural Resources
IOC	inorganic chemical
LSL	lead service line
MCL	maximum contaminant level
mg/L	milligrams per liter
M/R	Monitoring and Reporting
MRDL	maximum residual disinfectant level
mrem/yr	millirems per year
NOV	Notice of Violation
NTNC	non-transient non-community public water supply
NTU	nephelometric turbidity units
Pb	chemical symbol for lead
pCi/L	picocuries per liter
PE	public education for Lead
PN	public notification
PWS	public water supply system
PWSS	Public Water System Supervision (EPA program)
Rn	chemical symbol for radon
SDWA	Safe Drinking Water Act
SDWIS/FED	Safe Drinking Water Information System/Federal (EPA's electronic database)
SOC	synthetic (nonvolatile) organic chemical
SW	surface water
SWTR	Surface Water Treatment Rule
TCR	Total Coliform Rule
TNC	transient non-community public water supply
TT	treatment technique
TTHM	total trihalomethanes
U	chemical symbol for uranium
V/E	variance or exemption
VOC	volatile organic chemical
WD	water distribution
WT	water treatment
WQP	water quality parameters

Distribution of this Report

The Safe Drinking Water Act requires both summary and detailed reports from the State be accessible to the U.S. EPA, the Governor of Iowa, and the public. The following options are utilized to make this report readily available to the public.

The IDNR sends the detailed report to the:

- EPA Headquarters in Washington, DC,
- EPA Region 7 Headquarters in Kansas City, KS, and
- Office of the Governor of Iowa.

The IDNR also:

- publishes an official notice of report availability,
- includes the report on the IDNR Internet website and makes it available for downloading, and
- makes the detailed and summary report available for individuals and organizations upon request.

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APPENDIX A: EPA Violations Summary Report

The EPA Violations Summary Report listed in this appendix is a numerical total of the violations of each contaminant required under the SDWA and is a required report element. This report lists the number of violations of each contaminant categorized by both MCL/MRDL/TT Violations and major federal Monitoring & Reporting Violations. State violations, such as failure to obtain an operation permit, are not included in this summary report.

Legend

Column (from left to right)	Description of Heading
1	The first column identifies the contaminant name
2	The second column identifies the MCL for that contaminant
3	The third column identifies the number of MCL violations for that contaminant
4	The fourth column identifies the number of PWSs with MCL violations for that contaminant
5	The fifth column identifies the number of TT violations
6	The sixth column identifies the number of PWSs with TT violations
7	The seventh column identifies the number of M/R violations for that contaminant
8	The eighth column identifies the number of PWSs with M/R violations for that contaminant

APPENDIX A: EPA VIOLATIONS SUMMARY REPORT

State: Iowa

Reporting Interval: January 1, 2005 through December 31, 2005

Organic Contaminants	MCL (mg/L)	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems with Violations	Number of Violations	Number of Systems with Violations	Number of Violations	Number of Systems with Violations
1,1,1-Trichloroethane	0.2	0	0	0	0	5	3
1,1,2-Trichloroethane	0.005	0	0	0	0	5	3
1,1-Dichloroethylene	0.007	0	0	0	0	5	3
1,2,4-Trichlorobenzene	0.07	0	0	0	0	5	3
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	0	0	0	0	0	0
1,2-Dichloroethane	0.005	0	0	0	0	5	3
1,2-Dichloropropane	0.005	0	0	0	0	5	3
2,3,7,8-TCDD (Dioxin)	0.00000008	0	0	0	0	0	0
2,4,5-TP (Silvex)	0.05	0	0	0	0	4	2
2,4-D	0.07	0	0	0	0	4	2
Acrylamide		0	0	0	0	0	0
Alachlor (Lasso)	0.002	0	0	0	0	4	2
Atrazine	0.003	0	0	0	0	4	2
Benzene	0.005	0	0	0	0	5	3
Benzo[a]pyrene	0.0002	0	0	0	0	4	2
Carbofuran	0.04	0	0	0	0	0	0
Carbon tetrachloride	0.005	0	0	0	0	5	3
Chlordane	0.002	0	0	0	0	0	0

Organic Contaminants, continued		MCLs		Treatment Techniques		Significant Monitoring/Reporting	
	MCL (mg/L)	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
cis-1,2-Dichloroethylene	0.07	0	0	0	0	5	3
Dalapon	0.2	0	0	0	0	4	2
Di(2-ethylhexyl)adipate	0.4	0	0	0	0	4	2
Di(2-ethylhexyl)phthalate	0.006	0	0	0	0	5	3
Dichloromethane	0.005	0	0	0	0	5	3
Dinoseb	0.007	0	0	0	0	4	2
Diquat	0.02	0	0	0	0	0	0
Endothall	0.1	0	0	0	0	0	0
Endrin	0.002	0	0	0	0	0	0
Epichlorohydrin		0	0	0	0	0	0
Ethylbenzene	0.7	0	0	0	0	5	3
Ethylene dibromide	0.00005	0	0	0	0	0	0
Glyphosate	0.7	0	0	0	0	0	0
Heptachlor	0.0004	0	0	0	0	0	0
Heptachlor epoxide	0.0002	0	0	0	0	0	0
Hexachlorobenzene	0.001	0	0	0	0	0	0
Hexachlorocyclopentadiene	0.05	0	0	0	0	0	0
Lindane	0.0002	0	0	0	0	0	0
Methoxychlor	0.04	0	0	0	0	0	0

Organic Contaminants, continued	MCL (mg/L)	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
Monochlorobenzene	0.1	0	0	0	0	5	3
o-Dichlorobenzene	0.6	0	0	0	0	5	3
Oxamyl (Vydate)	0.2	0	0	0	0	0	0
para-Dichlorobenzene	0.075	0	0	0	0	5	3
Pentachlorophenol	0.001	0	0	0	0	4	2
Picloram	0.5	0	0	0	0	4	2
Simazine	0.004	0	0	0	0	4	2
Styrene	0.1	0	0	0	0	5	3
Tetrachloroethylene	0.005	0	0	0	0	5	3
Toluene	1	0	0	0	0	5	3
Total polychlorinated biphenyls	0.0005	0	0	0	0	0	0
Toxaphene	0.003	0	0	0	0	0	0
trans-1,2-Dichloroethylene	0.1	0	0	0	0	5	3
Trichloroethylene	0.005	0	0	0	0	5	3
Vinyl chloride	0.002	0	0	0	0	5	3
Xylenes (total)	10	0	0	0	0	5	3
Haloacetic acids	0.060	6	4	0	0	23	23
Total trihalomethanes	0.080	67	27	0	0	24	24

Inorganic Contaminants	MCL (mg/L)	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
Antimony	0.006	0	0	0	0	8	4
Arsenic	0.010	1	1	0	0	11	6
Asbestos	7 million fibers/L (>10 µm in length)	0	0	0	0	0	0
Barium	2	0	0	0	0	8	4
Beryllium	0.004	0	0	0	0	0	0
Cadmium	0.005	0	0	0	0	8	4
Chromium	0.1	0	0	0	0	8	4
Cyanide (as free cyanide)	0.2	0	0	0	0	0	0
Fluoride	4.0	0	0	0	0	10	6
Mercury	0.002	0	0	0	0	8	4
Nitrate	10 (as Nitrogen)	44	19	0	0	179	124
Nitrite	1.0 (as Nitrogen)	3	3	0	0	18	14
Selenium	0.05	0	0	0	0	8	4
Sodium	not applicable	0	0	0	0	13	9
Thallium	0.002	0	0	0	0	8	4
Total nitrate and nitrite	10 (as Nitrogen)	NA	NA	NA	NA	NA	NA

Contaminant	MCL	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
Radionuclide Contaminants							
Gross alpha	15 pCi/L	0	0	0	0	3	3
Radium-226 and radium-228	5 pCi/L	8	4	0	0	6	5
Gross beta	4 mrem/year	0	0	0	0	0	0
Uranium	30 μg/L	0	0	0	0	0	0
Subtotal		129	54*	0	0	497	169*

*: Each system is only counted once in the subtotal category (i.e., 54 systems had 129 MCL violations and 169 systems had 497 monitoring/reporting violations).

Contaminant	MCL (mg/L)	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
Other Contaminants							
Acute Total Coliform Bacteria MCL violation	Presence	16	13	0	0	0	0
Non-acute Total Coliform Bacteria MCL violation	Presence	158	105	0	0	0	0
Major routine and follow up Total Coliform Bacteria monitoring violation		0	0	0	0	356	221
Sanitary survey		0	0	0	0	State initiates Sanitary survey	State initiates Sanitary survey
Subtotal		174	105*	0	0	356	221

*Each system is counted only once in the subtotal category, i.e., 105 systems had 174 acute and non-acute coliform bacteria violations.

Contaminant	MCL (mg/L)	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
Surface Water Treatment Rule and Interim Enhanced SWTR *							
Filtered systems *		0	0	0	0	0	0
Monitoring, routine/repeat		0	0	0	0	4	2
Treatment techniques		0	0	3	2	0	0
Unfiltered systems *		0	0	0	0	0	0
Monitoring, routine/repeat		0	0	0	0	0	0
Failure to filter		0	0	0	0	0	0
Subtotal		0	0	3	2	4	2

* All surface water and influenced groundwater systems in Iowa have filtration.

Contaminant	Action Level	Action Level Exceedance		Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
Lead and Copper Rule	Lead: 0.015 mg/L Copper: 1.3 mg/L	Lead: 25 Copper: 22	Lead: 24 Copper: 19		0	0	0
Initial lead and copper tap M/R		0	0	0	0	0	0
Follow-up or routine lead and copper tap M/R		0	0	0	0	Cu: 17 Pb: 17	Cu: 17 Pb: 17
Treatment installation		0	0	0	0	0	0
Public education		0	0	0	0	1	1
Subtotal		47	39*	0	0	35	18*

*: Each system is only counted once in the subtotal category (i.e., 39 systems had 47 ALE and 18 had 35 monitoring/reporting violations).

Contaminant	MRDL or MCL	MRDL or MCL Violations		Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations	Number of Violations	Number of Systems With Violations
Stage 1 DBPR (TTHM & HAA included under Organic Contaminants)							
Chlorine or chloramine residual	4.0	0	0	0	0	47 monitoring 9 reporting	27 monitoring 7 reporting
Chlorine dioxide	0.8 mg/L	0	0	0	0	0	0
Chlorite	1.0 mg/L	0	0	0	0	0	0
Bromate	0.010 mg/L	0	0	0	0	0	0
Total organic carbon (TOC)		0	0	0	0	0	0
Subtotal		0	0	0	0	56	25*

*: Each system is only counted once in the subtotal category (i.e., 25 systems had 56 monitoring/reporting violations).

APPENDIX B: Iowa Public Water Supply Violation Data

All public water supply systems that incurred one or more violations during 2005 are listed in the following appendix, including the most recent enforcement action. Systems that became "inactive" during the year because they no longer met the definition of a public water supply are denoted in boldface print on the table.

Legend

Item	Description
PWS Name	Business name of the Public Water System
Minimum Population Served	Population that could use the water, as reported to IDNR by the PWS. For municipal systems, it is the most recent official census.
County	County location of PWS
PWSID Number	Public Water System Identification number, a unique and dedicated number permanently assigned to each PWS
PWS Type	Classification type of PWS: community public water system (CWS), non-transient non-community system (NTNC), or transient non-community system (TNC)
Violation Number	A unique, dedicated identification number assigned to each violation as it occurs.
Analyte	The analyte that triggered the violation.
Compliance Period End Date	Date at the end of the compliance period in which the violation occurred.
Violation	The EPA-assigned text description of the violation.
Violation Type	The alphabetic code description of the violation.
Enforcement Action Date	Most recent action taken by the PWS or the IDNR in response to the violation. The final action for any violation is "Compliance Achieved", meaning the system is now in compliance.
Enforcement Action	Date the follow-up action or enforcement action occurred