DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION

SUPPLYING WATER TO THE PUBLIC

Filed with the secretary of state on July 27, 2020

These rules take effect 7 days after filing with the secretary of state.

(By authority conferred on the department of environment, Great Lakes, and energy by section 5 of the safe drinking water act, 1976 PA 399, MCL 325.1005)

R 325.10107, R 325.10116, R 325.10308b, R 325.10313, R 325.10401a, R 325.10405, and R 325.12701 of the Michigan Administrative Code are amended, and R 325.10604g, R 325.10717d, R 325.12708, and R 325.12710 are added, as follows:

PART 1. GENERAL PROVISIONS

R 325.10107 Definitions; P, R.

Rule 107. As used in these rules:

(a) "Permit" means a public water supply construction permit that is issued to a supplier of water by the department under section 4 of the act, MCL 325.1004.

(b) "Person" means an individual, partnership, copartnership, cooperative, firm, company, public or private association or corporation, political subdivision, agency of the state, agency of the federal government, trust, estate, joint structure company, or any other legal entity, or their legal representative, agent, or assignee.

(c) "PFAS" means per- and polyfluoroalkyl substances.

(d) "Pitless adapter" means a device or assembly of parts that permits water to pass through the wall of a well casing or extension of a well casing and that provides access to the well and to the parts of the system within the well in a manner that prevents the entrance of contaminants into the well and the water produced.

(e) "Plans and specifications" means drawings, data, and a true description or representation of an entire waterworks system or parts of the system as it exists or is to be constructed, and a statement of how a waterworks system must be operated.

(f) "Plant intake" means the works or structures at the head of a conduit through which water is diverted from a source, for example, river or lake, into the treatment plant.

(g) "Point-of-entry treatment device (POE)" means a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

(h) "Point-of-use treatment devise (POU)" means a treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water at that 1 tap.

(i) "Political subdivision" means a city, village, township, charter township, county, district, authority, or portion or combination of any of the entities specified in this subdivision.

(j) "PQL" means the practical quantitation levels. The PQL is the lowest concentration that can be reliably achieved by well-operated laboratories within specified limits of precision and accuracy during routine laboratory operating conditions.

(k) "Presedimentation" means a preliminary treatment process used to remove gravel, sand, and other particulate material from the source water through settling before the water enters the primary clarification and filtration processes in a treatment plant.

(l) "Production well" means a well that has been approved for use for a public water supply pursuant to part 8 of these rules.

(m) "Public hearing" means a hearing that is conducted by the director of the department on matters relating to the functions and responsibilities of the division and that seeks public input relevant to such functions and responsibilities.

(n) "Public water supply" or "public water system" means a waterworks system that provides water for drinking or household purposes to persons other than the supplier of the water, and does not include either of the following:

(i) A waterworks system that supplies water to only 1 living unit.

(ii) A waterworks system that consists solely of customer site piping.

(o) "Pumping water level" means the distance measured from an established datum at or above ground level to the water surface in a well being pumped at a known rate for a known period of time.

(p) "Rated treatment capacity" means 1 or any combination of the following capacities when water treatment is practiced:

(i) Rated capacity from an approved surface water supply, ground water supply under the direct influence of surface water, or complete treatment system as contained in R 325.11006.

(ii) Firm capacity from an approved ground water supply where firm capacity means the production capability of each respective component of the waterworks system with the largest well, pump, or treatment unit out of service.

(iii) Available capacity obtained under contract and capable of delivery from another approved public water supply.

(q) "Raw water" means water that is obtained from a source by a public water supply before the public water supply provides any treatment or distributes the water to its customers.

(r) "Regional administrator" means the EPA region V administrator.

(s) "Regulated VOCs" means a group of volatile organic chemicals for which state drinking water standards have been promulgated but does not include total trihalomethanes.

(t) "Removed from service" means physically disconnected from the waterworks system in a manner that would prevent the inadvertent use of the well and would require specific authorization from the public water supply to reconnect.

(u) "Repeat sample" means a sample that is collected and analyzed in response to a previous coliform-positive sample.

(v) "Resident" means an individual who owns or occupies a living unit.

(w) "Routine sample" means a water sample that is collected and analyzed to meet the monitoring requirements for total coliform, as outlined in the written sampling plan.

R 325.10116 Addresses.

Rule 116. The following are addresses and contact information of the department and other organizations referred to in these rules:

(a) Department of Environment, Great Lakes, and Energy, Drinking Water and Environmental Health Division, 525 West Allegan Street, Post Office Box 30817, Lansing, MI 48909-8311, Telephone 800-662-9278. Internet address: http://www.michigan.gov/egle.

(b) National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Suite 400, Bethesda, Maryland 20814-3095, Telephone 301-657-2652. Internet address: http://www.ncrponline.org/.

(c) NSF International, P.O Box 130140, 789 North Dixboro Road, Ann Arbor, Michigan 48105, Telephone 734-769-8010 or 800-673-6275, email info@nsf.org, Internet address http://www.nsf.org.

(d) Superintendent of Documents, U.S. Government Publishing Office, P.O. Box 979050, St. Louis, MO 63197-9000, Telephone 202-512-1800. Internet address to purchase documents online is http://bookstore.gpo.gov.

PART 3. VARIANCES, EXEMPTIONS, AND TREATMENT TECHNOLOGIES

R 325.10308b Best available technology.

Rule 308b. (1) The department identifies the following as the best technology, treatment technique, or other means generally available for achieving compliance with the MCL:

(a) For organic contaminants in R 325.10604b, R325.10604d, and R 325.10604g the best available technologies, treatment techniques, or other means available for achieving compliance with the MCLs are granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX), as listed in table 1 of this rule.

Table 1 Best available technologies for organic contaminants

Contaminant	GAC	PTA	OX
Alachlor	x		
Aldicarb	x		
Aldicarb sulfone	x		
Aldicarb sulfoxide	x		
Atrazine	x		
Benzene	x	x	
Benzo(a)pyrene	x		
Carbofuran	x		
Carbon tetrachloride	x	x	
Chlordane	x		
Dalapon	x		
2,4 D	x		
Di (2 ethylhexyl)adipate	x	x	
Di (2 ethylhexyl)phthalate	x		

Contaminant	GAC	PTA	OX
Dibromochloropropane (DBCP)	x	x	
o Dichlorobenzene	x	x	
para Dichlorobenzene	x	x	
1,2 Dichloroethane	x	x	
1,1 Dichloroethylene	x	x	
cis 1,2 Dichloroethylene	x	x	
trans 1,2 Dichloroethylene	x	x	
Dichloromethane		x	
1,2 Dichloropropane	x	x	
Dinoseb	x		
Diquat	x		
Endothall	x		
Endrin	x		
Ethylbenzene	x	x	
Ethylene Dibromide (EDB)	x	x	
Glyphosate			x
Heptachlor	x		
Heptachlor epoxide	x		
Hexachlorobenzene	x		
Hexachlorocyclopentadiene	x	x	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	x[1]		
Lindane	x		
Methoxychlor	x		
Monochlorobenzene	x	x	
Oxamyl (Vydate)	x		
Pentachlorophenol	x		
Perfluorobutanesulfonic acid (PFBS)	x[1]		
Perfluorohexanesulfonic acid (PFHxS)	x[1]		
Perfluorohexanoic acid (PFHxA)	x[1]		
Perfluorononanoic acid (PFNA)	x[1]		
Perfluorooctanesulfonic acid (PFOS)	x[1]		
Perfluorooctanoic acid (PFOA)	x[1]		
Picloram	x		
Polychlorinated biphenyls(PCB)	x		
Simazine	x		
Styrene	x	x	
2,3,7,8 TCDD (Dioxin)	x		
Tetrachloroethylene	x	x	
Toluene	x	x	
Toxaphene	x		
2,4,5 TP (Silvex)	x		
1,2,4 Trichlorobenzene	x	x	
1,1,1 Trichloroethane	x	x	

Contaminant	GAC	PTA	OX
1,1,2 Trichloroethane	x	x	
Trichloroethylene	x	x	
Vinyl chloride		x	
Xylene	x	x	

[1]Best available technology is GAC or an equally efficient technology.

(b) For inorganic contaminants in R 325.10604c, the best available technologies, treatment techniques, or other means available for achieving compliance with the MCLs are listed in table 2 of this rule. The affordable technology, treatment technique, or other means available to supplies serving 10,000 or fewer people for achieving compliance with the maximum contaminant level for arsenic are listed in table 3 of this rule.

Table 2 Best available technologies for inorganic contaminants

Chemical name	Best available technologies
Antimony	2,7
Arsenic[4]	1,2, 5,6,7,9,11[5]
Asbestos	2,3,8
Barium	5,6,7,9
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6[2],7
Cyanide	5,7,10
Mercury	2[1],4,6[1],7[1]
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2[3],6,7,9
Thallium	1,5

[1]Best available technology only if influent Hg concentrations are 10 µg/l or less.

[2]Best available technology for chromium III only.

[3]Best available technology for selenium IV only.

[4]BATs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

[5]To obtain high removals, iron to arsenic ratio must be at least 20:1.

Key to best available technologies in table:

1 = activated alumina

2 = coagulation/filtration (not BAT for supplies with fewer than 500 service connections)

3 = direct and diatomite filtration

4 = granular activated carbon

5 = ion exchange

6 = lime softening (not BAT for supplies than 500 service connections)

7 = reverse osmosis

8 = corrosion control
9 = electrodialysis
10 = alkaline chlorination (pH greater than or equal to 8.5)
11 = oxidation/filtration

Table 3 Small supplies compliance technologies (SSCTs) for arsenic[1]

Small supply compliance technology	Affordable for listed small supply categories.[2]
Activated alumina (centralized)	All size categories.
Activated alumina (point-of-use)[3]	All size categories.
Coagulation/filtration	501-3,300, 3,301-10,000.
Coagulation-assisted microfiltration	501-3,300, 3,301-10,000.
Electrodialysis reversal	501-3,300, 3,301-10,000.
Enhanced coagulation/filtration	All size categories.
Enhanced lime softening (pH more than 10.5)	All size categories.
Ion exchange	All size categories.
Lime softening	501-3,300, 3,301-10,000.
Oxidation/filtration[4]	All size categories.
Reverse osmosis (centralized)	501-3,300, 3,301-10,000.
Reverse osmosis (point-of-use)[3]	All size categories.

[1] SSCTs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

[2]Three categories of small supplies are: (i) those serving 25 or more, but fewer than 501, (ii) those serving more than 500, but fewer than 3,301, and (iii) those serving more than 3,300, but fewer than 10,001.

[3]POU must not be used to obtain a variance.

[4]To obtain high removals, iron to arsenic ratio must be at least 20:1.

(c) For radionuclide contaminants in R 325.10603, the best available technologies, treatment techniques, or other means available for achieving compliance with the MCLs are listed in table 4 for all size supplies. The affordable technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level are listed in table 5 for supplies serving 10,000 or fewer people as categorized in table 6.

Table 4 Best available technologies for radionuclide contaminants

Contaminant	Best available technologies.
Combined radium 226 and radium 228	Ion exchange, reverse osmosis, lime softening.
Uranium	Ion exchange, reverse osmosis, lime softening, coagulation/filtration.
Gross alpha particle activity (excluding radon and uranium)	Reverse osmosis.
Beta particle and proton radioactivity	Ion exchange, reverse osmosis.

Table 5 List of small supplies compliance technologies for radionuclides and limitations to use

Unit Technologies	Limitations (see footnotes)	Operator skill level required *	Raw water quality range and considerations.
1. Ion exchange	(a)	Intermediate	All ground waters.
2. Reverse osmosis (RO)	(b)	Advanced	Surface waters usually require pre-filtration.
3. Lime softening	(c)	Advanced	All waters.
4. Green sand filtration	(d)	Basic	
5. Co-precipitation and Barium sulfate	(e)	Intermediate to Advanced	Ground waters with suitable water quality.
6. Electrodialysis/ electrodialysis reversal	Not applicable	Basic to intermediate	All ground waters.
7. Pre-formed hydrous Manganese oxide filtration.	(f)	Intermediate	All ground waters.
8. Activated alumina	(a), (g)	Advanced	All ground waters; competing anion concentrations may affect regeneration frequency.
9. Enhanced coagulation/ filtration	(h)	Advanced	Can treat a wide range of water qualities.

* An operator with a basic skill level has minimal experience in the water treatment field and can perform the necessary system operation and monitoring if provided with proper instruction. The operator is capable of reading and following explicit directions. An operator with an intermediate skill level understands the principles of water treatment and has a knowledge of the regulatory framework. The operator is capable of making system changes in response to source water fluctuations. An operator with an advanced skill level possesses a thorough understanding of the principles of system operation. The operator is knowledgeable in water treatment and regulatory requirements. The operator may, however, have advanced knowledge of only the particular treatment technology. The operator seeks information, remains informed, and reliably interprets and responds to water fluctuations and system intricacies.

Limitations Footnotes: Technologies for Radionuclides:

a. The regeneration solution contains high concentrations of the contaminant ions. Disposal options must be carefully considered before choosing this technology.

b. Reject water disposal options must be carefully considered before choosing this technology.

c. The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small surface water systems.

d. Removal efficiencies may vary depending on water quality.

e. This technology may be very limited in application to small systems. Since the process requires static mixing, detention basins, and filtration, it is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.

f. This technology is most applicable to small systems that already have filtration in place.

g. Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems without an adequately trained operator.

h. Assumes modification to a coagulation/filtration process already in place.

Table 6 Compliance technologies by supply size category for radionuclide Requirements

Contaminant	Compliance technologies* for supply size categories (population served)		
	25-500	501-3,300	3,301 – 10,000
1. Combined radium 226 and radium 228	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7
2. Gross alpha particle activity	2	2	2
3. Beta particle activity and photon activity	1, 2	1, 2	1, 2
4. Uranium	1, 8, 9	1, 2, 3, 8, 9	1, 2, 3, 8, 9

* Numbers correspond to those technologies listed in Table 5 of this rule.

(2) The department shall require community water supplies and nontransient, noncommunity water supplies to employ a treatment method identified in subrule (1) of this rule as a condition for granting a variance, except as provided in subrule (3) of this rule. If, after the treatment method is installed in the system, the supply cannot meet the MCL, then the supply is eligible for a variance under this part and section 20 of the act, MCL 325.1020.

(3) If a supply demonstrates through comprehensive engineering assessments, which may include pilot plant studies, that the treatment methods identified in subrule (1) of this rule may only achieve a de minimis reduction in contaminants, then the department may issue a schedule of compliance that requires the supply being granted the variance to examine other treatment methods as a condition of obtaining the variance.

(4) If the department determines that a treatment method identified in subrule (3) of this rule is technically feasible, then the department may require the supply to use that treatment method in connection with a compliance schedule issued under section 20 of

the act, MCL 325.1020. The department's determination must be based on studies by the supply and other relevant information.

(5) The department may require a community or noncommunity supply to use point-of-use devices, point-of-entry devices, or other means as a condition of granting a variance or an exemption from the requirements of R 325.10603, R 325.10604b, R 325.10604c, R 325.10604d, or R325.10604g to avoid an unreasonable risk to health. The department may require a public water supply to use point-of-use devices or other means, but not point-of-entry devices, as a condition for granting an exemption from corrosion control treatment requirements for lead and copper in R 325.10604f(2) and (3) to avoid an unreasonable risk to health. The department may require a public water supply to use point-of-entry devices as a condition for granting an exemption from the source water and lead service line replacement requirements for lead and copper under R 325.10604f(4) and (5) to avoid an unreasonable risk to health, provided the supply demonstrates that the device will not cause an increased corrosion of lead and copper bearing materials located between the device and the tap that may increase contaminant levels at the tap.

(6) Community or noncommunity water supplies that use point-of-use or point-of-entry devices under this rule shall meet the conditions in R 325.10313.

R 325.10313 Criteria for water supplies using POE, or POU, or both.

Rule 313. (1) Community and noncommunity water supplies shall not use point-of-use devices (POU) or point-of-entry devices (POE) except as required by the department under R 325.10308b or under all of the following provisions with department approval:

(a) Community water supplies may use POE to comply with the maximum contaminant level or treatment technique for organic, inorganic, and radiological contaminants.

(b) Noncommunity water supplies may use POU, or POE, or both, to comply with maximum contaminant levels or treatment techniques for organic and inorganic contaminants.

(c) An alternative source of water that meets state drinking water standards is not available.

(2) Supplies that use POU or POE, or both, shall meet all of the following requirements:

(a) The supply shall operate and maintain the POU, or POE, or both.

(b) Before POU, or POE, or both, are installed, the supply shall obtain department approval of a monitoring plan that ensures that the devices provide health protection equivalent to that provided by central water treatment. If the POU, or POE, or both, are being used to comply with maximum contaminant levels or treatment techniques, then "equivalent" means that the water must meet all state drinking water standards and must be of acceptable quality similar to water distributed by a well-operated central treatment plant. At a minimum, the monitoring plan must include all of the following:

(i) Contaminants and parameters to be analyzed.

(ii) Physical measurements and observations, such as total flow treated and mechanical condition of the treatment equipment.

(iii) Location of sampling sites.

(iv) Frequency of sampling. Approximately 10% of the treatment units must be sampled at regular intervals so that all the POE or POU are monitored at least as frequently as required in part 7 for a particular contaminant. For example, for a

contaminant that is required to be sampled every 3 years, 10% of the POE or POU must be monitored quarterly so that in 3 years time all of the POE or POU have been monitored. The department may approve an alternate frequency that better represents the rate of degradation of the POE or POU.

(c) Before POU, or POE, or both, are installed, the supply shall obtain department approval of a technology plan that ensures that effective technology is applied and that the microbiological safety of the water is maintained at all times. At a minimum, the technology plan must include all of the following:

(i) The POU, or POE, or both, must be equipped with mechanical warnings to ensure that customers are automatically notified of operational problems.

(ii) If a specific type of POU or POE has been independently certified to comply with the maximum contaminant level or treatment technique in accordance with the American National Standards Institute/National Sanitation Foundation standards 44, 53, 58, or 62, as adopted by reference in R 325.10112, then individual units of that type must be used to comply with the maximum contaminant level or treatment technique. A supply may use an alternate type of POU or POE if the supply demonstrates to the department, using pilot plant studies or other means, that the alternative POU or POE consistently complies with the maximum contaminant level or treatment technique and the department approves the use of the POU or POE.

(iii) The design and application of the POU, or POE, or both, must consider the potential for increasing concentrations of heterotrophic bacteria in water treated with activated carbon. Frequent backwashing, post-contactor disinfection, and heterotrophic plate count monitoring may ensure that the microbiological safety of the water is not compromised.

(d) The supply shall demonstrate that buildings connected to the system have sufficient POU, or POE, or both, that are properly installed, maintained, and monitored such that all customers are protected.

(e) If the POU, or POE, or both, are used to meet an MCL or treatment technique, then the supply shall replace or repair the POU or POE when the contaminant for which the device is intended to control is above the maximum contaminant level in a confirmed sample.

(3) Compliance with the maximum contaminant level must be determined based on the analytical results obtained at each POU or POE, also known as the "sampling point". The compliance determination must be made under R 325.10604b(2) for volatile organic contaminants, R 325.10604c(2) for inorganic contaminants, R 325.10604d(2) for synthetic organic chemicals, or R 325.10604g(2) for per- and polyfluoroalkyl substances.

(4) Supplies that violate the MCL shall notify the department under part 7 of these rules and shall notify the public under part 4 of these rules. The supply may limit the distribution of the public notice to only persons served by the POU or POE that is out of compliance.

PART 4. PUBLIC NOTIFICATION AND PUBLIC EDUCATION

R 325.10401a General public notification requirements.

Rule 401a. (1) Each community water supply, nontransient noncommunity water supply, or transient noncommunity water supply shall give notice for violations of the

maximum contaminant level (MCL), maximum residual disinfection level (MRDL), treatment technique (TT), monitoring requirements, testing procedures in these rules, and for other situations, as listed in the following provisions:

(a) Violations and other situations requiring public notice, including all of the following:

(i) Failure to comply with an applicable maximum contaminant level (MCL) or maximum residual disinfectant level (MRDL).

(ii) Failure to comply with a prescribed treatment technique (TT).

(iii) Failure to perform water quality monitoring, as required by part 7 of these rules.

(iv) Failure to comply with testing procedures as prescribed by part 6 of these rules.

(b) Variances and exemptions under part 3 of these rules, including both of the following:

(i) Operation under a variance or an exemption.

(ii) Failure to comply with the requirements of a schedule that has been set under a variance or exemption.

(c) Special public notices, including all of the following:

(i) Occurrence of a waterborne disease outbreak or other waterborne emergency.

(ii) Exceedance of the nitrate MCL by noncommunity water supplies, where granted permission by the department.

(iii) Fluoride level above 2.0 mg/l as specified in R 325.10408a.

(iv) Availability of unregulated contaminant monitoring data.

(v) Other violations and situations that are determined by the department to require a public notice under this part and that are not already listed in table 1 of this rule. The tier assignment for each specific violation or situation requiring a public notice is identified in table 1 of this rule. Community and noncommunity water supplies are also considered "water supplies" or "supplies" in this rule, R 325.10402 to R 325.10407, and R 325.10408a to R 325.10409.

(2) Public notice requirements are divided into 3 tiers to take into account the seriousness of the violation or situation and of the potential adverse health effects that may be involved. The public notice requirements for each violation or situation listed in subrule (1) of this rule are determined by the tier to which the violation or situation is assigned. The definition of each tier is provided in the following provisions:

(a) Tier 1 public notice is required for violations and situations that have significant potential to have serious adverse effects on human health as a result of short term exposure.

(b) Tier 2 public notice is required for all other violations and situations that have potential to have serious adverse effects on human health.

(c) Tier 3 public notice is required for all other violations and situations not included in tier 1 and tier 2. The tier assignment for each specific violation or situation is identified in table 1 of this rule.

(3) Supplies shall provide public notice to the following:

(a) Each supply shall provide public notice to persons served by the supply as specified in this part. Supplies that sell or otherwise provide drinking water to other public water supplies, such as to consecutive supplies, shall give public notice to the consecutive supply. The consecutive supply shall provide public notice to the persons it serves.

(b) If a public water supply has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, then the department may grant permission, which must be in writing, to the supply to limit distribution of the public notice to only persons served by that portion of the system that is out of compliance. To be considered physically isolated, the supply shall show that the affected portion of the distribution system is separated from other parts of the distribution system with no interconnections. To be considered hydraulically isolated, the supply shall show that the design of the distribution system or the system operation, or both, created a situation where water in the affected portion is effectively isolated from the water in all other parts of the distribution system because of projected water flow patterns and water pressure zones.

(4) The supply, within 10 days of completing the public notification requirements under this part for the initial public notice and applicable repeat notices, shall submit to the department a certification that it fully complied with the public notification regulations. The supply shall include with this certification a representative copy of each type of notice distributed, published, posted, and made available to the persons served by the supply and to the media.

Table 1 Violations and other situations requiring public notice

Contaminant	MCL/MRDL/TT violations [1]		Monitoring, testing, & reporting procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. Violations of MCL, MRDL, treatment technique, monitoring and reporting, and testing procedure requirements:				
A. Microbiological contaminants				
Total coliform until March 31, 2016	2	R 325.10602(1)(a) and (b)	3	R 325.10704 to R 325.10707a R 325.10702(2) R 325.10707b(4)
Total coliform (TT violations resulting from failure to perform assessments or corrective actions, monitoring violations, and reporting violations) beginning April 1, 2016	2	R 325.10704j(2)(a)	3	R 325.10704j(3) R 325.10704j(4)(a)
Seasonal supply failure to follow department-approved start-up plan before serving water to the public or failure to provide certification to the department beginning April 1, 2016	2	R 325.10704j(2)(b)	3	R 325.10704j(4)(c)
Fecal coliform/E. coli until March 31, 2016	1	R 325.10602(1)(c)	1, 3 [2]	R 325.10704(3) R 325.10707b(4)

Contaminant	MCL/MRDL/TT violations [1]		Monitoring, testing, & reporting procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
E. coli (MCL, monitoring, and reporting violations) beginning April 1, 2016	1	R 325.10704j(1)	3	R 325.10704j(3)(b) R 325.10704j(4)(a) R 325.10704j(4)(b)
E. coli (TT violations resulting from failure to perform level 2 assessments or corrective action) beginning April 1, 2016	2	R 325.10704j(2)(a)	n/a	n/a
Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level)	2, 1 [3]	R 325.10611b	3	R 325.10605 R 325.10720(2)(a) and (b)
Violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT)	2	R 325.10611, R 325.10611a, and R 325.10611b	3	R 325.10605 R 325.10720(2)(c) and (d)
Violations of disinfection profiling and benchmarking	N/A	N/A	3	R 325.10722
Violations of filter backwash recycling provisions	2	R 325.10611c	3	R 325.11507
Violations of enhanced treatment for cryptosporidium	2	R 325.10611e to R 325.10611m	2, 3	40 CFR 141.701 to 141.705, as adopted by reference in R 325.10720b, R 325.10720c and R 325.10720d. Failure to collect 3 or more samples for Cryptosporidium analysis is a tier 2 violation requiring special notice as required in R 325.10408d. All other monitoring and testing procedure violations are tier 3.
Violations of rules for ground water supplies subject to R 325.10612	2	R 325.10612b	3	R 325.10739(7) R 325.10739a(5)
B. Inorganic chemicals (IOC)				
Antimony	2	R 325.10604c(1)	3	R 325.10710(4) and (5)

Contaminant	MCL/MRDL/TT violations [1]		Monitoring, testing, & reporting procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
Arsenic	2	R 325.10604c(1)	3	R 325.10710(4) and (5) R 325.10605
Asbestos (fibers longer than 10 µm)	2	R 325.10604c(1)	3	R 325.10710(4), (6)
Barium	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
Beryllium	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
Cadmium	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
Chromium (total)	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
Cyanide (free)	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
Fluoride	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
Mercury (inorganic)	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
Nitrate (as nitrogen)	1	R 325.10604c(1)	1, 3 [4]	R 325.10710(3), (4), (7), and (9)(b)
Nitrite (as nitrogen)	1	R 325.10604c(1)	1, 3 [4]	R 325.10710(3), (4), (8), and (9)(b)
Total nitrate and nitrite (as nitrogen)	1	R 325.10604c(1)	3	R 325.10710(4)
Selenium	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
Thallium	2	R 325.10604c(1)	3	R 325.10710(4) and (5)
C. Lead and copper (action level for lead is 0.015 mg/l through December 31, 2024 and 0.012 mg/l beginning January 1, 2025; action level for copper is 1.3 mg/l)				
Lead and copper rule (TT)	2	R 325.10604f(1) – (5) R 325.10410(2) and (3)	3	R 325.10710a to R 325.10710c and R 325.10605
D. Synthetic organic chemicals (SOC)				
2,4-D	2	R 325.10604d(1)	3	R 325.10717
2,4,5-TP (silvex)	2	R 325.10604d(1)	3	R 325.10717
Alachlor	2	R 325.10604d(1)	3	R 325.10717
Atrazine	2	R 325.10604d(1)	3	R 325.10717
Benzo(a)pyrene (PAHs)	2	R 325.10604d(1)	3	R 325.10717
Carbofuran	2	R 325.10604d(1)	3	R 325.10717
Chlordane	2	R 325.10604d(1)	3	R 325.10717
Dalapon	2	R 325.10604d(1)	3	R 325.10717
Di (2-ethylhexyl) adipate	2	R 325.10604d(1)	3	R 325.10717
Di (2-ethylhexyl) phthalate	2	R 325.10604d(1)	3	R 325.10717
Dibromochloropropane	2	R 325.10604d(1)	3	R 325.10717
Dinoseb	2	R 325.10604d(1)	3	R 325.10717
Dioxin (2,3,7,8-TCDD)	2	R 325.10604d(1)	3	R 325.10717
Diquat	2	R 325.10604d(1)	3	R 325.10717

Contaminant	MCL/MRDL/TT violations [1]		Monitoring, testing, & reporting procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
Endothall	2	R 325.10604d(1)	3	R 325.10717
Endrin	2	R 325.10604d(1)	3	R 325.10717
Ethylene dibromide	2	R 325.10604d(1)	3	R 325.10717
Glyphosate	2	R 325.10604d(1)	3	R 325.10717
Heptachlor	2	R 325.10604d(1)	3	R 325.10717
Heptachlor epoxide	2	R 325.10604d(1)	3	R 325.10717
Hexachlorobenzene	2	R 325.10604d(1)	3	R 325.10717
Hexachlorocyclo-pentadiene	2	R 325.10604d(1)	3	R 325.10717
Lindane	2	R 325.10604d(1)	3	R 325.10717
Methoxychlor	2	R 325.10604d(1)	3	R 325.10717
Oxamyl (vydate)	2	R 325.10604d(1)	3	R 325.10717
Pentachlorophenol	2	R 325.10604d(1)	3	R 325.10717
Picloram	2	R 325.10604d(1)	3	R 325.10717
Polychlorinated biphenyls [PCBs]	2	R 325.10604d(1)	3	R 325.10717
Simazine	2	R 325.10604d(1)	3	R 325.10717
Toxaphene	2	R 325.10604d(1)	3	R 325.10717
E. Volatile organic chemicals (VOC)				
Benzene	2	R 325.10604b(1)	3	R 325.10716
Carbon tetrachloride	2	R 325.10604b(1)	3	R 325.10716
Chlorobenzene (monochloro-benzene)	2	R 325.10604b(1)	3	R 325.10716
O-dichlorobenzene	2	R 325.10604b(1)	3	R 325.10716
P-dichlorobenzene	2	R 325.10604b(1)	3	R 325.10716
1,2-dichloroethane	2	R 325.10604b(1)	3	R 325.10716
1,1-dichloroethylene	2	R 325.10604b(1)	3	R 325.10716
Cis-1,2-dichloroethylene	2	R 325.10604b(1)	3	R 325.10716
Trans-1,2-dichloroethylene	2	R 325.10604b(1)	3	R 325.10716
Dichloromethane	2	R 325.10604b(1)	3	R 325.10716
1,2-dichloropropane	2	R 325.10604b(1)	3	R 325.10716
Ethylbenzene	2	R 325.10604b(1)	3	R 325.10716
Styrene	2	R 325.10604b(1)	3	R 325.10716
Tetrachloro-ethylene	2	R 325.10604b(1)	3	R 325.10716
Toluene	2	R 325.10604b(1)	3	R 325.10716
1,2,4-trichlorobenzene	2	R 325.10604b(1)	3	R 325.10716
1,1,1-trichloroethane	2	R 325.10604b(1)	3	R 325.10716
1,1,2-trichloroethane	2	R 325.10604b(1)	3	R 325.10716
Trichloroethylene	2	R 325.10604b(1)	3	R 325.10716
Vinyl chloride	2	R 325.10604b(1)	3	R 325.10716
Xylenes (total)	2	R 325.10604b(1)	3	R 325.10716
F. per- and polyfluoroalkyl substances (PFAS)				
Hexafluoropropylene oxide dimer acid (HFPO-DA)	2	R 325.10604g(1)	3	R 325.10717d
Perfluorobutane sulfonic acid (PFBS)	2	R 325.10604g(1)	3	R 325.10717d
Perfluorohexane sulfonic acid (PFHxS)	2	R 325.10604g(1)	3	R 325.10717d

Contaminant	MCL/MRDL/TT violations [1]		Monitoring, testing, & reporting procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
Perfluorohexanoic acid (PFHxA)	2	R 325.10604g(1)	3	R 325.10717d
Perfluorononanoic acid (PFNA)	2	R 325.10604g(1)	3	R 325.10717d
Perfluorooctane sulfonic acid (PFOS)	2	R 325.10604g(1)	3	R 325.10717d
Perfluorooctanoic acid (PFOA)	2	R 325.10604g(1)	3	R 325.10717d
G. Radioactive contaminants				
Beta/photon emitters	2	R 325.10603(2)(c)	3	R 325.10605 R 325.10725 R 325.10730
Alpha emitters (gross alpha)	2	R 325.10603(2)(b)	3	R 325.10605 R 325.10725 R 325.10726 R 325.10728 R 325.10729
Combined radium (226 & 228)	2	R 325.10603(2)(a)	3	R 325.10605 R 325.10725 R 325.10726 R 325.10728 R 325.10729
Uranium (pCi/L)	2	R 325.10603(2)(d)	3	R 325.10605 R 325.10725 R 325.10726 R 325.10728 R 325.10729
H. Disinfection byproducts (DBP), byproduct precursors, disinfectant residuals. Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBP). The department sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THM) and haloacetic acids (HAA). See R 325.10610 to R 325.10610d, and R 325.10719e to R 325.10719n for disinfection byproduct MCLs, disinfectant MRDLs, and related monitoring requirements.				
Total trihalomethanes (TTHM)	2	R 325.10610(2) R 325.10610b(2)(a)	3	R 325.10610d, R 325.10719e(1) and (2)(a), and R 325.10719h to R 325.10719n
Haloacetic acids (HAA)	2	R 325.10610(2) R 325.10610b(2)(a)	3	R 325.10610d, R 325.10719e(1) and (2)(a), and R 325.10719h to R 325.10719n
Bromate	2	R 325.10610 R 325.10610b(2)(b)	3	R 325.10719e(1) and (2)(c)
Chloramine (MRDL)	2	R 325.10610a R 325.10610b(3)(a)	3	R 325.10719e(1) and (3)
Chlorine (MRDL)	2	R 325.10610a R 325.10610b(3)(a)	3	R 325.10719e(1) and (3)

Contaminant	MCL/MRDL/TT violations [1]		Monitoring, testing, & reporting procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
Chlorite	2	R 325.10610 R 325.10610b(2)(c)	3	R 325.10719e(1) and (2)(b)
Chlorine dioxide (MRDL), where any 2 consecutive daily samples at entrance to distribution system only are above MRDL	2	R 325.10610a R 325.10610b(3)(b)(ii)	2 *, 3	R 325.10719e(1), (3)(b)(i) and (iii)
	* Failure to monitor for chlorine dioxide at the entrance to the distribution system the day after exceeding the MRDL at the entrance to the distribution system is a tier 2 violation.			
Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL	1 *	R 325.10610a R 325.10610b(3)(b)(i)	1	R 325.10719e(1), (3)(b)(ii) and (iii)
	* If any daily sample taken at the entrance to the distribution system exceeds the MRDL for chlorine dioxide and 1 or more samples taken in the distribution system the next day exceed the MRDL, tier 1 notification is required. Failure to take the required samples in the distribution system after the MRDL is exceeded at the entry point also triggers tier 1 notification.			
Control of DBP precursors—TOC (TT)	2	R 325.10610b(4) R 325.10610c	3	R 325.10719e(1) and (4)
Bench marking and disinfection profiling	N/A	N/A	3	R 325.10722
Development of monitoring plan	N/A	N/A	3	R 325.10719e(5)
I. Other treatment techniques				
Acrylamide (TT)	2	R 325.10604e	N/A	N/A
Epichlorohydrin (TT)	2	R 325.10604e	N/A	N/A
II. Other monitoring:				
Unregulated contaminants	N/A	N/A	3	40 CFR 141.40 [5]
Nickel	N/A	N/A	3	R 325.10710(4), (5), and (9)
III. Public notification for variances and exemptions:				
Operation under a variance or exemption	3	R 325.10302	N/A	N/A
Violation of conditions of a variance or exemption	2	R 325.10312	N/A	N/A
IV. Other situations requiring public notification:				
Fluoride level above 2.0 mg/l	3	R 325.10408a(1)	N/A	N/A
Exceedance of nitrate MCL for noncommunity supplies, as allowed by the department	1	R 325.10604c(3)	N/A	N/A
Availability of unregulated contaminant monitoring data	3	R 325.10407	N/A	N/A
Waterborne disease outbreak	1	R 325.10734(4)	N/A	N/A
Source water sample positive for fecal indicator: E.coli, enterococci, or coliphage	1	R 325.10739(6)	N/A	N/A
	1 or 2 or 3 *	N/A	N/A	N/A

Contaminant	MCL/MRDL/TT violations [1]		Monitoring, testing, & reporting procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
Other waterborne emergencies and other situations as determined by the department	* Waterborne emergencies require a tier 1 public notice. The department may place other situations in any tier it determines appropriate, based on threat to public health.			

[1]MCL - Maximum contaminant level, MRDL - maximum residual disinfectant level, TT - treatment technique.

[2]Failure to test for fecal coliform or E. coli is a tier 1 violation if testing is not done after any repeat sample tests positive for coliform. All other total coliform monitoring and testing procedure violations are tier 3.

[3]Supplies with treatment technique violations involving a single exceedance of a maximum turbidity limit under R 325.10611b(1) are required to initiate consultation with the department within 24 hours after learning of the violation. Based on this consultation, the department may subsequently decide to elevate the violation to tier 1. If a supply is unable to make contact with the department in the 24-hour period, the violation is automatically elevated to tier 1.

[4]Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a tier 1 violation. Other monitoring violations for nitrate are tier 3.

[5]40 CFR 141.40,which pertains to unregulated contaminant monitoring, is contained in Title 40 CFR parts 136 to 149 and is available for purchase for $67.00 from the superintendent of documents at the address in R 325.10116. The material is available for inspection from the offices of the department at the address in R 325.10116(a) or available on the internet at http://www.ecfr.gov/.

R 325.10405 Content of public notice.

Rule 405. (1) If a community or noncommunity water supply that is subject to R 325.10401a has a violation or situation requiring public notification, then each public notice must include all of the following elements:

(a) A description of the violation or situation, including the contaminant or contaminants of concern, and, as applicable, the contaminant level or levels.

(b) When the violation or situation occurred.

(c) The potential adverse health effects from the violation or situation, including the standard language under subrule (4)(a) or (b) of this rule, whichever is applicable.

(d) The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in their drinking water.

(e) If alternative water supplies should be used.

(f) What actions consumers should take, including when they should seek medical help, if known.

(g) What the supply is doing to correct the violation or situation.

(h) When the supply expects to return to compliance or resolve the situation.

(i) The name, business address, and phone number of the supply or designee of the supply as a source of additional information concerning the notice.

(j) A statement to encourage the notice recipient to distribute the public notice to other persons served, using the standard language under subrule (4)(c) of this rule, where applicable.

(2) All of the following elements must be included in the public notice for public water supplies operating under a variance or exemption:

(a) If a public water supply has been granted a variance or an exemption, then the public notice must contain all of the following elements:

(i) An explanation of the reasons for the variance or exemption.

(ii) The date on which the variance or exemption was issued.

(iii) A brief status report on the steps the supply is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption.

(iv) A notice of opportunities for public input in the review of the variance or exemption.

(b) If a public water supply violates the conditions of a variance or exemption, then the public notice must contain the 10 elements listed in subrule (1) of this rule.

(3) The public notice must be presented in the following manner:

(a) Each public notice required by this part must meet all of the following criteria:

(i) Must be displayed in a conspicuous way when printed or posted.

(ii) Must not contain overly technical language or very small print.

(iii) Must not be formatted in a way that defeats the purpose of the notice.

(iv) Must not contain language that nullifies the purpose of the notice.

(b) In communities where more than 10% of the consumers are non-English speaking consumers, the public notice must contain information in the appropriate language or languages regarding the importance of the notice or contain a telephone number or address where persons served may contact the supply to obtain a translated copy of the notice or to request assistance in the appropriate language.

(4) The supply shall include the following standard language in the public notice:

(a) The supply shall include in each public notice the health effects language specified in table 1 of this rule corresponding to each MCL, MRDL, and treatment technique violation listed in table 1 of R 325.10401a, and for each violation of a condition of a variance or exemption.

(b) The supply shall include the following language in the notice, including the language necessary to fill in the blanks, for all monitoring and testing procedure violations listed in table 1 of R 325.10401a: "We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During [compliance period], we 'did not monitor or test' or 'did not complete all monitoring or testing' for [contaminant or contaminants], and therefore cannot be sure of the quality of your drinking water during that time."

(c) The supply shall include in the notice the following language, where applicable, to encourage the distribution of the public notice to all persons served: "Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail."

Table 1 Regulated contaminants

Key

AL=Action level

MCL=Maximum contaminant level

MCLG=Maximum contaminant level goal

mfl=Million fibers per liter

MRDL=Maximum residual disinfectant level

MRDLG=Maximum residual disinfectant level goal

mrem/year=Millirems per year (a measure of radiation absorbed by the body)

N/A=Not applicable

NTU=Nephelometric turbidity units (a measure of water clarity)

pci/l=Picocuries per liter (a measure of radioactivity)

ppm=Parts per million, or milligrams per liter (mg/l)

ppb=Parts per billion, or micrograms per liter (µg/l)

ppt=Parts per trillion, or nanograms per liter

ppq=Parts per quadrillion, or picograms per liter

TT=Treatment technique

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Microbiological contaminants						
Total coliform bacteria until March 31, 2016	MCL: For water supplies analyzing 40 or more samples per month, not more than 5.0% of the monthly samples may be positive for total coliform. For supplies analyzing fewer than 40 samples per month, not more than 1 sample per month may be positive for total coliform.			zero	Naturally present in the environment	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.
Total coliform bacteria beginning April 1, 2016. This row applies to Consumer Confidence Reporting.	TT	No conversion necessary	TT	N/A	Naturally present in the environment	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system.
Fecal coliform and E. coli until March 31, 2016	zero	No conversion necessary	zero	zero	Human and animal fecal waste	Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
E. coli beginning April 1, 2016	MCL: Routine and repeat samples are total coliform-positive and either is E. coli-positive or supply fails to take all required repeat samples following E. coli-positive routine sample or supply fails to analyze total coliform-positive repeat sample for E. coli			zero	Human and animal fecal waste	E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely-compromised immune systems.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Coliform Assessment or Corrective Action Violations, or both, beginning April 1, 2016. This row applies to public notification. For Consumer Confidence Reporting, see R 325.10413(12)(g)(i).	N/A	No conversion necessary	TT	N/A	N/A	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessments to identify problems and to correct any problems that are found. [THE SUPPLY MUST USE 1 OF THE FOLLOWING APPLICABLE SENTENCES:] We failed to conduct the required assessment. We failed to correct all identified sanitary defects that were found during the assessment(s).
E. coli Assessment or Corrective Action Violations, or both, beginning April 1, 2106. This row applies to public notification. For Consumer Confidence Reporting, see R 325.10413(12)(g)(ii).	N/A	No conversion necessary	TT	N/A	N/A	E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems. We violated the standard for E. coli, indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct a detailed assessment to identify problems and to correct any problems that are found. [THE SUPPLY MUST USE 1 OF THE FOLLOWING APPLICABLE SENTENCES:] We failed to conduct the required assessment. We failed to correct all identified sanitary defects that were found during the assessment that we conducted.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Seasonal Supply Treatment Technique Violations of the Total Coliform Rule beginning April 1, 2016.	N/A	No conversion necessary	TT	N/A	N/A	When this violation includes the failure to monitor for total coliforms or E. coli prior to serving water to the public, the mandatory language found at R 325.10405(4)(b) must be used. When this violation includes failure to complete other actions, the appropriate public notice elements found in R 325.10405(1) must be used.
Fecal indicator under groundwater requirements in R 325.10612 et. al: - E.coli - enterococci or - coliphage)	TT	No conversion necessary	TT	E.coli: zero Others: N/A	Human and animal fecal waste	Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
Violations of rules for ground water supplies subject to R 325.10612	TT	No conversion necessary	TT	N/A	N/A	Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.
Turbidity (ntu)	TT	No conversion necessary	TT	N/A	Soil runoff	Turbidity 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. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
Other microbiological contaminants						
Giardia lamblia, viruses, heterotrophic plate count (HPC) bacteria, legionella, cryptosporidium	TT*	No conversion necessary	TT*	zero	Naturally present in the environment	Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
	* The treatment technique violations that involve turbidity exceedances may use health effects language for turbidity instead.					
Inorganic contaminants						

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Antimony (ppb)	0.006	1000	6	6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
Arsenic (ppb)	0.010	1000	10	0	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes	Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
Asbestos [fibers longer than 10 µm] (mfl)	7 mfl	No conversion necessary	7	7	Decay of asbestos cement water mains; erosion of natural deposits	Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.
Barium (ppm)	2	No conversion necessary	2	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
Beryllium (ppb)	0.004	1000	4	4	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.
Cadmium (ppb)	0.005	1000	5	5	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
Chromium [total] (ppb)	0.1	1000	100	100	Discharge from steel and pulp mills; erosion of natural deposits	Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Cyanide [free] (ppb)	0.2	1000	200	200	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
Fluoride (ppm)	4.0	No conversion necessary	4.0	4.0	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories	Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children less than 9 years old. Mottling, also known as dental fluorosis, may include brown staining or pitting of the teeth, or both, and occurs only in developing teeth before they erupt from the gums.
Mercury [inorganic] (ppb)	0.002	1000	2	2	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills; runoff from cropland	Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.
Nitrate [as nitrogen] (ppm)	10	No conversion necessary	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	Infants below the age of 6 months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
Nitrite [as nitrogen] (ppm)	1	No conversion necessary	1	1	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	Infants below the age of 6 months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
Total nitrate and nitrite [as nitrogen] (ppm)	10	No conversion necessary	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	Infants below the age of 6 months who drink water containing nitrate and nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Selenium (ppb)	0.05	1000	50	50	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines	Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.
Thallium (ppb)	0.002	1000	2	0.5	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.
Lead and copper						
Lead (ppb)	AL=0.015 through December 31, 2024; AL= 0.012 beginning January 1, 2025.	1000	AL=15 through December 31, 2024; AL=12 beginning January 1, 2025. (TT)	zero	Lead services lines, corrosion of household plumbing including fittings and fixtures; erosion of natural deposits	Infants and children who drink water containing lead could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.
Copper (ppm)	AL=1.3	No conversion necessary	AL=1.3 (TT)	1.3	Corrosion of household plumbing systems; erosion of natural deposits	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor.
Synthetic organic contaminants including pesticides and herbicides						
2,4-D (ppb)	0.07	1000	70	70	Runoff from herbicide used on row crops	Some people who drink water containing the weed killer 2,4-d well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
2,4,5-TP [silvex] (ppb)	0.05	1000	50	50	Residue of banned herbicide	Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
Alachlor (ppb)	0.002	1000	2	zero	Runoff from herbicide used on row crops	Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
Atrazine (ppb)	0.003	1000	3	3	Runoff from herbicide used on row crops	Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
Benzo(a)pyrene [PAHs] (ppt)	0.0002	1,000,000	200	zero	Leaching from linings of water storage tanks and distribution lines	Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
Carbofuran (ppb)	0.04	1000	40	40	Leaching of soil fumigant used on rice and alfalfa	Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood or nervous or reproductive systems.
Chlordane (ppb)	0.002	1000	2	zero	Residue of banned termiticide	Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
Dalapon (ppb)	0.2	1000	200	200	Runoff from herbicide used on rights of way	Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.
Di(2-ethylhexyl) adipate (ppb)	0.4	1000	400	400	Discharge from chemical factories	Some people who drink water containing di (2-ethylhexyl) adipate well in excess of the MCL over many years could experience toxic effects such as weight loss, liver enlargement, or possible reproductive difficulties.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Di(2-ethylhexyl) phthalate (ppb)	0.006	1000	6	zero	Discharge from rubber and chemical factories	Some people who drink water containing di (2-ethylhexyl) phthalate well in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.
Dibromochloropropane [DBCP] (ppt)	0.0002	1,000,000	200	zero	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
Dinoseb (ppb)	0.007	1000	7	7	Runoff from herbicide used on soybeans and vegetables	Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
Dioxin [2,3,7,8-TCDD] (ppq)	0.00000003	1,000,000,000	30	zero	Emissions from waste incineration and other combustion; discharge from chemical factories	Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
Diquat (ppb)	0.02	1000	20	20	Runoff from herbicide use	Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
Endothall (ppb)	0.1	1000	100	100	Runoff from herbicide use	Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.
Endrin (ppb)	0.002	1000	2	2	Residue of banned insecticide	Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.
Ethylene dibromide (ppt)	0.00005	1,000,000	50	zero	Discharge from petroleum refineries	Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
Glyphosate (ppb)	0.7	1000	700	700	Runoff from herbicide use	Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Heptachlor (ppt)	0.0004	1,000,000	400	zero	Residue of banned pesticide	Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
Heptachlor epoxide (ppt)	0.0002	1,000,000	200	zero	Breakdown of heptachlor	Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
Hexachlorobenzene (ppb)	0.001	1000	1	zero	Discharge from metal refineries and agricultural chemical factories	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.
Hexachlorocyclopentadiene (ppb)	0.05	1000	50	50	Discharge from chemical factories	Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
Lindane (ppt)	0.0002	1,000,000	200	200	Runoff/leaching from insecticide used on cattle, lumber, gardens	Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
Methoxychlor (ppb)	0.04	1000	40	40	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock	Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
Oxamyl [vydate] (ppb)	0.2	1000	200	200	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.
Pentachlorophenol (ppb)	0.001	1000	1	zero	Discharge from wood preserving factories	Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Picloram (ppb)	0.5	1000	500	500	Herbicide runoff	Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.
Polychlorinated biphenyls [PCBs] (ppt)	0.0005	1,000,000	500	zero	Runoff from landfills; discharge of waste chemicals	Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.
Simazine (ppb)	0.004	1000	4	4	Herbicide runoff	Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.
Toxaphene (ppb)	0.003	1000	3	zero	Runoff/leaching from insecticide used on cotton and cattle	Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.
Per- and polyfluoroalkyl substances (PFAS)						
Hexafluoropropylene oxide dimer acid (HFPO-DA) (ppt)	370 ppt (ng/l)	No conversion necessary	370	N/A	Discharge and waste from industrial facilities utilizing the Gen X chemical process	Some people who drink water containing HFPO-DA in excess of the MCL could experience problems with their liver. Some fetuses of pregnant women and infants born to mothers who drink water containing HFPO-DA in excess of the MCL may experience developmental effects.
Perfluorobutane sulfonic acid (PFBS) (ppt)	420 ppt (ng/l)	No conversion necessary	420	N/A	Discharge and waste from industrial facilities; stain-resistant treatments	Some infants born to mothers who drink water containing PFBS in excess of the MCL may experience decreased thyroid hormone levels.
Perfluorohexane sulfonic acid (PFHxS) (ppt)	51 ppt (ng/l)	No conversion necessary	51	N/A	Firefighting foam; discharge and waste from industrial facilities	Some people who drink water containing PFHxS in excess of the MCL could experience problems with their thyroid, liver, and cholesterol levels.
Perfluorohexanoic acid (PFHxA) (ppt)	400,000 ppt (ng/l)	No conversion necessary	400,000	N/A	Firefighting foam; discharge and waste from industrial facilities	Some people who drink water containing PFHxA in excess of the MCL could experience problems with their liver and kidneys.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Perfluorononanoic acid (PFNA) (ppt)	6 ppt (ng/l)	No conversion necessary	6	N/A	Discharge and waste from industrial facilities; breakdown of precursor compounds	Some fetuses of pregnant women and infants born to mothers who drink water containing PFNA in excess of the MCL may experience developmental delays and decreased body weight gain.
Perfluorooctane sulfonic acid (PFOS) (ppt)	16 ppt (ng/l)	No conversion necessary	16	N/A	Firefighting foam; discharge from electroplating facilities; discharge and waste from industrial facilities	Some fetuses of pregnant women and infants born to mothers who drink water containing PFOS in excess of the MCL may experience developmental delays and decreased body weight gain.
Perfluorooctanoic acid (PFOA) (ppt)	8 ppt (ng/l)	No conversion necessary	8	N/A	Discharge and waste from industrial facilities; stain-resistant treatments	Some fetuses of pregnant women and infants born to mothers who drink water containing PFOA in excess of the MCL may experience neurodevelopmental effects and skeletal effects.
Volatile organic contaminants						
Benzene (ppb)	0.005	1000	5	zero	Discharge from factories; leaching from gas storage tanks and landfills	Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.
Carbon tetrachloride (ppb)	0.005	1000	5	zero	Discharge from chemical plants and other industrial activities	Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
Chlorobenzene (ppb)	0.1	1000	100	100	Discharge from chemical and agricultural chemical factories	Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
O-dichlorobenzene (ppb)	0.6	1000	600	600	Discharge from industrial chemical factories	Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.
P-dichlorobenzene (ppb)	0.075	1000	75	75	Discharge from industrial chemical factories	Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
1,2-dichloroethane (ppb)	0.005	1000	5	zero	Discharge from industrial chemical factories	Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
1,1-dichloroethylene (ppb)	0.007	1000	7	7	Discharge from industrial chemical factories	Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
Cis-1,2-dichloroethylene (ppb)	0.07	1000	70	70	Discharge from industrial chemical factories	Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
Trans-1,2-dichloroethylene (ppb)	0.1	1000	100	100	Discharge from industrial chemical factories	Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
Dichloromethane (ppb)	0.005	1000	5	zero	Discharge from pharmaceutical and chemical factories	Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.
1,2-dichloropropane (ppb)	0.005	1000	5	zero	Discharge from industrial chemical factories	Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
Ethylbenzene (ppb)	0.7	1000	700	700	Discharge from petroleum refineries	Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
Styrene (ppb)	0.1	1000	100	100	Discharge from rubber and plastic factories; leaching from landfills	Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
Tetrachloro-ethylene (ppb)	0.005	1000	5	zero	Discharge from factories and dry cleaners	Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.
Toluene (ppm)	1	No conversion necessary	1	1	Discharge from petroleum factories	Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
1,2,4-trichlorobenzene (ppb)	0.07	1000	70	70	Discharge from textile-finishing factories	Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.
1,1,1-trichloroethane (ppb)	0.2	1000	200	200	Discharge from metal degreasing sites and other factories	Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.
1,1,2-trichloroethane (ppb)	0.005	1000	5	3	Discharge from industrial chemical factories	Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
Trichloroethylene (ppb)	0.005	1000	5	zero	Discharge from metal degreasing sites and other factories	Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
Vinyl chloride (ppb)	0.002	1000	2	zero	Leaching from PVC piping; discharge from plastics factories	Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
Xylenes [total] (ppm)	10	No conversion necessary	10	10	Discharge from petroleum factories; discharge from chemical factories	Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.
Radioactive contaminants						
Beta/photon emitters (mrem/yr)	4 mrem/yr	No conversion necessary	4	zero	Decay of natural and man-made deposits	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta particle and photon radioactivity in excess of the MCL over many years may have an increased risk of getting cancer.
Alpha emitters [gross alpha] (pci/l)	15 pCi/L	No conversion necessary	15	zero	Erosion of natural deposits	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Combined radium [226 & 228] (pci/l)	5 pCi/L	No conversion necessary	5	zero	Erosion of natural deposits	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
Uranium (pCi/L)	30 ug/L	No conversion necessary	30	zero	Erosion of natural deposits	Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.
Disinfection byproducts (DBP), byproduct precursors, and disinfectant residuals: where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBP). The department sets standards for controlling the levels of disinfectants and DBP in drinking water, including trihalomethanes (THM) and haloacetic acids (HAA). See R 325.10610 to R 325.10610d and R 325.10719e to R 325.10719n for disinfection byproduct MCLs, disinfectant MRDLs, and related monitoring requirements.						
Total trihalomethanes [TTHM] (ppb)	0.080*	1000	80*	N/A	By-product of drinking water disinfection	Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.
	* The MCL for total trihalomethanes is the sum of the concentrations of the individual trihalomethanes.					
Haloacetic acids (HAAs) (ppb)	0.060*	1000	60*	N/A	By-product of drinking water disinfection	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
	* The MCL for haloacetic acids is the sum of the concentrations of the individual haloacetic acids.					
Bromate (ppb)	0.010	1000	10	zero	By-product of drinking water disinfection	Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
Chloramines (ppm)	MRDL = 4	No conversion necessary	MRDL = 4	MRDLG = 4	Water additive used to control microbes	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.
Chlorine (ppm)	MRDL = 4	No conversion necessary	MRDL = 4	MRDLG = 4	Water additive used to control microbes	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Chlorite (ppm)	1	No conversion necessary	1	0.8	By-product of drinking water disinfection	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.
Chlorine dioxide (ppb)	MRDL = 0.8	1000	MRDL = 800	MRDLG = 800	Water additive used to control microbes	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 in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.
	Add the following only to public notification where any 2 consecutive daily samples taken at the entrance to the distribution system are above the MRDL: "The chlorine dioxide violations reported today are the result of exceedances at the treatment facility only, not within the distribution system which delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers." Add the following only to public notification where 1 or more distribution system samples are above the MRDL: "The chlorine dioxide violations reported today include exceedances of the drinking water standard within the distribution system which delivers water to consumers. 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."					
Total organic carbon [TOC - control of DBP precursors] (ppm)	TT	No conversion necessary	TT	None	Naturally present in the environment	Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THM) and haloacetic acids (HAA). 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.
Other treatment techniques						

Contaminant in CCR units	Traditional MCL in mg/l, except where noted	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Acrylamide	TT	No conversion necessary	TT	zero	Added to water during sewage/ wastewater treatment	Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.
Epichlorohydrin	TT	No conversion necessary	TT	zero	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.

PART 6. STATE DRINKING WATER STANDARDS AND ANALYTICAL METHODS

R 325.10604g MCLs for per- and polyfluoroalkyl substances.

Rule 604g. (1) The maximum contaminant levels and effective dates for per- and polyfluoroalkyl substances in table 1 of this rule apply to community and nontransient noncommunity water supplies.

Table 1 MCLs for per and polyfluoroalkyl substances

Contaminant	Maximum Contaminant Level in ng/l	Effective Date
Hexafluoropropylene oxide dimer acid (HFPO-DA)	370	[effective date of this rule]
Perfluorobutane sulfonic acid (PFBS)	420	[effective date of this rule]
Perfluorohexane sulfonic acid (PFHxS)	51	[effective date of this rule]
Perfluorohexanoic acid (PFHxA)	400,000	[effective date of this rule]
Perfluorononanoic acid (PFNA)	6	[effective date of this rule]
Perfluorooctane sulfonic acid (PFOS)	16	[effective date of this rule]
Perfluorooctanoic acid (PFOA)	8	[effective date of this rule]

(2) Compliance with the MCLs in table 1 of this rule must be determined based on the analytical results obtained at each sampling point. If 1 sampling point is in violation of an MCL, then the supply is in violation of the MCL. All of the following provisions apply:

(a) For supplies monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.

(b) Supplies monitoring annually whose sample result exceeds an MCL in table 1 of this rule shall begin quarterly sampling. Compliance with the MCL must be based on the running annual average. For the purpose of calculating the running annual average, the initial exceedance must be the result for the first quarter. If the department requires a confirmation sample under R 325.10717d(12), then the average of the initial exceedance and the confirmation sample must be the result for the first quarter, unless the department determines a sample should be excluded per R 325.10717d(12). The supply shall not be in violation of the MCL until it has completed 1 year of quarterly sampling.

(c) If any sample result causes the running annual average to exceed the MCL at any sampling point, then the supply is out of compliance with the MCL immediately.

(d) If a supply fails to collect the required number of samples, then compliance must be based on the total number of samples collected.

(e) If a sample result is less than the reporting limit, then zero must be used to calculate the annual average.

PART 7. SURVEILLANCE, INSPECTION, AND MONITORING

R 325.10717d Collection and analysis of samples for per- and polyfluoroalkyl substances.

Rule 717d. (1) Suppliers of community and nontransient noncommunity water supplies shall collect samples and cause analyses to be made under this rule for per- and polyfluoroalkyl substances to determine compliance with the state drinking water standards in R 325.10604g. Each supplier shall monitor at the time designated by the department.

(2) For transient noncommunity and type III public water supplies, the department may require samples to be collected and analyzed at prescribed frequencies for per- and polyfluoroalkyl substances.

(3) A groundwater supplier shall take at least 1 sample at every entry point to the distribution system that is representative of each well after treatment, also known as sampling point. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(4) A surface water supplier, or combined surface water and ground water, shall take at least 1 sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment, also known as sampling point. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(5) If a system draws water from more than 1 source and the sources are combined before distribution, then the supplier shall sample at an entry point to the distribution system during periods of normal operating conditions when water that is representative of all sources is being used.

(6) An existing supplier with one or more samples taken at each sampling point described in subrules (3), (4), or (5) of this rule as part of the State of Michigan's 2018/2019 Statewide PFAS Survey shall conduct initial sampling as follows:

(a) A supplier with one or more sample results greater than 50% of the MCL for a contaminant listed in rule 10604g shall collect samples from each sampling point beginning the first full quarter following the effective date of this rule.

(b) A supplier with no detection or a detection less than or equal to 50% of the MCL for a contaminant listed in rule 10604g shall collect at least 1 sample from each sampling point within 6 months of the effective date of this rule.

(7) An existing supplier without sampling conducted under subrule (6) of this rule, shall collect samples beginning the first full quarter following the effective date of this rule.

(8) A new community or nontransient noncommunity water supply shall collect samples beginning the first full quarter following the initiation of operations.

(9) If the results of samples collected under subrules (6), (7), or (8) of this rule are below the reporting limits specified in R 325.12708, the department may allow the water supply to monitor annually.

(10) If a contaminant in R 325.10604g is detected above the reporting limit in any sample, then all of the following provisions apply:

(a) Each supply shall monitor quarterly at each sampling point that resulted in a detection. The department may decrease the quarterly monitoring requirement specified in this subrule if it has determined that the supply is reliably and consistently below the MCL. A groundwater supplier shall take not fewer than 2 quarterly samples and a surface water supplier shall take not fewer than 4 quarterly samples before this determination.

(b) After the department determines that the supply is reliably and consistently below the MCL, the department may allow the supply to monitor annually.

(11) A supplier that violates R 325.10604g shall monitor quarterly. If not fewer than 4 quarterly samples show that the supply is in compliance and the department determines the supply is reliably and consistently below the MCL, then the department may allow the supply to monitor annually.

(12) The department may require confirmation sampling for positive or negative results. If confirmation sampling is required, then the results must be averaged with the first sampling result and the average must be used for the compliance determination. The department may exclude results of obvious sampling errors from this calculation.

(13) The department may increase the required monitoring to detect variations within the system.

(14) All new supplies or supplies that use a new source of water shall demonstrate compliance with the MCLs before serving water to the public. The supply shall also comply with the initial sampling frequencies specified by the department.

PART 27. LABORATORY CERTIFICATION

R 325.12701 Purpose.

Rule 2701. An analytical result that is used to determine compliance with a state drinking water standard established in part 6 must be the result of an analysis performed by a department or EPA certified laboratory, except that measurements for alkalinity, bromide, calcium, daily chlorite samples at the entrance to the distribution system, conductivity, magnesium, orthophosphate, pH, residual disinfectant concentration, silica, specific ultraviolet absorbance, temperature, chloride, sulfate, and turbidity may be performed by personnel acceptable to the department. This part sets forth requirements established by the federal act for laboratory certification.

R 325.12708 Certification for PFAS analyses.

Rule 2708. To qualify for certification to conduct analyses for the PFASs in table 1 of R 325.10604g, a laboratory must be in compliance with the following provisions:

(a) Samples must be collected and analyzed in accordance with EPA method 537.1 or other methods as approved by the department.

(b) The minimum reporting limit must be 2 ng/l.

(c) Analytical results must be reported to the nearest ng/l.

(d) The laboratory must analyze performance evaluation samples that include the PFASs in table 1 of this rule and are acquired from a third party proficiency test provider approved by the department at least once per year.

(e) For each regulated PFAS contaminant included in the performance evaluation sample, the laboratory must achieve quantitative results on the analyses that are within the acceptance limits listed in table 1 of this rule.

Table 1 Acceptance limits

Contaminant	Chemical Abstract Services Registry Number	Acceptance Limits (percent)
Hexafluoropropylene oxide dimer acid (HFPO-DA)	13252-13-6	± 30% (GV) [1]
Perfluorobutane sulfonic acid (PFBS)	375-73-5	± 30% (GV) [1]
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	± 30% (GV) [1]
Perfluorohexanoic acid (PFHxA)	307-24-4	± 30% (GV) [1]
Perfluorononanoic acid (PFNA)	375-95-1	± 30% (GV)[1]
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	± 30% (GV) [1]
Perfluorooctanoic acid (PFOA)	335-67-1	± 30% (GV) [1]

[1]Gravimetric value

R 325.12710 Suspension or revocation of certification.

Rule 2710. (1) If the department determines that a laboratory certified under the act and these rules is not operating in an approved manner, is reporting results that do not meet state laboratory certification requirements, or is operating in a manner that may cause a hazard to the public health, the department may move to suspend or revoke the certification of the laboratory pursuant to the administrative procedures act of 1969, 1969 PA 306, MCL 24.201 to 24.328.

(2) Reasons for suspension of a laboratory's certification, in part or whole, or the denial of an initial certification request include, but are not limited to the following:

(a) Failure to pay certification fees.

(b) Failure to pass a laboratory inspection.

(c) Failure to meet proficiency test requirements.

(d) Failure to respond to a laboratory inspection report within the allotted timeframe.

(e) Persistent failure to report compliance data to the public water system or the state drinking water program in a timely manner, thereby preventing timely compliance determination with federal or state regulations and endangering public health.

(f) Failure to correct deficiencies noted in an on-site inspection report.

(g) Refusal to participate in an on-site inspection conducted by the certifying agency.

(h) Failure to make records pertaining to the analysis of regulated drinking water contaminants available for review or copying by the laboratory certification program.

(3) Suspension of a laboratory's certification remains in effect until the laboratory provides documentation that the reason or reasons for the suspension have been corrected.

(4) Reasons for revocation of a laboratory's certification include but are not limited to:

(a) Falsification of the certification application or certification renewal application.

(b) Fraud or other criminal activity.

(c) Falsification of records or analytical results.

(d) Reporting results not meeting the federal act, the act and administrative rules promulgated thereunder, or method requirements.

(e) Reporting proficiency test data from another laboratory as its own.

(f) Using analytical methodology not listed on the laboratory's certification letter for reporting regulated drinking water contaminants.

(g) A written notification from the laboratory that it is voluntarily relinquishing certification.