

333-061-0036

Sampling and Analytical Requirements

(1) General:

- (a) Analyses must be conducted by EPA Methods in accordance with the analytical requirements set forth in 40 CFR 141. Samples analyzed for the purposes of this rule shall be collected after the water has been allowed to flow from the sample tap for a sufficient length of time to assure that the collected sample is representative of water in the distribution system or from the water source as applicable, except for samples collected to determine corrosion by-products.
 - (A) Analysis for *Cryptosporidium* must be conducted by EPA Methods in accordance with the analytical requirements set forth in 40 CFR 141.704.
- (b) Alternate Analytical Methods:
 - (A) With the written permission of the Department, an alternate analytical method may be employed on the condition that it is substantially equivalent to the prescribed test in both precision and accuracy as it relates to the determination of compliance with any MCL; and
 - (B) The use of the alternate analytical method shall not decrease the frequency of sampling required by these rules.
- (c) Approved laboratories:
 - (A) For the purpose of determining compliance with the maximum contaminant levels and the sampling requirements of these rules, sampling results may be considered only if they have been analyzed by a laboratory certified by the Department, except that measurements for turbidity, disinfectant residual, temperature, alkalinity, calcium, conductivity, chlorite, bromide, TOC, SUVA, dissolved organic carbon (DOC), UV254, orthophosphate, silica and pH may be performed on site using approved methods by individuals trained in sampling and testing techniques. Daily chlorite samples measured at the entrance to the distribution system must be performed by a party approved by the Department.
 - (B) Nothing in these rules shall be construed to preclude the Department or any of its duly authorized representatives from taking samples and from using the results of such samples to determine compliance with applicable requirements of these rules.
 - (C) All analysis for *Cryptosporidium* must be conducted by a laboratory that is approved by EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory certified for *Cryptosporidium* analysis by the Department.

- (d) Monitoring of purchasing water systems:
 - (A) When a public water system obtains its water, in whole or in part, from another public water system, the monitoring requirements imposed by these rules on the purchasing water system may be modified by the Department to the extent that the system supplying the water is in compliance with its source monitoring requirements. When a public water system supplies water to one or more other public water systems, the Department may modify monitoring requirements imposed by this rule to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes.
 - (B) Any modified monitoring shall be conducted pursuant to a schedule specified by the Department and concurred in by the Administrator of the US Environmental Protection Agency.
- (e) Water suppliers shall monitor each water source individually for contaminants listed in OAR 333-061-0030 (Maximum Contaminant Levels), except for coliform bacteria, TTHMs and corrosion by-products, at the entry point to the distribution system except as described below. Any such modified monitoring shall be conducted pursuant to a schedule prescribed by the Department.
 - (A) If the system draws water from more than one source and sources are combined before distribution, the system may be allowed to sample at an entry point to the distribution system during normal operating conditions, where justified, taking into account operational considerations, geologic and hydrologic conditions, and other factors.
 - (B) If a system draws water from multiple ground water sources which are not combined before distribution, the system may be allowed to sample at a representative source or sources, where justified, taking into account geologic and hydrogeologic conditions, land uses, well construction, and other factors.
- (f) Compliance with MCLs shall be based on each sampling point as described in this section. If any point is determined to be out of compliance, the system shall be deemed out of compliance. If an entirely separated portion of a water system is out of compliance, then only that portion of the system shall be deemed out of compliance.
- (g) The Department may require additional sampling and analysis for the contaminants included in OAR 333-061-0030 (Maximum Contaminant Levels) when necessary to determine whether an unreasonable risk to health exists. The Department may also require sampling and analysis for additional contaminants not included in OAR 333-061-0030 (Maximum Contaminant Levels) when necessary for public health protection.

- (h) Water suppliers and their appointed representatives shall collect water samples from representative locations in the water system as prescribed in this rule and shall employ proper sampling procedures and techniques. Samples submitted to laboratories for analysis shall be clearly identified and shall include the name of the water system, public water system identification number, sampling date, and time, sample location identifying the sample tap, the name of the person collecting the sample and be labeled as follows:
 - (A) Routine: These are samples collected from established sampling locations within a water system at specified frequencies to satisfy monitoring requirements as prescribed in this rule. These samples are used to calculate compliance with maximum contaminant levels prescribed in OAR 333-061-0030(4);
 - (B) Repeat: These are samples collected as a follow-up to a routine sample that has exceeded a maximum contaminant level as prescribed in OAR 333-061-0030. Repeat samples are also used to calculate compliance with maximum contaminant levels prescribed in OAR 333-061-0030(4);
 - (C) Special: These are samples collected to supplement routine monitoring samples and are not required to be reported to the Department. Samples of this type are not considered representative of the water system and are outside the scope of normal quality assurance and control procedures and/or the established compliance monitoring program. Special samples include, but are not limited to, samples taken for special studies, user complaints, post construction/repair disinfection, sources not in service and raw water prior to treatment, except as required by this rule.
- (2) Inorganic chemicals:
 - (a) Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Selenium and Thallium.
 - (A) Sampling of water systems for regulated Inorganic Chemicals shall be conducted as follows:
 - (i) Community and Non-Transient Non-Community Water systems using surface water sources or groundwater sources under the direct influence of surface water solely or a combination of surface and ground water sources shall sample at each point in the distribution system representative of each source after treatment or at entry points to the distribution system after any application of treatment. Surface water systems shall collect samples annually at each sampling point beginning in the initial compliance period according to the schedule in subsection (2)(k) of this rule. The water system shall take

- each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
- (ii) Community and Non-Transient Non-Community Water systems using ground water sources shall sample at each point in the distribution system representative of each source after treatment or at entry points to the distribution system representative of each source after any application of treatment. Ground water systems shall collect samples once every three years at each sampling point beginning in the initial compliance period according to the schedule in subsection (2)(k) of this rule. The water system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
 - (iii) All new Transient Non-Community and State Regulated water systems or existing Transient Non-Community, and State Regulated water systems with new sources shall sample once for arsenic. Samples are to be collected at the entry points to the distribution system representative of each source after any application of treatment.
 - (iv) If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions when water is representative of all the sources being used.
- (B) The Department may allow compositing of samples from a maximum of 5 sampling points, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples is to be done in the laboratory. Composite samples must be analyzed within 14 days of collection. If the concentration in the composite sample is equal to or greater than one-fifth of the MCL of any inorganic chemical listed in section (2) of this rule, then a follow-up sample must be taken for the contaminants which exceeded one-fifth of the MCL within 14 days at each sampling point included in the composite. If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the Department within 14 days of collection. If the population served by the water system is >3,300 persons, then compositing can only be allowed within the system. In systems serving £

3,300 persons, compositing is allowed among multiple systems provided the 5 sample limit is maintained.

- (C) Water systems may apply to the Department for a waiver from the monitoring frequencies specified in paragraph (2)(a)(A) of this rule on the condition that the system shall take a minimum of one sample while the waiver is effective and the effective period for the waiver shall not exceed one nine-year compliance cycle.
 - (i) The Department may grant a waiver provided surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring (at least one sample shall have been taken since January 1, 1990), and all analytical results are less than the maximum contaminant levels prescribed in OAR 333-061-0030 for inorganic chemicals. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.
 - (ii) Waivers granted by the Department shall be in writing and shall set forth the basis for the determination. The Department shall review and revise, where appropriate, its determination of the appropriate monitoring frequency when the system submits new monitoring data or where other data relevant to the system's appropriate monitoring frequency become available. In determining the appropriate reduced monitoring frequency, the Department shall consider the reported concentrations from all previous monitoring; the degree of variation in reported concentrations; and other factors which may affect concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.
- (D) Systems which exceed the maximum contaminant levels as calculated in subsection (2)(j) of this rule shall monitor quarterly beginning in the next quarter after the violation occurred. The Department may decrease the quarterly monitoring requirement to the frequencies prescribed in paragraph (2)(a)(A) of this rule when it is determined that the system is reliably and consistently below the maximum contaminant level. Before such a decrease is permitted a groundwater system must collect at least two quarterly samples and a surface water system must collect a minimum of four quarterly samples.

- (E) All new systems or systems that use a new source of water must demonstrate compliance with the MCL within a period of time specified by the Department. The system must also comply with the initial sampling frequencies specified by the Department to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.
- (b) Sulfate:
 - (A) Samples of water which is delivered to users shall be analyzed for sulfate as follows:
 - (i) Community and Non-Transient Non-Community water systems using surface or ground sources shall sample at each point in the distribution system representative of each source after treatment or at entry points to the distribution system after any application of treatment. Community and Non-Transient Non-Community water systems shall collect one sample at each sampling point beginning in the initial compliance period according to the schedule in subsection (2)(k) of this rule. The water systems must take each sample from the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
 - (ii) If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions when water is representative of all the sources being used.
 - (B) Each Community and Non-Transient Non-Community water system may apply to the Department for a waiver from the requirements of paragraph (2)(b)(A) of this rule. The Department may grant a waiver if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.
 - (C) The Department may require confirmation samples for positive or negative results.
 - (D) The Department may allow compositing of samples to reduce the number of samples to be analyzed by the system. Composite samples from a maximum of five sampling points are allowed. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collections. For systems with a population greater than 3,300, the Department may allow compositing at sampling points only within a single system. For systems with a population £ 3,300 the Department may allow compositing among different systems.

- (c) Asbestos:
- (A) Community and Non-Transient Non-Community water systems regardless of source, shall sample for Asbestos at least once during the initial three-year compliance period of each nine-year compliance cycle starting January 1, 1993 according to the schedule under subsection (2)(k) of this rule unless a water system applies for a waiver and the waiver is granted by the Department.
 - (B) As reviewed by the Department, if the water system is determined not to be vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, a waiver may be granted. If granted, the water system will not be required to monitor while the waiver remains in effect. A waiver remains in effect until the completion of the three year compliance period.
 - (C) A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take one sample at a tap served by the asbestos-cement pipe under conditions where asbestos contamination is most likely to occur.
 - (D) A system vulnerable to asbestos contamination due solely to source water shall monitor for asbestos once every nine years.
 - (E) A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.
 - (F) A System which exceeds the maximum contaminant levels for asbestos as prescribed in subsection (2)(j) of this rule shall monitor quarterly beginning in the next quarter after the violation occurred. If the Department determines that the system is reliably and consistently below the maximum contaminant level based on a minimum of two quarterly samples for groundwater systems or a minimum of four quarterly samples for surface water systems or combined surface water/groundwater systems, the system may return to the sampling frequency prescribed in paragraph (2)(c)(A) of this rule.
 - (G) If monitoring data collected after January 1, 1990 are generally consistent with subsection (2)(c) of this rule, then the Health Department may allow the system to use these data to satisfy monitoring requirements for the three-year compliance period beginning January 1, 1993.
- (d) Lead and Copper:

- (A) Community and Non-Transient, Non-Community water systems shall monitor for lead and copper in tap water as follows: Sample site location:
- (i) Each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this paragraph, and which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in paragraph 2(d)(C) of this rule. All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants.
 - (ii) In addition to any information that may have been gathered under the special corrosivity monitoring requirements, the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites:
 - (I) All plumbing codes, permits, and records in the files of the building department(s) which indicate the plumbing materials that are installed within publicly and privately owned structures connected to the distribution system; and
 - (II) All existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.
 - (iii) The sampling sites selected for a Community water system's sampling pool ("tier 1 sampling sites") shall consist of single family structures that contain copper pipes with lead solder installed from January 1, 1983 through June 30, 1985 or contain lead pipes. When multiple-family residences comprise at least 20 percent of the structures served by a water system, the system may include these types of structures in its sampling pool.
 - (iv) Any Community water system with insufficient tier 1 sampling sites shall complete its sampling pool with "tier 2 sampling sites", consisting of buildings, including multiple-family residences that contain copper pipes with

lead solder installed from January 1, 1983 through June 30, 1985 or contain lead pipes.

- (v) Any Community water system with insufficient tier 1 and tier 2 sampling sites shall complete its sampling pool with "tier 3 sampling sites", consisting of single family structures that contain copper pipes with lead solder installed before 1983. A community water system with insufficient tier 1, tier 2 and tier 3 sampling sites shall complete its sampling pool with representative sites throughout the distribution system. A representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the system.
 - (vi) The sampling sites selected for a Non-Transient Non-Community water system ("tier 1 sampling sites") shall consist of buildings that contain copper pipes with lead solder installed from January 1, 1983 through June 30, 1985 or contain lead pipes.
 - (vii) A Non-Transient Non-Community water system with insufficient tier 1 sites that meet the targeting criteria in paragraph (2)(d)(A)(vi) of this rule shall complete its sampling pool with sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed, the system shall use representative sites throughout the distribution system. A representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.
 - (viii) Any water system whose sampling pool does not consist exclusively of tier 1 sites shall demonstrate in a letter submitted to the Department under OAR 333-061-0040(1)(f)(A)(i) why a review of the information listed in paragraph (2)(d)(A)(ii) of this rule was inadequate to locate a sufficient number of tier 1 sites. Any Community water system which includes tier 3 sampling sites in its sampling pool shall demonstrate in such a letter why it was unable to locate a sufficient number of tier 1 and tier 2 sampling sites.
- (B) Monitoring requirements for lead and copper in tap water.
Sample collection methods:
- (i) All tap samples for lead and copper collected in accordance with this paragraph shall be first draw samples.

- (ii) Each first-draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours. First-draw samples from residential housing shall be collected from the cold-water kitchen tap or bathroom sink tap. First-draw samples from a non-residential building shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. First-draw samples may be collected by the system or the system may allow residents to collect first-draw samples after instructing the residents of the sampling procedures specified in this paragraph. To avoid problems of residents handling nitric acid, acid fixation of first draw samples may be done up to 14 days after the sample is collected. If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.
- (iii) A water system shall collect each first-draw tap sample from the same sampling site from which it collected a previous sample. If, for any reason, the water system cannot gain entry to a sampling site in order to collect a follow-up tap sample, the system may collect the follow-up tap sample from another sampling site in its sampling pool as long as the new site meets the same targeting criteria, and is within reasonable proximity of the original site.

(C) Monitoring requirements for lead and copper in tap water.
Number of samples: Water systems shall collect at least one sample during each monitoring period specified in paragraph (2)(d)(D) of this rule from the number of sites listed in the first column below ("standard monitoring"). A system conducting reduced monitoring under paragraph (2)(d)(D)(iv) of this rule shall collect at least one sample from the number of sites specified in the second column below during each monitoring period specified in paragraph (2)(d)(D)(iv) of this rule. Such reduced monitoring sites shall be representative of the sites required for standard monitoring. A system that has fewer than five drinking water taps, that can be used for human consumption meeting the sample site criteria of (2)(d)(A) of this rule to reach the required number of sample sites, must collect at least one sample from each tap and then must collect additional samples from those taps on different days during the monitoring period to meet the required number of sites.

Alternatively the Department may allow these public water systems to collect a number of samples less than the number of sites specified below provided that 100 percent of all taps that can be used for human consumption are sampled. The Department must approve this reduction of the minimum number of samples in writing based on a request from the system or onsite verification by the Department. The Department may specify sampling locations when a system is conducting reduced monitoring.

System Size (# People Served)	# of sites (Standard Monitoring)	# of sites (Reduced Monitoring)
>100,000	100	50
10,001 to 100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
≤100	5	5

(D) Monitoring requirements for lead and copper in tap water.

Timing of monitoring:

- (i) Initial tap monitoring requirements:
 - (I) All large systems shall monitor during two consecutive six-month periods.
 - (II) All small and medium-size systems shall monitor during each six-month monitoring period until the system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements specified in OAR 333-061-0034(2), in which case the system shall continue monitoring in accordance with paragraph (2)(d)(D)(ii) of this rule, or the system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with paragraph (2)(d)(D)(iv) of this rule.
- (ii) Monitoring after installation of corrosion control and source water treatment.
 - (I) Any large system which installs optimal corrosion control treatment pursuant to OAR 333-061-0034(2)(a)(D) shall monitor during two consecutive six-month monitoring periods by the date specified in 333-061-0034(2)(a)(E).

- (II) Any small or medium-size system which installs optimal corrosion control treatment pursuant to OAR 333-061-0034(2)(b)(E) shall monitor during two consecutive six-month monitoring periods by the date specified in 333-061-0034(2)(b)(F).
 - (III) Any system which installs source water treatment pursuant to OAR 333-061-0034(4)(a)(C) shall monitor during two consecutive six-month monitoring periods by the date specified in 333-061-0034(4)(a)(D).
- (iii) Monitoring after the Department specifies water quality parameter values for optimal corrosion control. After the Department specifies the values for water quality control parameters under OAR 333-061-0034(3)(l), the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the Department specifies the optimal values.
 - (iv) Reduced monitoring
 - (I) A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with paragraph (2)(d)(C) of this rule, and reduce the frequency of sampling to once per year. A small or medium water system collecting fewer than five samples as specified in (2)(d)(C) of this rule that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the frequency of sampling to once per year. In no case can the system reduce the number of samples required below the minimum of one sample per available tap. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.
 - (II) Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Department during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring to once per year and reduce the number of lead and copper samples in

accordance with paragraph (2)(d)(C) of this rule if it receives written approval from the Department. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period. The Department shall review monitoring, treatment, and other relevant information submitted by the water system, and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring. The Department shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

- (III) A small or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Department during three consecutive years of monitoring may reduce the frequency of monitoring from annually to once every three years if it receives written approval from the Department. Samples collected once every three years shall be collected no later than every third calendar year. The Department shall review monitoring, treatment, and other relevant information submitted by the water system and shall notify the system in writing when it determines the system is eligible to reduce the frequency of monitoring to once every three years. The Department shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.
- (IV) A water system that reduces the number and frequency of sampling shall collect these samples from representative sites included in the pool of targeted sampling sites identified in paragraph

(2)(d)(A) of this rule. Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August or September. The Department may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period shall be no longer than four consecutive months and must represent a time of normal operation where the highest levels of lead are most likely to occur. For a Non-transient Non-community water system that does not operate during the months of June through September, and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, the Department shall designate a period that represents a time of normal operation for the system. This sampling shall begin during the period approved or designated by the Department in the calendar year immediately following the end of the second consecutive six-month monitoring period for systems initiating annual monitoring and during the three-year period following the end of the third consecutive calendar year of annual monitoring for systems initiating triennial monitoring.

Community and Non-transient Non-community water systems monitoring annually or triennially that have been collecting samples during the months of June through December and that receive Department approval to alter their sample collection period must collect their next round of samples during a time period that ends no later than 21 months or 45 months, respectively, after the previous round of sampling. Subsequent rounds of sampling must be collected annually or triennially as required in this subsection.

- (V) A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance with paragraph (2)(d)(D)(iii) of this rule and collect the number of samples specified for standard lead and copper monitoring in paragraph (2)(d)(C) of this rule and shall also conduct water quality parameter monitoring in accordance with

paragraphs (2)(d)(F)(iii), (iv) or (v) of this rule, as appropriate, during the period in which the lead or copper action level was exceeded. Any such system may resume annual monitoring for lead and copper at the tap at the reduced number of sites after it has completed two subsequent consecutive six-month rounds of monitoring that meet the requirement of paragraph (2)(d)(D)(iv)(I) of this rule. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period. Any such system may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria prescribed in paragraphs (2)(d)(D)(iv)(III) or (VI) of this rule. Any water system subject to reduced monitoring frequency that fails to meet the lead action level during any four-month monitoring period or that fails to operate at or above the minimum value or within the range of values for the water quality control parameters specified by the Department for more than nine days in any six-month period specified in paragraph (2)(d)(F)(v) of this rule shall conduct tap water sampling for lead and copper at the frequency specified in paragraph (2)(d)(D)(iii) of this rule, collect the number of samples specified for standard monitoring, and shall resume monitoring for water quality parameters within the distribution system in accordance with paragraph (2)(d)(F)(v) of this rule. This standard tap water sampling shall begin no later than the six-month monitoring period beginning January 1 of the calendar year following the lead action level exceedance or water quality parameter excursion. Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions. Such a system may, with written Department approval, resume reduced annual monitoring for lead and copper at the tap after it has completed two subsequent six-month rounds of tap lead and copper monitoring that meet the criteria specified

in paragraph (2)(d)(D)(iv)(II) of this rule. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period. Such a system, with written Department approval, may resume reduced triennial monitoring for lead and copper at the tap if it meets the criteria specified in paragraphs (2)(d)(D)(iv)(III) and (VI) of this rule. Such a system may reduce the number and frequency of water quality parameter distribution tap samples required in accordance with paragraph (2)(d)(F)(vi)(I) and (II) of this rule. Such a system may not resume triennial monitoring for water quality parameters distribution tap samples until it demonstrates that it has re-qualified for triennial monitoring.

- (VI) Any water system that demonstrates for two consecutive 6-month monitoring periods that the 90th percentile lead level is less than or equal to 0.005 mg/l and the 90th percentile copper level is less than or equal to 0.65 mg/l may reduce the number of samples in accordance with paragraph (2)(d)(C) of this rule and reduce the frequency of sampling to once every three calendar years.
 - (VII) Any water system subject to a reduced monitoring frequency under (2)(d)(D)(iv) of this rule shall notify the Department in writing of any upcoming long-term change in treatment or addition of a new source. The Department must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Department may require the system to resume standard monitoring or take other appropriate steps such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment given the potentially different water quality considerations.
- (E) Monitoring requirements for lead and copper in tap water. Additional monitoring by systems: The results of any monitoring conducted in addition to the minimum requirements of subsection (d) of this rule shall be considered by the system and the Department in making any determinations (i.e., calculating the 90th percentile lead or copper level). The

Department may invalidate lead and copper tap water samples as follows:

- (i) The Department may invalidate a lead or copper tap sample if at least one of the following conditions is met. The decision and the rationale for the decision must be documented in writing by the Department. A sample invalidated by the Department does not count toward determining lead or copper 90th percentile levels or toward meeting the minimum monitoring requirements:
 - (I) The laboratory establishes that improper sample analysis caused erroneous results; or
 - (II) A site that did not meet the site selection criteria; or
 - (III) The sample container was damaged in transit; or
 - (IV) There is substantial reason to believe that the sample was subject to tampering.
 - (ii) The system must report the results of all samples to the Department and all supporting documentation for samples the system believes should be invalidated.
 - (iii) The Department may not invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.
 - (iv) The water system must collect replacement samples for any samples invalidated if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements. Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the Department invalidates the sample. The replacement samples shall be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.
- (F) Monitoring requirements for water quality parameters. All large water systems and all medium and small water systems that exceed the lead or copper action levels shall monitor water quality parameters in addition to lead and copper as follows:
- (i) General Requirements. Sample collection methods:
 - (I) Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Water quality parameter sampling is not required to be conducted at taps targeted for

lead and copper sampling, however, established coliform sampling sites may be used to satisfy these requirements.

- (II) Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions when water is representative of all sources being used.
- (ii) General requirements. Number of samples:
 - (I) Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under paragraphs (2)(d)(F)(iii) through (vi) of this rule from the following number of sites.

System Size # People served / # of Sites For Water Quality

Parameters

100,000	25
10,001-100,000	10
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
<100	1

- (II) Except as provided in paragraph (2)(d)(F)(iv)(III) of this rule, systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in paragraph (2)(d)(F)(iii) of this rule. During each monitoring period specified in paragraphs (2)(d)(F)(iv) through (vi) of this rule, systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.
- (iii) Initial Sampling. All large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each six-month monitoring period specified in paragraph (2)(d)(D)(i) of this rule. All small and medium-size systems shall measure the applicable

water quality parameters at the locations specified below during each six-month monitoring period specified in paragraph (2)(d)(D)(i) of this rule during which the system exceeds the lead or copper action level:

- (I) At taps: pH, alkalinity, orthophosphate (when an inhibitor containing a phosphate compound is used), silica (when an inhibitor containing a silicate compound is used), calcium, conductivity, and water temperature.
 - (II) At each entry point to the distribution system: all of the applicable parameters listed in paragraph (2)(d)(F)(iii)(I) of this rule.
- (iv) Monitoring after installation of corrosion control. Any large system which installs optimal corrosion control treatment pursuant to OAR 333-061-0034(2)(a)(D) shall measure the water quality parameters at the locations and frequencies specified below during each six-month monitoring period specified in paragraph (2)(d)(D)(ii)(I) of this rule. Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in paragraph (2)(d)(D)(ii)(II) of this rule in which the system exceeds the lead or copper action level.
- (I) At taps, two samples for: pH, alkalinity (when adjusting for alkalinity), orthophosphate (when an inhibitor containing a phosphate compound is used), silica (when an inhibitor containing a silicate compound is used), calcium (when calcium carbonate stabilization is used as part of corrosion control).
 - (II) Except as provided in paragraph (2)(d)(D)(iv)(III) of this rule, at each entry point to the distribution system, at least one sample, no less frequently than every two weeks (bi-weekly) for: pH; when alkalinity is adjusted as part of optimal corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration; and when a corrosion inhibitor is used as part of optimal corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate or silica (whichever is applicable).

- (III) Any ground water system can limit entry point sampling to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated ground water sources mixes with water from treated ground water sources, the system must monitor for water quality parameters both at representative entry points receiving treatment and no treatment. Prior to the start of any monitoring, the system shall provide to the Department written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.
- (v) Monitoring after Department specifies water quality parameter values for optimal corrosion control. After the Department specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under OAR 333-061-0034(3)(l), all large systems shall measure the applicable water quality parameters in accordance with paragraph (2)(d)(F)(iv) of this rule and determine compliance every six months with the first six-month period to begin on either January 1 or July 1, whichever comes first, after the Department specifies optimal water quality parameter values. Any small or medium-size system shall conduct such monitoring during each monitoring period specified in this paragraph in which the system exceeds the lead or copper action level. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to paragraph (2)(d)(D)(iv) of this rule at the time of the action level exceedance, the start of the applicable six-month monitoring period shall coincide with the start of the applicable monitoring period under (2)(d)(D) of this rule. Compliance with Department-designated optimal water quality parameter values shall be determined as specified under 333-061-0034(3)(m).
- (vi) Reduced monitoring:
 - (I) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of two consecutive six-month monitoring periods under paragraph (2)(d)(D) of this rule shall

continue monitoring at the entry point(s) to the distribution system as specified in paragraph (2)(d)(F)(iv)(II) of this rule. Such system may collect two tap samples for applicable water quality parameters from the following reduced number of sites during each six-month monitoring period.

System Size# People served / Reduced # of Sites for Water Quality Parameters

100,000	10
10,001-100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
<100	1

- (II) Any water system that maintains the minimum values or maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Department under OAR 333-061-0034(3)(1) during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in paragraph (2)(d)(F)(vi)(I) of this rule from every six months to annually. This sampling begins during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs. Any water system that maintains the minimum values or maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Department under 333-061-0034(3)(1) during three consecutive years of annual monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters from annually to every three years. This sampling begins no later than the third calendar year following the end of the monitoring period in which the third consecutive year of monitoring occurs.

- (III) A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters to every three years if it demonstrates during two consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to 0.005 mg/l, that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/l, and that it also has maintained the range of values for water quality parameters reflecting optimal corrosion control treatment specified by the Department. Monitoring conducted every three years shall be done no later than every third calendar year.
- (IV) A water system that conducts sampling annually shall collect these samples evenly throughout the year so as to reflect seasonal variability.
- (V) Any water system subject to reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the Department under OAR 333-061-0034(3)(l) for more than nine days in any six-month period shall resume distribution system tap water sampling in accordance with the number and frequency requirements in paragraph (2)(d)(F)(v) of this rule. Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria specified in paragraph (2)(d)(F)(v) of this rule and/or may resume triennial monitoring at the reduced number of sites after it demonstrates through subsequent annual rounds that it meets the criteria of paragraphs (2)(d)(F)(vi)(I) and (II) of this rule.
- (vii) Additional monitoring by systems. The results of any monitoring conducted in addition to the minimum requirements of subsection (2)(d) of this rule shall be considered by the system and the Department in making any determinations.
- (G) Monitoring requirements for lead and copper in source water. Sample location, collection methods, and number of samples:
 - (i) A water system that fails to meet the lead or copper action level on the basis of tap samples collected in

accordance with paragraphs (2)(d)(A) through (E) of this rule shall collect lead and copper source water samples in accordance with the following requirements regarding sample location, number of samples, and collection methods:

- (I) Ground water systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant;
 - (II) Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source, after treatment. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant; Surface water systems include systems with a combination of surface and ground sources; and
 - (III) If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods when water is representative of all sources being used.
- (ii) Where the results of sampling indicate an exceedance of maximum permissible source water levels established under OAR 333-061-0034(4)(b)(D) the Department may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point. If a Department-required confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the Department-specified maximum permissible levels. Any sample value below the detection limit shall be considered to be zero. For lead any value above the detection limit but below the Practical Quantitation Level (PQL) (0.005 mg/l) shall either be considered as the measured value or be considered one-half the PQL (0.0025 mg/l). For copper any value above

the detection limit but below the PQL (0.050 mg/l) shall either be considered as the measured value or be considered one-half the PQL (0.025 mg/l).

- (H) Monitoring requirements for lead and copper in source water. Monitoring frequency after system exceeds tap water action level. Any system which exceeds the lead or copper action level at the tap, shall collect one source water sample from each entry point to the distribution system no later than six months after the end of the monitoring period during which the lead or copper action level was exceeded. For monitoring periods that are annual or less frequent, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or if the Department has established an alternate monitoring period, the last day of that period.
 - (i) Monitoring frequency after installation of source water treatment. Any system which installs source water treatment pursuant to OAR 333-061-0034(4)(a)(C) shall collect an additional source water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in 333-061-0034(4)(a)(D).
 - (ii) Monitoring frequency after Department specifies maximum permissible source water levels or determines that source water treatment is not needed.
 - (I) A system shall monitor at the frequency specified below in cases where the Department specifies maximum permissible source water levels under OAR 333-061-0034(4)(b)(D) or determines that the system is not required to install source water treatment under 333-061-0034(4)(b)(B). A water system using only groundwater shall collect samples once during the three-year compliance period in effect when the applicable Department determination is made. Such systems shall collect samples once during each subsequent compliance period. Triennial samples shall be collected every third calendar year. A water system using surface water (or a combination of surface and groundwater) shall collect samples once during each calendar year, the first annual monitoring period to begin during the year in which the applicable Department determination is made.
 - (II) A system is not required to conduct source water sampling for lead and/or copper if the system

meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system under paragraph (2)(d)(H)(ii)(I) of this rule.

(iii) Reduced monitoring frequency:

- (I) A water system using only groundwater may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle provided that the samples are collected no later than every ninth calendar year and it demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Department in OAR 333-061-0034(4)(b)(D) during at least three consecutive compliance periods under paragraph (2)(d)(H)(ii)(I) of this rule or the Department has determined that source water treatment is not needed and the system demonstrates during at least three consecutive compliance periods under paragraph (2)(d)(H)(ii)(I) of this rule that the concentration of lead in source water was less than or equal to 0.005 mg/l and the concentration of copper in source water was less than or equal to 0.65 mg/l.
- (II) A water system using surface water (or a combination of surface and ground waters) may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle provided that the samples are collected no later than every ninth calendar year and it demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Department in OAR 333-061-0034(4)(b)(D) for at least three consecutive years or the Department has determined that source water treatment is not needed and the system demonstrates that during at least three consecutive years the concentration of lead in source water was less than or equal to 0.005 mg/l and the concentration of copper in source water was less than or equal to 0.65 mg/l.

- (III) A water system that uses a new source of water is not eligible for reduced monitoring for lead and/or copper until concentrations in samples collected from the new source during three consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the Department in OAR 333-061-0034(4)(a)(E).
- (e) Nitrate:
 - (A) Community and Non-Transient Non-Community water systems using surface water sources or groundwater sources under the direct influence of surface water shall monitor for Nitrate quarterly beginning January 1, 1993. The Department may allow a surface water system to reduce the sampling frequency to annually provided that all analytical results from four consecutive quarters are less than 50% of the MCL. A surface water system shall return to quarterly monitoring if any one sample is 50% of the MCL.
 - (B) Community and Non-Transient Non-Community water systems using groundwater sources shall monitor for Nitrate annually beginning January 1, 1993. The Department shall require quarterly monitoring for a least one year following any one sample in which the concentration is 50% of the MCL. The system may return to annual monitoring after four consecutive quarterly samples are found to be reliably and consistently below the MCL.
 - (C) Transient Non-Community and State Regulated water systems shall monitor for Nitrate annually beginning January 1, 1993.
 - (D) After the initial round of quarterly sampling is completed, each Community and Non-Transient Non-Community water system which is monitoring annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.
- (f) Nitrite:
 - (A) Community and Non-Transient Non-Community water systems shall collect one sample at each sampling point for Nitrite during the compliance period beginning January 1, 1993. The Department shall require quarterly monitoring for at least one year following any one sample in which the concentration is 50% of the MCL. The system may return to annual monitoring after four consecutive quarterly samples are found to be reliably and consistently below the MCL.

- (B) After the initial sample, all systems where analytical results for Nitrite are <50% of the MCL, shall monitor once during each subsequent compliance cycle.
 - (C) Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.
- (g) Sodium
- (A) Samples of water which is delivered to users shall be analyzed for Sodium as follows:
 - (i) Community and Non-Transient Non-Community water systems, surface water sources, once per year for each source;
 - (ii) Community and Non-Transient Non-Community water systems, ground water sources, once every three years for each source.
 - (B) The water supplier shall report to the Department the results of the analyses for Sodium as prescribed in rule 333-061-0040. The Department shall notify local health officials of the test results.
- (h) Confirmation Samples:
- (A) Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium exceed the MCL prescribed in OAR 333-061-0030 for inorganic chemicals, the Department may require one additional sample to be taken as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.
 - (B) Where the results of sampling for nitrate or nitrite exceed the MCL prescribed in OAR 333-061-0030 for inorganic chemicals, the system is required to collect one additional sample within 24 hours of notification of the results of the initial sample at the same sampling point. Systems unable to comply with the 24-hr sampling requirement must initiate consultation with the Department as soon as practical, but no later than 24 hours after the system learns of the violation and must immediately notify their users as prescribed in 333-061-0042(2)(a)(B), and collect one additional sample within two weeks of notification of the results of the initial sample.
 - (C) If a confirmation sample required by the Department is taken for any contaminant then the results of the initial and confirmation sample shall be averaged. The resultant average

shall be used to determine the system's compliance as prescribed in subsection (2)(j) of this rule.

- (i) The Department may require more frequent monitoring than specified in subsections (2)(a) through (g) of this rule or may require confirmation samples for positive and negative results. Systems may apply to the Department to conduct more frequent monitoring than is required in this section.
- (j) Compliance with the inorganic MCLs as listed in 333-061-0030(1) (Table 1) shall be determined based on the analytical result(s) obtained at each sampling point as follows:
 - (A) For systems which are conducting monitoring at a frequency greater than annual, compliance with the MCLs for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium is determined by a running annual average at any sampling point. If the average at any sampling point rounded to the same number of significant figures as the MCL for the substance in question is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample with results below the detection limit specified for the approved EPA analytical method shall be calculated at zero for the purpose of determining the annual average. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
 - (B) Systems monitoring annually or less frequently for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium must determine compliance with the MCL by running annual average at any sampling point. If the level of a contaminant at any sampling point is greater than the MCL listed in OAR 333-061-0030(1), the water system must begin quarterly sampling. The water system will not be considered in violation of the MCL until it has completed one year of quarterly monitoring. If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
 - (C) Compliance with MCLs for nitrate and nitrite is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels of nitrate and/or nitrite exceed

the MCLs in the initial sample, a confirmation sample is required in accordance with paragraph (2)(h)(B) of this rule and compliance shall be determined based on the average of the initial and confirmation samples.

(D) If the results of an analysis as prescribed in this rule indicate the level of any contaminant exceeds the maximum contaminant level, the water supplier shall report the analysis results to the Department within 48 hours as prescribed in OAR 333-061-0040 and initiate the public notice procedures as prescribed by OAR 333-061-0042.

(k) All Community and Non-Transient Non-Community water systems shall monitor according to the following schedule:

<u>Population</u>	<u>Begin Initial Monitoring</u>	<u>Complete Initial Monitoring By</u>
300 or More	January 1, 1993	December 31, 1993
100-299	January 1, 1994	December 31, 1994
Less than 100	January 1, 1995	December 31, 1995

(3) Organic chemicals:

(a) Synthetic Organic Chemicals: Alachlor, Atrazine, Benzo(a)pyrene, Carbofuran, Chlordane, Dalapon, Dibromochloropropane, Dinoseb, Dioxin(2,3,7,8-TCDD), Diquat, Di(2-ethylhexyl)adipate, Di(2-ethylhexyl)phthalate, Endothall, Endrin, Ethylene dibromide, Glyphosate, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, Hexachlorocyclopentadiene, Lindane(BHC-g), Methoxychlor, Oxamyl(Vydate), Picloram, Polychlorinated biphenyls, Pentachlorophenol, Simazine, Toxaphene, 2,4-D and 2,4,5-TP Silvex.

(A) Samples of water which is delivered to users shall be analyzed for regulated synthetic organic chemicals (SOC) as follows:

(i) Community and Non-Transient Non-Community water systems using surface, ground water under the direct influence of surface water or ground sources shall sample at each point in the distribution system representative of each source after treatment or at entry points to the distribution system after any application of treatment. Community and Non-Transient Non-Community water systems shall collect four consecutive quarterly samples at each sampling point beginning with the initial compliance period starting January 1, 1993. The water systems must take each sample from the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. New wells in an existing wellfield, within an existing drinking water protection area, or within an area well

characterized by area-wide source water assessments and/or past monitoring results as determined by the Department, may be eligible for a reduction in initial monitoring from four consecutive quarterly samples to one sample if no detections occur and if, based on the system's source assessment, the Department determines that the new well is producing from the same and only the same aquifer or does not significantly modify the existing drinking water protection area.

- (ii) If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions when water is representative of all the sources being used.
- (iii) If the initial analysis does not detect any contaminant listed in subsection (3)(a) of this rule, then monitoring at each sampling point may be reduced to:
 - (I) Two consecutive quarterly samples in one year during each repeat compliance period for systems serving more than 3300 population; or
 - (II) One sample in each repeat compliance period for systems serving less than or equal to 3300 population; or
 - (III) Once every 6 years for all SOCs, if the system has a state certified Drinking Water Protection Plan or for those SOCs determined to be "used" and for which that portion of the aquifer identified by the drinking water protection area delineation has been determined to be of "moderate" susceptibility according to the Department's Use and Susceptibility Protocol. Information from the system's Source Water Assessment can be used in this determination; or
 - (IV) Once every 9 years for those SOCs in an analytical method group determined to be "not used" in the delineated drinking water protection area, or for those SOCs determined to be "used" if that portion of the aquifer identified by the drinking water protection area delineation has been determined to be of "low susceptibility" according to the Department's Use and Susceptibility Waiver Document. Information from the system's Source Water Assessment can be used in this determination.

- (iv) If a water system has two or more wells that have been determined by the Department to constitute a "wellfield" as specified in OAR 333-061-0058, the system must sample at the entry point(s) designated by the Department.
- (B) Each Community and Non-Transient Non-Community water system may apply to the Department for a waiver from the requirements of paragraph (3)(a)(A) of this rule. Each water system can receive specific guidance in obtaining a waiver from the Use and Susceptibility Waiver Guidance Document developed by the Department. A waiver must be in place prior to the year in which the monitoring is to be accomplished, and the water system must reapply for a waiver for Organics monitoring each compliance period.
- (i) The water system shall use the drinking water protection area as delineated during the Source Water Assessment according to procedures described in the Use and Susceptibility Waiver Guidance Document.
 - (ii) The Use Waiver criteria as described in the Use and Susceptibility Waiver Guidance Document shall take into consideration but is not limited to the use, storage, distribution, transport and disposal of the contaminant within the delineated recharge or watershed area.
 - (iii) The Susceptibility Waiver criteria as described in the Use and Susceptibility Waiver Guidance Document shall address only those contaminants that remain after the use waiver process has been completed. The Susceptibility Waiver criteria shall take into consideration but is not limited to the history of bacteria and/or nitrate contamination, well construction, agricultural management practices, infiltration potential, and contaminant mobility and persistence.
 - (iv) Water systems which qualify for use and susceptibility waivers shall follow the monitoring requirements as directed in the Use and Susceptibility Waiver Guidance Document.
 - (v) The Use and Susceptibility Waiver Guidance Document is made a part of this rule and shall take into consideration the Wellhead Protection Program and shall be updated with new methods and procedures as they become available.
 - (vi) The Department may establish area-wide waivers based on historical monitoring data, land use activity, and the

results of "Source Water Assessments" and/or "Use and Susceptibility Waiver Documents".

- (C) If a water system detects in any sample a contaminant listed in subsection (3)(a) of this rule equal to or greater than the minimum detection limit listed in Table 15, then the water system shall monitor quarterly at each sampling point where a detection occurred.

Table 15

Contaminant	Detection Limit (mg/l)
Alachlor	0.0002
Atrazine	0.0001
Benzo(a) pyrene	0.00002
Carbofuran	0.0009
Chlordane	0.0002
Dalapon	0.001
Di(2-ethylhexyl) adipate	0.0006
Di(2-ethylhexyl) phthalate	0.0006
Dibromochloropropane (DBCP)	0.00002
Dinoseb	0.0002
Dioxin(2,3,7,8-TCDD)	0.000000005
Diquat	0.0004
Endothall	0.009
Endrin	0.00001
Ethylene Dibromide (EDB)	0.00001
Glyphosate	0.006
Heptachlor	0.00004
Heptachlor Epoxide	0.00002
Hexachlorobenzene	0.0001
Hexachlorocyclopentadiene	0.0001
Lindane(BHC-g)	0.00002
Methoxychlor	0.0001
Oxamyl(Vydate)	0.002
Picloram	0.0001
Polychlorinated Biphenyls (PCBs) (as Decachlorobiphenyl)	0.0001
Pentachlorophenol	0.00004
Simazine	0.00007
Toxaphene	0.001
2,4-D	0.0001
2,4,5-TP (Silvex)	0.0002

- (i) Based on a minimum of two quarterly samples for ground water sources and four quarterly samples for surface water sources, the Department may reduce the monitoring frequency required in paragraph (3)(a)(C) of this rule to annually provided the system is reliably and consistently below the MCL. Systems which monitor

annually must monitor during the quarter that previously yielded the highest analytical result.

- (ii) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Department for a waiver as specified in paragraph (3)(a)(B) of this rule.
 - (iii) If any monitoring required in paragraph (3)(a)(A) of this rule results in the detection of either Heptachlor or Heptachlor epoxide, then subsequent monitoring shall analyze for both contaminants.
- (D) If the results of an analysis prescribed in paragraph (3)(a)(A) of this rule indicate that the level of any contaminant exceeds a maximum contaminant level, then the system must monitor quarterly. After a minimum of four quarterly samples show the system to be reliably and consistently below the MCL and in compliance with paragraph (3)(a)(G) of this rule, then the system may monitor annually.
- (E) The Department may require confirmation samples for positive or negative results. If a confirmation sample is required by the Department, the result must be averaged with the original sample result (unless the previous sample has been invalidated by the Department) and the average used to determine compliance.
- (F) The Department may allow compositing of samples to reduce the number of samples to be analyzed by the system. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collections. If the concentration in the composite sample detects one or more contaminants listed in subsection (3)(a) of this rule, then a follow-up sample must be taken and analyzed within 14 days at each sampling point included in the composite, and be analyzed for that contaminant. Duplicates taken on the original composite samples may be used instead of resampling provided the duplicates are analyzed and the results reported to the Department within 14 days of collection. For systems with a population greater than 3,300, the Department may allow compositing at sampling points only within a single system. For systems with a population \leq 3,300, the Department may allow compositing among different systems, provided the 5-sample limit is maintained.
- (G) Compliance with contaminants listed in OAR 333-061-0030(2)(a) shall be determined based on the analytical results

obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL. For systems which monitor more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. Systems which monitor annually or less whose sample result exceeds the regulatory detection limit prescribed in paragraph (3)(a)(C) of this rule (Table 15) must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly monitoring. If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately. If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected. If a sample result is less than the detection limit, zero will be used to calculate the annual average. If the system is out of compliance, the system shall follow the reporting and public notification procedures as prescribed in OAR 333-061-0040 and 333-061-0042(2)(b)(A).

- (H) If monitoring data collected after January 1, 1990 are consistent with the requirements of subsection (3)(a) of this rule, the Department may allow systems to use that data to satisfy the monitoring requirements for the initial compliance periods beginning January 1, 1993 and January 1, 1996.
- (I) All Community and Non-Transient Non-Community water systems shall monitor according to the following schedule:

<u>Population</u> <u>By</u>	<u>Begin Initial Monitoring</u>	<u>Complete Initial Monitoring</u>
300 or More	January 1, 1993	December 31, 1993
100-299	January 1, 1994	December 31, 1994
Less than 100	January 1, 1995	December 31, 1995

- (J) All new systems or systems that use a new source of water must demonstrate compliance with the MCL within a period of time specified by the Department. The system must also comply with the initial sampling frequencies specified by the Department to ensure a system can demonstrate compliance with the MCL.
- (b) Volatile Organic Chemicals: Benzene, Carbon tetrachloride, Cis-1,2-Dichloroethylene, Dichloromethane, Ethylbenzene, Monochlorobenzene, O-Dichlorobenzene, P-Dichlorobenzene, Styrene, Tetrachloroethylene(PCE), Toluene, Trans-1,2-Dichloroethylene, Trichloroethylene(TCE), Vinyl chloride, Xylenes(total), 1,1-Dichloroethylene, 1,1,1-Trichloroethane, 1,1,2-

Trichloroethane, 1,2-Dichloroethane, 1,2-Dichloropropane, and 1,2,4-Trichlorobenzene.

(A) Samples of water which is delivered to users shall be analyzed for regulated volatile organic chemicals (VOC) as follows:

- (i) Community and Non-Transient Non-Community water systems using surface, ground water under the direct influence of surface water or ground water sources shall sample at each point in the distribution system representative of each source after treatment or at entry points to the distribution system after any application of treatment. Community and Non-Transient Non-Community water systems shall collect four consecutive quarterly samples from each sampling point during each compliance period beginning in the initial compliance period starting January 1, 1993. The water system shall take each sample from the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. New wells in an existing wellfield, within an existing drinking water protection area, or within an area well characterized by area-wide source water assessments and/or past monitoring results as determined by the Department, may be eligible for a reduction in initial monitoring from four consecutive quarterly samples to one sample if no detections occur and if, based on the system's Source Water Assessment, the Department determines that the new well is producing from the same and only the same aquifer or does not significantly modify the existing drinking water protection area.
- (ii) If warranted, the Department may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determines consumer exposure.
- (iii) If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions when water is representative of all sources being used.
- (iv) If a water system has two or more wells that have been determined by the Department to constitute a "wellfield" as specified in OAR 333-061-0058, the system must sample at the entry point(s) designated by the Department.

- (B) For the purpose of subsection (3)(c) of this rule, a detectable level for VOCs is 0.0005 mg/l.
- (C) If the initial analyses do not detect any contaminant listed in subsection (3)(c) of this rule, then monitoring for all of the VOCs may be reduced to:
 - (i) Annual per entry point for surface and ground water systems;
 - (ii) Once every three years per entry point for ground water systems after a minimum of three years of annual monitoring and no history of detections;
 - (iii) Once every 6 years if the system has a state certified Drinking Water Protection Plan or if that portion of the aquifer identified by the drinking water protection area delineation has been determined to be of "moderate" susceptibility to the VOCs according to the Department's Use and Susceptibility Protocol. Information from the system's Source Water Assessment can be used in this determination; or
 - (iv) Once every 9 years if that portion of the aquifer identified by the drinking water protection area delineation has been determined to be of "low susceptibility" to the VOCs according to the Use and Susceptibility Waiver Document. Information from the system's Source Water Assessment can be used in this determination.
 - (v) The Department may establish area-wide waivers based on historical monitoring data, land use activity, and the results of "Source Water Assessments" and/or "Use and Susceptibility Waiver Documents".
- (D) Each Community and Non-Transient Non-Community water system which does not detect any contaminant listed in subsection (3)(c) of this rule after the initial monitoring period may apply to the Department for a waiver from the requirements prescribed in paragraphs (3)(c)(A) and (C) of this rule according to procedures described in paragraph (3)(a)(B) of this rule and the Use and Susceptibility Waiver Guidance Document developed by the Department. A waiver must be in place prior to the year in which the monitoring is to be accomplished, and the water system must reapply for a waiver for Volatile Organic Chemicals monitoring every two compliance periods (6 years).
- (E) As a condition of a waiver groundwater systems must take one sample at each sampling point during the time the waiver is in effect and update its vulnerability assessment addressing those

factors listed in paragraph (3)(a)(B)(ii) and (iii) of this rule. The Department must confirm that a system is not vulnerable within three years of the original determination or the waiver is invalidated and the system is required to sample annually as specified in paragraph (3)(c)(C) of this rule.

- (F) Surface water systems which do not detect any contaminant listed in subsection (3)(c) of this rule after completing the initial monitoring and have been determined to be not vulnerable to VOC contamination by the Department shall monitor at the discretion of the Department. The Department shall reevaluate the vulnerability of such systems during each compliance period.
- (G) If a water system detects any contaminant listed in subsection (3)(c) of this rule (except vinyl chloride) in any sample greater than the minimum detection limit of 0.0005 mg/l, then the water system shall monitor quarterly at each sampling point where a detection occurred.
- (i) Based on a minimum of two quarterly samples for ground water sources and four quarterly samples for surface water sources, the Department may reduce the monitoring frequency required in paragraph (3)(c)(G) of this rule to annually provided the system is reliably and consistently below the MCL. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.
 - (ii) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Department for a waiver as specified in paragraph (3)(c)(D) of this rule.
 - (iii) Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the Department may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. Surface water systems are required to monitor for vinyl chloride at the discretion of the Department.

- (H) If the results of an analysis prescribed in paragraph (3)(c)(A) of this rule indicate that the level of any contaminant exceeds a maximum contaminant level, then the system shall monitor quarterly. After a minimum of four consecutive quarterly samples show the system to be reliably and consistently below the MCL and in compliance with paragraph (3)(c)(K) of this rule, then the system may monitor annually during the quarter which previously yielded the highest analytical result.
- (I) The Department may require confirmation samples for positive or negative results. If a confirmation sample is required by the Department, the result must be averaged with the original sample result and the average used to determine compliance.
- (J) The Department may allow compositing of samples to reduce the number of samples to be analyzed by the system. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collections. If the concentration in the composite sample is 0.0005 mg/l for any contaminant listed in subsection (3)(c) of this rule, then a follow-up sample must be taken and analyzed within 14 days at each sampling point included in the composite, and be analyzed for that contaminant. Duplicates taken on the original composite samples may be used instead of resampling provided the duplicates have not been held for longer than 14 days. For systems with a population greater than 3,300, the Department may allow compositing at sampling points only within a single system. For systems with a population \leq 3,300, the Department may allow compositing among different systems provided the 5-sample limit is maintained.
- (K) Compliance with contaminants listed in OAR 333-061-0030(2)(c) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL. For systems which monitor more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. Systems which monitor annually or less whose sample result exceeds the MCL must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling. If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately. If a system fails to

collect the required number of samples, compliance will be based on the total number of samples collected. If a sample result is less than the detection limit, zero will be used to calculate the annual average. If the water system is out of compliance, the system shall follow the reporting and public notification procedures as prescribed in 333-061-0040 and 333-061-0042(2)(b)(A).

- (L) If monitoring data collected after January 1, 1988 are consistent with the requirements of subsection (3)(c) of this rule, the Department may allow systems to use that data (i.e. a single sample rather than four quarterly samples) to satisfy the monitoring requirements prescribed in paragraph (3)(c)(A) of this rule for the initial compliance period. Systems which use grandparented samples and did not detect any contaminant listed in subsection (3)(c) of this rule shall begin monitoring annually in accordance with paragraph (3)(c)(C) of this rule beginning with the initial compliance period.
- (M) All Community and Non-Transient Non-Community water systems shall monitor according to the following schedule:

<u>Population</u> <u>by</u>	<u>Begin initial monitoring</u>	<u>Complete initial monitoring</u>
300 or More	January 1, 1993	December 31, 1993
100-299	January 1, 1994	December 31, 1994
Less than 100	January 1, 1995	December 31, 1995

- (N) All new systems or systems that use a new source of water must demonstrate compliance with the MCL within a period of time specified by the Department. The system must also comply with the initial sampling frequencies specified by the Department to ensure a system can demonstrate compliance with the MCL.
- (4) Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors:
- (a) General sampling and analytical requirements. The requirements of this section apply to all Community and Non-transient Non-community water systems that add a disinfectant (oxidant) to the water supply at any point in the treatment process or deliver water in which a disinfectant (oxidant) has been added to the water supply.
 - (A) Water systems must take all samples during normal operating conditions.
 - (B) Water systems may consider multiple wells where a disinfectant is added, drawing water from a single aquifer, as one treatment plant for determining the minimum number of total trihalomethanes (TTHM) and haloacetic

acids(five)(HAA5) samples required, with approval from the Department.

- (C) Failure to monitor in accordance with the monitoring plan as specified in paragraphs (4)(c)(C) or (4)(d)(D) of this rule is a monitoring violation.
 - (D) Failure to monitor will be treated as a violation for the entire period covered by the annual average where compliance is based on a running annual average (RAA) of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MCLs or MRDLs.
 - (E) Systems must use only data collected under the provisions of this rule to qualify for reduced monitoring.
- (b) Initial Distribution System Evaluation (IDSE) Requirements. This subsection establishes monitoring and other requirements for identifying monitoring locations which, in conjunction with the requirements of subsections (4)(d) and (4)(f) of this rule, determine compliance with the MCLs for TTHM and HAA5 as specified in OAR 333-061-0030. Non-transient Non-community water systems serving 10,000 people or less are exempt from the requirements of this subsection.
- (A) IDSE Submittal Schedule: Water systems must comply with the requirements specified in Table 16 of this paragraph. Water systems that begin adding a disinfectant to the water supply after the dates specified in Table 16 must consult with the Department to identify compliance monitoring locations and any IDSE compliance requirements. Water systems that were granted a waiver by the EPA exempting them from completing an IDSE, must begin monitoring in accordance with subsection (4)(d) of this rule no later than the date set forth in Table 22 in subsection (4)(d) of this rule.

Table 16 IDSE Submittal Schedule for water systems that are not part of a combined distribution system or water systems that serve the largest population in a combined distribution system		
Population served	Systems must complete standard monitoring or system specific study by:	Systems must submit IDSE report to the Department by: ^{1 & 2}
≥100,000	September 30, 2008	January 1, 2009
50,000-99,999	March 31, 2009	July 1, 2009
10,000-49,999	September 30, 2009	January 1, 2010
<10,000 (CWS Only)	March 31, 2010	July 1, 2010
Other water systems, whether wholesale or	At the same time as the water system with the largest	At the same time as the water system with the largest

purchasing, that are part of a combined distribution system	population in the combined distribution system	population in the combined distribution system
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¹ A water system must implement standard monitoring or complete a system specific study by the date identified in this column if the Department does not approve the IDSE plan or notify the water system that it has not yet completed its review.

² If, within three months after the date identified in this column (nine months after the date identified in this column if the system must comply with the schedule in paragraph (4)(b)(A)(iii) of this rule) the Department does not approve the IDSE report or notify the water system that it has not yet completed its review, the system may consider the report approved and system must implement the recommended Stage 2 monitoring as required.

- (i) The Department may determine, in regards to the dates specified in Table 16, that a combined distribution system does not include certain wholesale or purchasing water systems based on factors such as delivering or receiving water only on an emergency basis, or delivering or receiving only a small percentage and volume of water.
- (ii) IDSE results will not be used for the purpose of determining compliance with MCLs as prescribed by OAR 333-061-0030(2)(b).
- (B) Standard monitoring plans. Standard monitoring plans must comply with the requirements of paragraphs (4)(b)(B)(i) through (iv) of this rule.
 - (i) The standard monitoring plan must include a schematic of the distribution system (including distribution system water sources, entry points, and storage facilities), with notes indicating the locations and dates of all projected standard monitoring and projected monitoring as prescribed by subsections (4)(c) and (4)(e) of this rule.
 - (ii) The standard monitoring plan must include an explanation of standard monitoring location selection, and a summary of data relied on to justify the selection.
 - (iii) The standard monitoring plan must identify the population served and source water classification for the water system.
 - (iv) Standard monitoring. Water systems must monitor as indicated in Table 17 below. Water systems must collect dual sample sets at each monitoring location, and at least one round of monitoring must be during the peak historical month for TTHM or HAA5 levels, or during the month of warmest water temperature. Water systems must review available compliance, study, or operational data to determine the peak historical month for TTHM or HAA5 levels or the month of warmest water temperature.

Table 17

Source water type	Population and category	Monitoring periods and frequency of sampling	Distribution system monitoring locations				
			Total per monitoring period	Near entry points	Average residence time	High TTHM locations	High HAA5 locations
Surface water or GWUDI:	< 500 purchasing water systems	One (during peak historical month)	2	1		1	
	< 500 non-purchasing water systems	One (during peak historical month)	2			1	1
	500-3,300 purchasing water systems	four (every 90 days)	2	1		1	
	500-3,300 non-purchasing water systems	four (every 90 days)	2			1	1
	3,301-9,999	four (every 90 days)	4		1	2	1
	10,000-49,999	six (every 60 days)	8	1	2	3	2
	50,000-249,999	six (every 60 days)	16	3	4	5	4
	250,000-999,999	six (every 60 days)	24	4	6	8	6
	1,000,000-4,999,999	six (every 60 days)	32	6	8	10	8
	≥5,000,000	six (every 60 days)	40	8	10	12	10
Groundwater:	< 500 purchasing water systems	one (during peak historical month)	2	1		1	
	< 500 non-purchasing water systems	one (during peak historical month)	2			1	1
	500-9,999	four (every 90 days)	2			1	1
	10,000-99,999	four (every 90 days)	6	1	1	2	2
	100,000-499,999	four (every 90 days)	8	1	1	3	3

	≥500,000	four (every 90 days)	12	2	2	4	4
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- (v) Samples must be collected at locations other than those specified by the monitoring plan as prescribed by subsection (4)(c) of this rule. Sampling locations must be spread throughout the distribution system.
- (vi) If the number of entry points to the distribution system is fewer than the number of entry point monitoring locations specified in Table 17, excess entry point samples must be replaced equally by samples collected at locations where you would expect to find high TTHM and HAA5 concentration. If there is an odd number of excess sampling locations, the additional sample must be collected at a location where you would expect to find high TTHM concentration. If the number of entry points to the distribution system is greater than the number of entry point monitoring locations specified in Table 17, the samples must be collected at entry points having the highest annual water flows.
- (vii) Monitoring in accordance with Table 17 may not be reduced according to the provisions of subsection (1)(d) of this rule.
- (viii) IDSE report. The IDSE report must include the following elements:
 - (I) The IDSE report must include all TTHM and HAA5 analytical results collected in accordance with subsection (4)(c) or (4)(e) of this rule, and all standard monitoring conducted during the period of the IDSE as individual analytical results and a locational running annual average (LRAA) presented in a format acceptable to the Department. If changed from the standard monitoring plan prescribed by paragraph (4)(b)(B) of this rule, the report must also include a schematic of the distribution system, the population served, and the source water type.
 - (II) The IDSE report must include an explanation of any deviations from the approved standard monitoring plan.
 - (III) Water systems must recommend timing and locations for compliance monitoring prescribed in subsections (4)(d) and (4)(f) of this rule, based on the protocol prescribed by paragraph (4)(b)(d)(iii)

of this rule, including an explanation for why the locations were selected.

(C) System Specific Study Plans. A system specific study plan may be based on either existing monitoring results or modeling as prescribed by paragraphs (4)(b)(C)(i) or (4)(b)(C)(ii) of this rule. System specific study plans must be completed according to Table 16 as prescribed in paragraph (4)(b)(A) of this rule.

(i) Existing Monitoring Results. Water systems must submit monitoring results collected prior to the date prescribed by paragraph (4)(b)(A) of this rule. The monitoring results and analysis must meet the following criteria:

(I) TTHM and HAA5 samples must have been collected no earlier than five years prior to the study plan submission date. Sample collection and analysis must be conducted in accordance with subsection (1)(a) of this rule;

(II) The monitoring locations and monitoring frequency must meet the conditions specified in Table 18. Each sampling location must be sampled once during the peak historical month for TTHM or HAA5 levels or the month of warmest water temperature, for every 12 months of data submitted for that sampling location. Monitoring results must include all monitoring results collected in accordance with subsection (4)(c) or (4)(e) of this rule, and any additional monitoring results necessary to meet the minimum sample requirements;

System Type	Population size category	Number of monitoring locations	Number of samples	
			TTHM	HAA5
Surface water or GWUDI:	< 500	3	3	3
	500-3,300	3	9	9
	3,301-9,999	6	36	36
	10,000-49,999	12	72	72
	50,000-249,999	24	144	144
	250,000-999,999	36	216	216
	1,000,000-4,999,999	48	288	288
	≥ 5,000,000	60	360	360
Groundwater:	< 500	3	3	3
	500-9,999	3	9	9
	10,000-99,999	12	48	48
	100,000-499,999	18	72	72
		≥ 500,000	24	96

- (III) The water system must report previously collected monitoring results, and certify that the reported monitoring results include all results generated during the time period beginning with the first reported result and ending with the most recent monitoring result collected in accordance with subsection (4)(c) or (4)(e) of this rule;
 - (IV) The water system must certify that the samples are representative of the entire distribution system, and that neither treatment nor the distribution system has changed significantly since the samples were collected;
 - (V) The study plan must include a schematic of the distribution system (including distribution system water sources, entry points, and storage facilities), with notes indicating the locations and dates of all completed or planned system specific study monitoring;
 - (VI) The system specific study plan must include the population served and source water classification; and
 - (VII) If a water system submits previously collected monitoring results that meets the number of samples required by Table 18, and the Department rejects some of the monitoring results, the water system must either conduct additional monitoring to replace the rejected results on a Department-approved schedule or conduct standard monitoring as prescribed by paragraph (4)(b)(B) of this rule.
- (ii) Modeling. Water systems must conduct analysis of an extended period simulation hydraulic model. The hydraulic model and analysis must meet the following criteria:
- (I) The model must simulate a 24-hour variation in demand and show a consistently repeating 24-hour pattern of residence time;
 - (II) The model must represent the following criteria:
 - (1) 75% of pipe volume;
 - (2) 50% of pipe length;
 - (3) all pressure zones;
 - (4) all 12-inch diameter and larger pipes;
 - (5) all 8-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves, or are known or

expected to be significant conveyors of water; (6) all 6-inch and larger pipes that connect remote areas of a distribution system to the main portion of the system; (7) all storage facilities with standard operations represented in the model; and (8) all active pump stations with controls represented in the model; and (9) all active control valves; and

- (III) The model must be calibrated, or have calibration plans for the current configuration of the distribution system during the period of highest TTHM formation potential. All storage facilities must be evaluated as part of the calibration process. Calibration must be completed no later than 12-months after submission of the system specific study plan.
- (IV) Reporting modeling. The system specific study plan must include (1) tabular or spreadsheet data demonstrating that the model meets requirements in paragraph (C)(ii)(II) of this section; (2) a description of all calibration activities undertaken, and if calibration is complete, a graph of predicted tank levels versus measured tank levels for the storage facility with the highest residence time in each pressure zone, and a time series graph of the residence time at the longest residence time storage facility in the distribution system showing the predictions for the entire simulation period (i.e., from time zero until the time it takes to for the model to reach a consistently repeating pattern of residence time); (3) model output showing preliminary 24 hour average residence time predictions throughout the distribution system; (4) timing and number of samples representative of the distribution system planned for at least one monitoring period of TTHM and HAA5 dual sample monitoring at a number of locations no less than would be required for the system under standard monitoring in paragraph (4)(b)(B) of this rule during the historical month of high TTHM. These samples must be taken at locations other than existing compliance monitoring locations determined in accordance with subsection (4)(c) of this rule (5) description of how all requirements

will be completed no later than 12 months after system submits the system specific study plan; (6) schematic of the distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed system specific study monitoring (if calibration is complete) and all compliance monitoring conducted in accordance with subsection (4)(c) of this rule; and (7) population served and system type (surface water, groundwater under the direct influence of surface water, or groundwater).

- (V) If a model is submitted that does not meet the requirements of paragraph (4)(b)(C)(ii) of this rule, the system must correct the deficiencies and respond to Department inquiries concerning the model. Failure to correct deficiencies or respond to inquiries by the Department will result in the system having to conduct standard monitoring as prescribed by paragraph (4)(b)(B) of this rule.
- (iii) IDSE report. Water systems must submit the IDSE report according to the schedule prescribed in Table 16, and the report must include the following elements:
- (I) The IDSE report must include all TTHM and HAA5 monitoring results collected in accordance with subsections (4)(c) and (4)(e) of this rule, and all system specific study monitoring results collected during the period of the system specific study submitted in a tabular or spreadsheet format acceptable to the Department. If changed from the system specific study plan submitted under paragraph (4)(b)(C) of this rule, the IDSE report must also include a schematic of the distribution system, the population served, and source water classification;
 - (II) If using the modeling provision prescribed by paragraph (4)(b)(C)(ii) of this rule, the system must include final information for the elements described in paragraphs (4)(b)(C)(ii)(IV) and (V) of this rule, and a 24-hour time series graph of residence time for each location selected for monitoring in accordance with subsections (4)(d) and (4)(f) of this rule;

- (III) The water system must recommend monitoring locations selected for monitoring in accordance with subsections (4)(d) and (4)(f) of this rule based on the protocol in paragraph (4)(b)(D) of this rule.
 - (IV) The IDSE report must include an explanation of any deviations from the approved system specific study plan.
 - (V) The IDSE report must include justification for recommending the monitoring locations selected for monitoring in accordance with subsections (4)(d) and (4)(f) of this rule.
 - (VI) Water systems may submit the IDSE report in lieu of the system specific study plan according to the schedule identified in Table 16 if the water system believes that it has the necessary information by the time that the system specific study plan is due. If water systems choose this approach, the IDSE report must also include all information required under paragraph (4)(b)(C) of this rule.
- (D) Monitoring location recommendations.
- (i) The IDSE report must include recommendations and explanation for where and during what month(s) TTHM and HAA5 monitoring in accordance with subsections (4)(d) and (4)(f) of this rule should be conducted. Recommendations must be based on the criteria in paragraphs (4)(b)(D)(ii) through (v) of this rule.
 - (ii) Water systems must collect samples as prescribed by Table 20 below. The number of samples and recommended locations must be used for monitoring in accordance with subsections (4)(d) and (4)(f) of this rule, unless the Department requires different or additional locations. Monitoring locations should be dispersed throughout the distribution system to the maximum extent possible.

Source water type	Population	Monitoring frequency ¹	Distribution system monitoring location			
			Total per monitoring period ²	Highest TTHM locations	Highest HAA5 locations	Previous monitoring locations
Surface water systems or GWUDI	< 500	Per year	2	1	1	
	500-3,300	per quarter	2	1	1	
	3,301-9,999	per quarter	2	1	1	
	10,000-49,999	per quarter	4	2	1	1

	50,000-249,999	per quarter	8	3	3	2
	250,000-999,999	per quarter	12	5	4	3
	1,000,000-4,999,999	per quarter	16	6	6	4
	≥5,000,000	per quarter	20	8	7	5
Groundwater:	< 500	Per year	2	1	1	
	500-9,999	Per year	2	1	1	
	10,000-99,999	per quarter	4	2	1	1
	100,000-499,999	per quarter	6	3	2	1
	≥500,000	per quarter	8	3	3	2

¹ All water systems must monitor during month of highest DBP concentrations.

² Water systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location. Groundwater systems serving a population of 500-9,999 people, on annual monitoring, must take dual sample sets at each monitoring location. All other water systems on annual monitoring, and surface water or GWUDI water systems serving a population of 500-3,300 may collect individual TTHM and HAA5 samples instead of dual sample sets at the locations with the highest TTHM and HAA5 concentrations. If a water system serving fewer than 500 people has the highest TTHM and HAA5 concentrations occur at the same location, during the same month, that system may collect only one dual sample set per monitoring period.

- (iii) Water systems must recommend locations for monitoring in accordance with subsections (4)(d) and (4)(f) of this rule based on standard monitoring results, system specific study results, or monitoring results collected in accordance with subsections (4)(c) and (4)(e) of this rule. Water systems must comply with the protocol specified in paragraphs (4)(b)(D)(iii)(I) through (VIII) of this rule. If a water system is required to monitor at more than eight locations, the protocol must be repeated as necessary. If a water system does not have sufficient monitoring results collected in accordance with subsections (4)(c) and (4)(e) of this rule, the system must repeat the protocol, ignoring the provisions of paragraphs (4)(b)(D)(iii)(III) and (VII) as necessary, until the required total number of monitoring locations have been identified. Water systems must select the:
- (I) Location with the highest TTHM LRAA not previously selected through this protocol;
 - (II) Location with the highest HAA5 LRAA not previously selected through this protocol;
 - (III) Location with the highest HAA5 RAA based on sampling in accordance with subsections (4)(c) and (4)(e) of this rule, and with average residence time

- (or maximum residence time for groundwater systems) not previously selected through this protocol;
 - (IV) Location with the highest TTHM LRAA not previously selected through this protocol;
 - (V) Location with the highest TTHM LRAA not previously selected through this protocol;
 - (VI) Location with the highest HAA5 LRAA not previously selected through this protocol;
 - (VII) Location with the highest TTHM LRAA based on sampling in accordance with subsections (4)(c) and (4)(e) of this rule, and with average residence time (or maximum residence time for groundwater systems) not previously selected through this protocol; and
 - (VIII) Location with the highest HAA5 LRAA not previously selected through this protocol.
- (iv) A water system may recommend locations other than those determined through paragraph (4)(b)(D)(iii) of this rule, if the system includes a rationale for selecting other locations. If the Department approves the alternate locations, the water system must monitor at these locations to determine compliance with subsections (4)(d) and (4)(f) of this rule.
- (v) The water system's recommended monitoring schedule must include the month of historically highest TTHM and HAA5 concentration, unless the Department approves another month. Once the highest historical month has been identified, and if quarterly or more frequent routine monitoring is required, water systems must schedule monitoring at a regular frequency of at least every 90 days.
- (c) Routine monitoring requirements for TTHMs and HAA5.
- (A) Water systems required to conduct monitoring for TTHM and HAA5 must monitor at the frequency specified in Table 21 until the date set forth in Table 22, after which water systems must comply with the requirements of subsections (4)(d) or (4)(f) of this rule.

Type of source and water system	Minimum monitoring frequency	Sample location in the distribution system
Surface water or groundwater under the	Four water samples per quarter per treatment plant.	At least 25 percent of all samples collected each quarter at locations representing

direct influence of surface water serving at least 10,000 persons.		maximum residence time. Remaining samples taken at locations representative of at least average residence time in the distribution system and representing the entire distribution system, taking into account number of persons served, different sources of water, and different treatment methods. ¹
Surface water or groundwater under the direct influence of surface water serving from 500 to 9,999 persons.	One water sample per quarter per treatment plant.	Locations representing maximum residence time. ¹
Surface water or groundwater under the direct influence of surface water influence serving fewer than 500 persons.	One sample per year per treatment plant during month of warmest water temperature.	Locations representing maximum residence time. ^{1 & 3}
Systems using only groundwater not under the direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	One water sample per quarter per treatment plant ² .	Locations representing maximum time. ¹
System using only groundwater not under the direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons.	One sample per year per treatment plant ² during month of warmest water temperature.	Locations representing maximum residence time. ^{1 & 3}

¹ If a system elects to sample more frequently than the minimum required, at least 25 percent of all samples collected each quarter (including those taken in excess of the required frequency) must be taken at locations that represent the maximum residence time of the water in the distribution system. The remaining samples must be taken at locations representative of at least average residence time in the distribution system.

² Multiple wells drawing water from a single aquifer may be considered one treatment plant for determining the minimum number of samples required as approved by the Department.

³ If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until the system meets the reduced monitoring criteria in paragraph (4)(e)(C) of this rule.

(B) Systems on increased monitoring may return to routine monitoring if, after at least one year of monitoring, the TTHM annual average is less than or equal to 0.060 mg/L and the HAA5 annual average is less than or equal to 0.045 mg/L.

- (C) Monitoring plans. Each water system required to monitor under subsection (4)(c) of this rule must develop and implement a monitoring plan. The system must maintain the plan and make it available for inspection by the Department and the general public no later than 30 days following the applicable compliance dates as specified in OAR 333-061-0032(10)(b). All water systems using surface water or groundwater under the direct influence of surface water serving more than 3,300 people must submit a copy of the monitoring plan to the Department no later than the date of the first report required by OAR 333-061-0040(k). The Department may also require the plan to be submitted by any other system. After review, the Department may require changes in any plan elements. The plan must include at least the following elements:
- (i) Specific locations and schedules for collecting samples for any parameters included in subsection (4)(c) and (4)(e) of this rule;
 - (ii) How the water system will calculate compliance with MCLs, MRDLs, and treatment techniques; and
 - (iii) If approved for monitoring as a purchasing water system, or if providing water to a purchasing water system, the sampling plan must reflect the entire distribution system.
- (d) Revised monitoring requirements for TTHM and HAA5. This subsection establishes monitoring and other requirements for achieving compliance with the MCL based on a LRAA for TTHM and HAA5, and for achieving compliance with maximum residual disinfectant levels for chlorine and chloramine for certain purchasing water systems.
- (A) Water systems must meet the requirements of this subsection beginning on the date specified by the schedule in Table 22:

Table 22		
System type	Population	Compliance Date*
Water systems that are not part of a combined distribution system, and water systems that serve the largest population within a combined distribution system	System serving \geq 100,000	April 1, 2012
	System serving 50,000-99,999	October 1, 2012
	System serving 10,000-49,999	October 1, 2013
	System serving < 10,000	October 1, 2013 if no <i>Cryptosporidium</i> monitoring is required under OAR 333-061-0036(5)(e)(A)(iv) or October 1, 2014 if

Other water systems, whether wholesale or purchasing, that are part of a combined distribution system

Any population

Cryptosporidium monitoring is required under OAR 333-061-0036(5)(e)(A)(iv) or OAR 333-061-0036(5)(e)(A)(v)

At the same time as the water system with the largest population in the combined distribution system

* The Department may grant up to an additional 24 months for compliance with MCLs and operational evaluation levels if capital improvements are required to comply with an MCL.

- (i) Water systems required to conduct quarterly monitoring must begin monitoring in the calendar quarter that includes the compliance date specified in Table 22.
 - (ii) Water systems required to conduct monitoring at a frequency less than quarterly must begin monitoring in the month recommended in the IDSE report prepared as prescribed in paragraphs (4)(b)(B) or (4)(b)(C) of this rule, or the month identified in the monitoring plan developed as prescribed in paragraph (4)(d)(D) of this rule, within 12 months of the date specified in Table 22.
- (B) Compliance calculations and determinations. Water systems required to conduct quarterly monitoring must make compliance calculations at the end of the fourth quarter following the compliance date specified in Table 22, and at the end of each subsequent quarter. The LRAA must be calculated prior to the fourth quarter if fewer than four quarters of data would cause the MCL to be exceeded, regardless of the monitoring results in subsequent quarters. Water systems required to conduct monitoring at a frequency less than quarterly must make compliance calculations beginning with the first sample collected after the date specified in Table 22.
 - (i) Water systems required to monitor quarterly. Water systems must calculate the LRAA for TTHM and HAA5 using monitoring results collected under this subsection to comply with the MCL listed in OAR 333-061-0030(2)(b). Water systems that fail to complete four consecutive quarters of monitoring must calculate the LRAA based on the available data from the most recent four quarters. Water systems that take more than one sample per quarter at a specific monitoring location must average all samples taken in the quarter for that location

to determine a quarterly average to be used in the LRAA calculation.

- (ii) Water systems required to monitor yearly or less frequently. Water systems must determine that each sample collected is less than the MCL listed in OAR 333-061-0030(2)(b). If any sample exceeds the MCL, the water system must comply with the requirements of subsection (4)(h) of this rule. If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.
 - (iii) A water system required to monitor quarterly is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the system fails to monitor.
- (C) Routine Monitoring Frequency. Water systems that submitted an IDSE report must begin monitoring at the locations and during the months recommended in the IDSE report as prescribed by paragraph (4)(b)(D) of this rule, following the schedule as prescribed by Table 22, unless the Department requires other or additional locations after its review. Non-transient Non-community water systems serving less than 10,000 people, and water systems that were granted a waiver by the EPA exempting them from completing an IDSE must begin monitoring at the location(s) and dates identified in the monitoring plan developed as prescribed in subsection (4)(c)(C) of this rule, and updated as required by paragraph (4)(d)(D) of this rule.
- (i) Systems must monitor at no fewer than the number of locations identified in Table 23:

Table 23

Source water type	Population size category	Monitoring Frequency ¹	Distribution system monitoring location total per monitoring period ²
Surface water systems or GWUDI:	< 500	per year	2
	500-3,300	per quarter	2
	3,301-9,999	per quarter	2
	10,000-49,999	per quarter	4
	50,000-249,999	per quarter	8
	250,000-999,999	per quarter	12
	1,000,000-4,999,999	per quarter	16
Groundwater:	>= 5,000,000	per quarter	20
	< 500	per year	2
	500-9,999	per year	2
	10,000-99,999	per quarter	4
	100,000-499,999	per quarter	6

¹ All systems must monitor during month of highest DBP concentrations.

² Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for surface water or groundwater under the direct influence of surface water systems serving 500-3,300. Groundwater systems serving 500-9,999 on annual monitoring must take dual sample sets at each monitoring location. All other systems on annual monitoring and surface water or groundwater under the direct influence of surface water systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. For systems serving fewer than 500 people, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location, and month.

(ii) Water systems that begin adding a disinfectant to the water supply after the dates specified in Table 16 must consult the Department to identify compliance monitoring locations. Systems must then develop a monitoring plan as prescribed in paragraph (4)(d)(D) of this rule that includes those monitoring locations.

(D) Monitoring Plan. Water systems must develop and implement a monitoring plan. The monitoring plan must be completed no later than the date the system begins monitoring in accordance subsections (4)(d) and (4)(f) of this rule, and must be maintained and made available for inspection by the Department and the general public.

(i) The monitoring plan must include the following elements:

(I) Monitoring locations;

(II) Monitoring dates; and

(III) Compliance calculation procedures.

(ii) Water systems not required to submit an IDSE report as prescribed in paragraphs (4)(b)(B) or (4)(b)(C) of this rule, and that have either insufficient or too many monitoring locations from monitoring in accordance with subsections (4)(c) and (4)(e) of this rule, must identify the required number of monitoring locations for monitoring in accordance with subsections (4)(d) and (4)(f) of this rule. Water systems must identify the locations by alternating the selection of locations representing high TTHM levels and high HAA5 levels until the required number of monitoring locations have been identified. Water systems must also provide a rationale for identifying the locations as having high levels of TTHM or HAA5.

(iii) Surface water or GWUDI systems serving more than 3,300 people must submit a copy of their monitoring plan to the Department prior to the date the system conducts

initial monitoring under this rule, unless the IDSE report submitted as prescribed in subsection (4)(b) of this rule contains all the information required in paragraph (4)(b)(D) of this rule.

- (iv) Revisions to monitoring plans. Systems may revise monitoring plans to reflect changes in treatment, distribution system operations, layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, including Department-approved reasons, after consultation with the Department regarding the need and justification for the revision. If monitoring locations are changed, then water systems must replace existing monitoring locations with the lowest LRAA with new locations that reflect current distribution system locations expected to have high TTHM or HAA5 levels. The Department may require modifications in monitoring plans. Surface water or groundwater under the direct influence of surface water systems serving > 3,300 people must submit a copy of their modified monitoring plan to the Department prior to the date required to comply with the revised monitoring plan.
- (e) Reduced monitoring. Until the date set forth in Table 22, water systems may reduce monitoring as specified in Table 24, except as otherwise provided.

Table 24 Reduced Monitoring Frequency for TTHM and HAA5		
Water System	Reduce monitoring if WS has monitored at least one year and the	To this level
Surface water or groundwater under the direct influence of surface water serving at least 10,000 persons which has a source water annual average TOC level, before any treatment, <4.0 mg/L	TTHM annual average <0.040 mg/L and HAA5 annual average <0.030 mg/L.	One sample per treatment plant per quarter at distribution system location reflecting maximum residence time.
Surface water or groundwater under the direct influence of surface water serving from 500 to 9,999 persons which has a source water annual average TOC level,	TTHM annual average <0.040 mg/L and HAA5 annual average <0.030 mg/L.	One sample per treatment plant per year at a distribution system location reflecting maximum residence time during month of warmest water temperature. NOTE: Any system using surface water or groundwater under the direct influence of surface water

before any treatment, <4.0 mg/L.		serving fewer than 500 persons may not reduce its monitoring to less than one sample per treatment plant per year.
Systems using only groundwater not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	TTHM annual average <0.040 mg/L and HAA5 annual average <0.030 mg/L.	One sample per treatment plant per year at a distribution system location reflecting maximum residence time during month of warmest water temperature.
System using only groundwater not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons.	TTHM annual average <0.040 mg/L and HAA5 annual average <0.030 mg/L for two consecutive years OR TTHM annual average <0.020 mg/L and HAA5 annual average <0.015 mg/L for one year.	One sample per treatment plant per 3 year monitoring cycle at a distribution system location reflecting max. residence time during month of warmest water temperature, with the 3-year cycle beginning on January 1 following quarter in which system qualifies for reduced monitoring.

- (A) Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems which must monitor quarterly) or the result of the sample (for systems which must monitor no more frequently than annually) is no more than 0.060 mg/L or 0.045 mg/L for TTHMs and HAA5, respectively. Systems that do not meet these levels must resume monitoring at the frequency identified in paragraph (4)(c)(A) of this rule (minimum monitoring frequency column) in the quarter immediately following the monitoring period in which the system exceeds 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. For systems using only groundwater not under the direct influence of surface water and serving less than 10,000 persons, if either the TTHM annual average is greater than 0.080 mg/L or the HAA5 annual average is greater than 0.060 mg/L, the water system must go to increased monitoring as specified in paragraph (4)(c)(A) of this rule (sample location column) in the quarter immediately following the monitoring period in which the system exceeds 0.080 mg/L or 0.060 mg/L for TTHMs or HAA5, respectively.
- (B) Systems may remain on reduced monitoring after the dates identified in Table 22 of paragraph (4)(d)(A) of this rule for compliance with this rule only if the water system was granted a waiver by the EPA exempting them from completing an IDSE and the system, plus meets the reduced monitoring criteria specified in paragraph (4)(f)(A) of this rule, and does not

change or add monitoring locations from those used for compliance monitoring in accordance with subsection (4)(c) of this rule. If monitoring locations under subsection (4)(d) of this rule differ from monitoring locations under subsection (4)(c) of this rule, then systems may not remain on reduced monitoring after the dates identified in paragraph (4)(d)(A) of this rule, for compliance with this rule.

- (C) Monitoring requirements for source water TOC. Surface water or GWUDI systems must collect monthly TOC samples at a location prior to any treatment in order to qualify for reduced HAA5 monitoring as prescribed by subsection (4)(n) of this rule, unless the water system is monitoring as prescribed by subsection (4)(n) of this rule. To remain on reduced monitoring, and in addition to meeting other criteria for reduced monitoring, the source water TOC running annual average must be ≤ 4.0 mg/L based on the most recent four quarters of monitoring, on a continuing basis at a location prior to any treatment. Once qualified for reduced monitoring as prescribed by this subsection, a water system may reduce source water TOC monitoring to quarterly TOC samples collected every 90 days at a location prior to any treatment.
- (D) The Department may return a system to routine monitoring at its discretion.
- (f) Revised reduced monitoring. Beginning on the dates set forth in Table 22, systems may reduce monitoring to the level specified in Table 25 any time the LRAA is ≤ 0.040 mg/L for TTHM and ≤ 0.030 mg/L for HAA5 at all monitoring locations.

Table 25

Source water type	Population size category	Monitoring frequency ¹	Distribution system monitoring location per monitoring period
Surface water or GWUDI:	< 500	per year	Monitoring may not be reduced.
	500-3,300		One TTHM sample at the location and during the quarter with the highest TTHM single measurement, and one HAA5 sample at the location and during the quarter with the highest HAA5 single measurement; or one dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and during the same quarter.
	3,301-9,999	per year	2 dual sample sets, one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	10,000-49,999	per quarter	2 dual sample sets, one each at the locations

	50,000-249,999	per quarter	with the highest TTHM and highest HAA5 LRAAs. 4 dual sample sets at the locations with the two highest TTHM and two highest HAA5 LRAAs.
	250,000-999,999	per quarter	6 dual sample sets at the locations with the three highest TTHM and three highest HAA5 LRAAs.
	1,000,000-4,999,999	per quarter	8 dual sample sets at the locations with the four highest TTHM and four highest HAA5 LRAAs.
	>= 5,000,000	per quarter	10 dual sample sets—at the locations with the five highest TTHM and five highest HAA5 LRAAs.
Groundwater:	< 500	every third year	One TTHM sample at the location and during the quarter with the highest TTHM single measurement, and one HAA5 sample at the location and during the quarter with the highest HAA5 single measurement; or one dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and during the same quarter.
	500-9,999	per year	One TTHM sample at the location and during the quarter with the highest TTHM single measurement, and one HAA5 sample at the location and during the quarter with the highest HAA5 single measurement; or one dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and during the same quarter.
	10,000-99,999	per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	100,000-499,999	per quarter	2 dual sample sets; at the locations with the highest TTHM and highest HAA5 LRAAs.
	>= 500,000	per quarter	4 dual sample sets at the locations with the two highest TTHM and two highest HAA5 LRAAs.

¹ Systems on quarterly monitoring must take dual sample sets every 90 days.

- (A) Systems may only use data collected under the provisions of subsections (4)(c) through (4)(f) of this rule to qualify for reduced monitoring. In addition, the annual source water average TOC level, before any treatment, must be less than or equal to 4.0 mg/L at each plant treating surface water or groundwater under the direct influence of surface water, based

on monitoring conducted as prescribed in paragraph (4)(f)(D) and subsection (4)(n) of this rule.

- (B) Water Systems may remain on reduced monitoring so long as:
 - (i) The LRAA for water systems conducting quarterly monitoring is less than or equal to 0.040 mg/L for TTHM and less than or equal to 0.030 mg/L for HAA5 at each monitoring location; or
 - (ii) Samples collected by water systems conducting annual or less frequent monitoring are less than or equal to 0.060 mg/L for TTHM and less than or equal to 0.045 mg/L for HAA5.
- (C) Water systems must resume routine monitoring as prescribed in subsection (4)(d) of this rule, or begin increased monitoring as prescribed in subsection (4)(h) of this rule if:
 - (i) The LRAA based on quarterly monitoring exceeds 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 at any monitoring location; or
 - (ii) A sample collected at any location exceeds either 0.060 mg/L for TTHM or 0.045 mg/L for HAA5 when the monitoring frequency is annual or less frequent; or
 - (iii) The average annual source water TOC level, before any treatment, is greater than 4.0 mg/L at any treatment plant treating surface water or groundwater under the direct influence of surface water.
- (D) Monitoring requirements for source water TOC. Surface water or GWUDI systems must collect monthly TOC samples at a location prior to any treatment in order to qualify for reduced TTHM and HAA5 monitoring as prescribed by this subsection, unless the water system is monitoring as prescribed by subsection (4)(n) of this rule. To remain on reduced monitoring, and in addition to meeting other criteria for reduced monitoring, the source water TOC running annual average must be ≤ 4.0 mg/L, based on the most recent four quarters of monitoring, on a continuing basis at a location prior to any treatment. Once qualified for reduced monitoring as prescribed by this subsection, a water system may reduce source water TOC monitoring to quarterly TOC samples collected every 90 days at a location prior to any treatment.
- (E) A water system may be returned to routine monitoring at the Department's discretion.
- (g) Disinfection Profiling. Any community, non-transient non-community, or transient non-community water system utilizing surface water or groundwater under direct influence of surface water that desires to make a significant change to its disinfection treatment

process as defined by OAR 333-061-0060(1)(e)(A) through (1)(e)(D), or any community or non-transient non-community utilizing surface water or groundwater under direct influence of surface water and having a running annual average greater than or equal to 0.064 mg/l for TTHM or 0.048 mg/l for HAA5, must conduct disinfection profiling as determined by the Department.

- (A) Water systems must monitor the following parameters to determine total log inactivation:
 - (i) The temperature of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;
 - (ii) The pH of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow for systems using chlorine;
 - (iii) The disinfectant contact time(s) (“T”) during peak hourly flow; and
 - (iv) The residual disinfectant concentration(s) (“C”) of the water before or at the first customer and prior to each additional point of disinfection during peak hourly flow.
- (B) Water systems serving at least 10,000 people must conduct the disinfection profiling in accordance with the USEPA Disinfection Profiling and Benchmarking Guidance Manual. The profile must be based on daily inactivation rate calculations over a period of 12 consecutive months. If the water system uses chloramines, ozone, or chlorine dioxide as a primary disinfectant, the log inactivation for viruses must be calculated and an additional disinfection profile must be developed using a method approved by the Department.
- (C) Water systems serving less than 10,000 people must conduct the disinfection profiling in accordance with or the USEPA LT1-ESWTR Disinfection Profiling and Benchmarking Technical Guidance Manual. The profile must be based on weekly inactivation rate calculations collected on the same calendar day over a period of 12 consecutive months.
- (D) Water systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in this paragraph.
 - (i) Water systems using only one point of disinfectant application must determine the total inactivation ratio for the disinfection segment based on the methods specified in this paragraph. Water systems with more than one point of disinfectant application must determine the total inactivation ratio for each disinfection segment.

- (I) Water systems must determine one inactivation ratio ($CT_{calc}/CT_{99.9}$) before or at the first customer during peak hourly flow; or
 - (II) Must determine successive ($CT_{calc}/CT_{99.9}$) values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Water systems must calculate the total inactivation ratio by determining ($CT_{calc}/CT_{99.9}$) for each sequence and then adding the ($CT_{calc}/CT_{99.9}$) values together to determine $\Sigma(CT_{calc}/CT_{99.9})$.
- (ii) Water systems using more than one point of disinfectant application before the first customer must determine the ($CT_{calc}/CT_{99.9}$) value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ($CT_{calc}/CT_{99.9}$) value of each segment and $\Sigma(CT_{calc}/CT_{99.9})$ must be calculated using the method in paragraph (4)(g)(D)(i)(II) of this rule.
 - (iii) The system must determine the total log of inactivation by multiplying the value calculated in paragraphs (4)(g)(D)(i) or (ii) of this rule by 3.0.
- (E) In lieu of conducting new monitoring as prescribed by this subsection, water systems may elect to meet the requirements of paragraphs (4)(g)(D)(i) or (ii) of this rule as follows:
- (i) Water systems that have at least one year of existing data that are substantially equivalent to data collected in accordance with the provisions of this subsection may use these data to develop disinfection profiles as specified in this section if the system has not made a significant change to its treatment practice nor changed sources since the data were collected. Water systems may develop disinfection profiles using up to three years of existing data.
 - (ii) Water systems may use disinfection profile(s) developed as prescribed by this subsection in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Water systems that have not developed a virus profile as prescribed by paragraph (F) of this subsection must develop a virus profile using

the same monitoring data on which the *Giardia lamblia* profile is based.

- (F) Water systems must calculate the log of inactivation for viruses using a similar protocol as described in paragraph (4)(g)(D) of this rule, using a CT99.99 and a multiplication factor of 4.0.
- (G) Water systems must use the procedures specified in (i) and (ii) of this paragraph to calculate a disinfection benchmark.
 - (i) For each year of profiling data collected and calculated as prescribed by paragraphs (4)(g)(A) through (F) of this rule, systems must determine the lowest mean monthly level of both *Giardia lamblia* and virus inactivation. Water systems must determine the mean *Giardia lamblia* and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly *Giardia lamblia* and virus log inactivation by the number of values calculated for that month.
 - (ii) The disinfection benchmark is the lowest monthly mean value (for water systems with one year of profiling data) or the mean of the lowest monthly mean values (for water systems with more than one year of profiling data) of *Giardia lamblia* and virus log inactivation in each year of profiling data.
- (H) Water systems must retain the disinfection profile data in graphic form, such as a spreadsheet, which must be available for review by the Department as part of a sanitary survey or other field visit contact.
- (h) Conditions requiring increased monitoring.
 - (A) Water systems required to monitor annually or less frequently as prescribed by subsections (4)(d) or (4)(f) of this rule must increase monitoring to dual sample sets collected every 90 days at all locations, if a TTHM or HAA5 sample exceeds the MCL at any location.
 - (B) Water systems conducting increased monitoring must collect samples at the monitoring locations specified in the monitoring plan developed in accordance with paragraph (4)(d)(D) of this rule.
 - (C) Water systems may return to routine monitoring if at least four consecutive quarters of increased monitoring has been conducted, and the LRAA for every monitoring location is less than or equal to 0.060 mg/L for TTHM and 0.045 mg/L for HAA5.
- (i) Operational evaluation levels
 - (A) Water systems have exceeded the operational evaluation level for TTHM or HAA5 at a monitoring location when the sum of

the two previous quarters' sample results plus twice the current quarter's sample result, divided by 4, exceeds the MCL.

- (B) Operational evaluation and report.
 - (i) Systems that exceed the operational evaluation level for either TTHM or HAA5 must conduct an operational evaluation and submit a written report of the evaluation to the Department no later than 90 days after being notified of the analytical result that causes the system to exceed the operational evaluation level. The written report must be made available to the public upon request.
 - (ii) Operational evaluations must include an examination of the water system's treatment and distribution practices, including but not limited to: storage tank operations, excess storage capacity, distribution system flushing, changes in sources or source water quality, and treatment changes or problems that may contribute to TTHM and HAA5 formation. The examination must also include what steps could be considered to minimize future exceedances.
 - (I) The Department may allow water systems to limit the scope of the evaluation if the water system is able to identify the cause of the operational evaluation level exceedance.
 - (II) The request to limit the scope of the evaluation does not extend the schedule specified in paragraph (4)(i)(B)(i) of this rule for submitting the written report. The Department must approve this limited scope of evaluation in writing, and the water system must keep that approval with the completed report.
- (j) Additional requirements for purchasing water systems. Purchasing water systems that do not add a disinfectant, but deliver water where a disinfectant (oxidant) has been added to the water supply at any point in the treatment process must comply with analytical and monitoring requirements for chlorine and chloramines as prescribed in paragraph (4)(m)(A) of this rule and in subsection (4)(t) of this rule.
- (k) Chlorite. Community and Non-transient Non-community water systems using chlorine dioxide, for disinfection or oxidation, must conduct monitoring for chlorite.
 - (A) Routine monitoring.
 - (i) Daily monitoring. Water systems must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the system must take additional samples in the distribution system the

following day at the locations required by paragraph (4)(k)(B) of this rule, in addition to the sample required at the entrance to the distribution system.

(ii) Monthly monitoring. Systems must take a three-sample set each month in the distribution system. The system must take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling must be conducted in the same manner (as three-sample sets, at the specified locations). The system may use the results of additional monitoring conducted under paragraph (4)(k)(B) of this rule to meet the requirement for monitoring in this paragraph.

(B) Additional monitoring. On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the system is required to take three chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

(C) Reduced monitoring.

(i) Chlorite monitoring at the entrance to the distribution system required by paragraph (4)(k)(A)(i) of this rule may not be reduced.

(ii) Chlorite monitoring in the distribution system required by paragraph (4)(k)(A)(ii) of this rule may be reduced to one three-sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under paragraph (4)(k)(A)(ii) of this rule has exceeded the chlorite MCL and the system has not been required to conduct monitoring under paragraph (4)(k)(B) of this rule. The system may remain on the reduced monitoring schedule until either any of the three individual chlorite samples taken quarterly in the distribution system under paragraph (4)(k)(A)(ii) of this rule exceeds the chlorite MCL or the system is required to conduct monitoring under paragraph (4)(k)(B) of this rule, at which time the system must revert to routine monitoring.

(l) Bromate

- (A) Routine monitoring. Community and Non-transient Non-community water systems using ozone, for disinfection or oxidation, must take one sample per month for each treatment plant in the system using ozone. Water systems must take samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.
 - (B) Reduced monitoring. Water systems required to analyze for bromate may reduce monitoring from monthly to quarterly, if the system's running annual average bromate concentration is less than or equal to 0.0025 mg/L based on monthly bromate measurements for the most recent four quarters. Water systems may remain on reduced monitoring as long as the running annual average of quarterly bromate samples is less than or equal to 0.0025 mg/L. If the running annual average bromate concentration is >0.0025 mg/L, the system must resume routine monitoring as required by paragraph (4)(1)(A) of this rule.
- (m) Monitoring requirements for disinfectant residuals.
- (A) Chlorine and chloramines
 - (i) Routine monitoring. Community and Non-transient Non-community water systems that use chlorine or chloramines must measure the residual disinfectant level at the same points in the distribution system and at the same time when total coliforms are sampled, as specified in OAR 333-061-0036(6). Water systems using surface water or groundwater under the direct influence of surface water may use the results of residual disinfectant concentration sampling conducted as required by OAR 333-061-0036(5)(a)(F) for unfiltered systems or OAR 333-061-0036(5)(b)(E) for systems which filter, in lieu of taking separate samples. Compliance with this rule is achieved when the running annual average of monthly averages of samples taken in the distribution system, computed quarterly, is less than or equal to the MRDL. Operators may increase residual disinfectant levels of chlorine or chloramine (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health in order to address specific microbiological contaminant problems resulting from events in the source water or in the distribution system.
 - (ii) Reduced monitoring from paragraph (4)(m)(A)(i) of this rule is not allowed.
 - (B) Chlorine dioxide

- (i) Routine monitoring. Community, Non-transient Non-community, and Transient Non-community water systems that use chlorine dioxide for disinfection or oxidation must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the water system must take samples in the distribution system the following day at the locations required by paragraph (4)(m)(B)(ii) of this rule, in addition to the sample required at the entrance to the distribution system. Compliance with this rule is achieved when daily samples are taken at the entrance to the distribution system and no two consecutive daily samples exceed the MRDL.
 - (ii) Additional monitoring. On each day following a routine sample monitoring result that exceeds the MRDL, the system is required to take three chlorine dioxide distribution system samples. If chlorine dioxide or chloramines are used to maintain a disinfectant residual in the distribution system, or if chlorine is used to maintain a disinfectant residual in the distribution system and there are no disinfection addition points after the entrance to the distribution system (i.e., no booster chlorination), the system must take three samples as close to the first customer as possible, at intervals of at least six hours. If chlorine is used to maintain a disinfectant residual in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system (i.e., booster chlorination), the system must take one sample at each of the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).
 - (iii) Chlorine dioxide monitoring may not be reduced from paragraph (4)(m)(B)(ii) of this rule.
- (n) Monitoring requirements for disinfection byproduct precursors (DBPP)
 - (A) Routine monitoring. Water systems using surface water or groundwater under the direct influence of surface water which use conventional filtration treatment must monitor each treatment plant for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water. All systems required to monitor under paragraph (4)(q)(A) of this rule must also monitor for TOC in the source

water prior to any treatment at the same time as monitoring for TOC in the treated water. These samples (source water and treated water) are referred to as paired samples. At the same time as the source water sample is taken, all systems must monitor for alkalinity in the source water prior to any treatment. Systems must take one paired sample and one source water alkalinity sample per month per plant at a time representative of normal operating conditions and influent water quality.

- (B) Reduced monitoring. Water systems using surface water or groundwater under the direct influence of surface water with an average treated water TOC of less than 2.0 mg/L for two consecutive years, or less than 1.0 mg/L for one year, may reduce monitoring for both TOC and alkalinity to one paired sample and one source water alkalinity sample per plant per quarter. The water system must revert to routine monitoring in the month following the quarter when the annual average treated water TOC is greater than or equal to 2.0 mg/L.
- (o) Bromide. Water systems required to analyze for bromate may reduce bromate monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly measurements for one year. The system must continue bromide monitoring to remain on reduced bromate monitoring.
- (p) General compliance requirements.
 - (A) Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system fails to monitor for TTHM, HAA5, or bromate, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MRDLs for chlorine and chloramines, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average.
 - (B) All samples taken and analyzed under the provisions of section (4) of this rule must be included in determining compliance, even if that number is greater than the minimum required.
 - (C) If, during the first year of monitoring as required by section (4) of this rule, any individual quarter's average will cause the running annual average of that system to exceed the MCL for TTHM, HAA5, or bromate, or the MRDL for chlorine or chloramine, the system is out of compliance at the end of that quarter.

- (q) Compliance requirements for TTHMs and HAA5.
 - (A) For systems monitoring quarterly, and in accordance with subsections (4)(c) or (4)(e) of this rule, compliance with MCLs as required by OAR 333-061-0030(2)(b) must be based on a running annual arithmetic average, computed quarterly, of quarterly arithmetic averages of all samples collected by the system as required by paragraph (4)(c) of this rule.
 - (B) For water systems monitoring less frequently than quarterly, and in accordance with subsections (4)(c) or (4)(e) of this rule, compliance must be based on an average of samples taken that year as required by paragraph (4)(c)(A) of this rule. If the average of these samples exceeds the MCL, the water system must increase monitoring to once per quarter per treatment plant and the system is not considered in violation of the MCL until it has completed one year of quarterly monitoring, unless the result of fewer than four quarters of monitoring will cause the running annual average to exceed the MCL, in which case the system is in violation at the end of that quarter. Water systems required to increase monitoring frequency to quarterly monitoring must calculate compliance by including the sample which triggered the increased monitoring plus the following three quarters of monitoring.
 - (C) If the running annual arithmetic average of quarterly averages covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public as required by OAR 333-061-0042(2)(b)(A), in addition to reporting to the Department as required by OAR 333-061-0040.
 - (D) If a water system fails to complete four consecutive quarters' monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.
 - (E) A water system monitoring for TTHM or HAA5 in accordance with subsections (4)(d), (4)(f) or (4)(h) of this rule is in violation of the MCL specified in OAR 333-061-0030(2)(b) when the LRAA calculation exceeds the MCL based on four consecutive quarters of monitoring (or fewer than four quarters of monitoring if the MCL would be exceeded regardless of monitoring results in subsequent quarters). A water system is in violation of the monitoring requirements every quarter that a monitoring result would be used in calculating an LRAA if the system fails to monitor.
- (r) Compliance requirements for Bromate. Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly

samples (or, for months in which the system takes more than one sample, the average of all samples taken during the month) collected by the system as required by paragraph (4)(l) of this rule. If the average of samples covering any consecutive four-quarter period exceeds the MCL, the water system is in violation of the MCL and must notify the public as required by OAR 333-061-0042(2)(b)(A), in addition to reporting to the Department as required by OAR 333-061-0040. If a water system fails to complete 12 consecutive months monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

- (s) Compliance requirements for Chlorite. Compliance must be based on an arithmetic average of each three sample set taken in the distribution system as required by paragraph (4)(k)(A)(ii) of this rule and paragraph (4)(k)(B) of this rule. If the arithmetic average of any three sample set exceeds the MCL, the water system is in violation of the MCL and must notify the public as required by OAR 333-061-0042(2)(b)(A), in addition to reporting to the Department as required by OAR 333-061-0040.
- (t) Compliance requirements for chlorine and chloramines.
 - (A) Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the system as required by paragraph (4)(m)(A) of this rule. If the average covering any consecutive four-quarter period exceeds the MRDL, the system is in violation of the MRDL and must notify the public as required by OAR 333-061-0042(2)(b)(A), in addition to reporting to the Department as required by OAR 333-061-0040.
 - (B) In cases where water systems switch between the use of chlorine and chloramines for residual disinfection during the year, compliance must be determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Reports submitted as required by OAR 333-061-0040(1) must clearly indicate which residual disinfectant was analyzed for each sample.
- (u) Compliance requirement for Chlorine dioxide.
 - (A) Acute violations. Compliance must be based on consecutive daily samples collected by the water system as required by paragraph (4)(m)(B) of this rule. If any daily sample taken at the entrance to the distribution system exceeds the MRDL, and on the following day one (or more) of the three samples taken in the distribution system exceed the MRDL, the water system is in violation of the MRDL and must take immediate corrective action to lower the level of chlorine dioxide below the MRDL and must notify the public pursuant to the

procedures for acute health risks as required by OAR 333-061-0042(2)(a)(C) in addition to reporting to the Department as required by OAR 333-061-0040. Failure to take samples in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system will also be considered an MRDL violation and the water system must notify the public of the violation in accordance with the provisions for acute violations as required by OAR 333-061-0042(2)(a)(C) in addition to reporting to the Department as required by OAR 333-061-0040.

- (B) Non-acute violations. Compliance must be based on consecutive daily samples collected by the system as required by paragraph (4)(m)(B) of this rule. If any two consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL, the water system is in violation of the MRDL and must take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling and will notify the public pursuant to the procedures for non-acute health risks specified by OAR 333-061-0042(2)(b)(A), in addition to reporting to the Department as required by OAR 333-061-0040. Failure to monitor at the entrance to the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also an MRDL violation and the water system must notify the public of the violation in accordance with the provisions for non-acute violations specified by OAR 333-061-0042(2)(b)(A) in addition to reporting to the Department as required by OAR 333-061-0040.
- (v) Compliance requirements for Disinfection byproduct precursors (DBPP). Compliance must be determined as specified by OAR 333-061-0032(10)(f). Water systems may begin monitoring to determine whether Step 1 TOC removals can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any water system that does not monitor during this period, and then determines in the first 12 months after the compliance date that it is not able to meet the Step 1 requirements as specified in OAR 333-061-0032(10)(e)(B) and must therefore apply for alternate minimum TOC removal (Step 2) requirements, is not eligible for retroactive approval of alternate minimum TOC removal (Step 2) requirements as allowed by OAR 333-061-0032(10)(e)(C) and is in violation. Water systems may apply for alternate minimum TOC removal (Step 2) requirements any time after the compliance date. For systems required

to meet step 1 TOC removals, if the value calculated under OAR 333-061-0032(10)(f)(A)(iv) is less than 1.00, the system is in violation of the treatment technique requirements and must notify the public pursuant to OAR 333-061-0042(2)(b)(A), in addition to reporting to the Department pursuant to OAR 333-061-0040.

(5) Surface Water Treatment.

(a) A public water system that uses a surface water source or a groundwater source under the direct influence of surface water that does not provide filtration treatment must monitor water quality as specified in this subsection beginning January 1, 1991 for systems using a surface water source and January 1, 1991 or 6 months after the Department has identified a source as being under the direct influence of surface water for groundwater sources, whichever is later.

(A) Fecal coliform or total coliform density measurements as required by OAR 333-061-0032(2)(b)(A) must be performed on representative source water samples immediately prior to the first or only point of disinfectant application. The system must sample for fecal or total coliforms at the minimum frequency shown in Table 26 each week the system serves water to the public. These samples must be collected on separate days.

Table 26

Population Served:	Samples Per Week:
500 or less	1
501 to 3,300	2
3,301 to 10,000	3
10,001 to 25,000	4
More than 25,000.	5

Also one fecal or total coliform density measurement must be made every day the system serves water to the public when the turbidity of the source water exceeds 1 NTU (these samples count towards the weekly coliform sampling requirement) unless the Department determines that the system, for logistical reasons outside of its control, cannot have the sample analyzed within 30 hours of collection.

(B) Turbidity measurements as required by OAR 333-061-0032(2)(b)(B) must be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Department. Systems using continuous

turbidity monitoring must report the turbidity data to the Department in the same manner that grab sample results are reported. The Department will furnish report forms upon request.

- (C) The total inactivation ratio for each day that the system is in operation must be determined based on the CT_{99.9} values in Tables 27 through 33. The parameters necessary to determine the total inactivation ratio must be monitored as follows:
- (i) The temperature of the disinfected water must be measured at least once per day at each residual disinfectant concentration sampling point.
 - (ii) If the system uses chlorine, the pH of the disinfected water must be measured at least once per day at each chlorine residual disinfectant concentration sampling point.
 - (iii) The disinfectant contact time(s) ("T") in minutes must be determined for each day during peak hourly flow.
 - (iv) The residual disinfectant concentration(s) ("C") in mg/l before or at the first customer must be measured each day during peak hourly flow.
 - (v) If a system uses a disinfectant other than chlorine or UV, the system may demonstrate to the Department, through the use of protocol approved by the Department for on-site disinfection challenge studies or other information satisfactory to the Department, that CT_{99.9} values other than those specified in the Tables 33 and 34 or other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by OAR 333-061-0032(3)(a).

TABLE 27-CT VALUES (CT_{99.9} FOR 99.9 PERCENT INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 0.5 °C(33°F) OR LOWER¹

	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
<0.4	137	163	195	237	277	329	390
0.6	141	168	200	239	286	342	407
0.8	145	172	205	246	295	354	422
1.0	148	176	210	253	304	365	437
1.2	152	180	215	259	313	376	451
1.4	155	184	221	266	321	387	464
1.6	157	189	226	273	329	397	477
1.8	162	193	231	279	338	407	489
2.0	165	197	236	286	346	417	500
2.2	169	201	242	297	353	426	511
2.4	172	205	247	298	361	435	522
2.6	175	209	252	304	368	444	533
2.8	178	213	257	310	375	452	543
3.0	181	217	261	316	382	460	552

¹ These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99,9} values at the lower temperature and at the higher pH.

TABLE 28- CT VALUES (CT_{99,9}) PERCENT INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 5.0 °C(41°F)¹

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	97	117	139	166	198	236	279
0.6	100	120	143	171	204	244	291
0.8	103	122	146	175	210	252	301
1.0	105	125	149	179	216	260	312
1.2	107	127	152	183	221	267	320
1.4	109	130	155	187	227	274	329
1.6	111	132	158	192	232	281	337
1.8	114	135	162	196	238	287	345
2.0	116	138	165	200	243	294	353
2.2	118	140	169	204	248	300	361
2.4	120	143	172	209	253	306	368
2.6	122	146	175	213	258	312	375
2.8	124	148	178	217	263	318	382
3.0	126	151	182	221	268	324	389

¹ These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99,9} value at the lower temperature, and at the higher pH.

TABLE 29-CT VALUES (CT_{99,9}) FOR 99.9 PERCENT INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 10.0 °C(50°F)¹

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	73	88	104	125	149	177	209
0.6	75	90	107	128	153	183	218
0.8	78	92	110	131	158	189	226
1.0	79	94	112	134	162	195	234
1.2	80	95	114	137	166	200	240
1.4	82	98	116	140	170	206	247
1.6	83	99	119	144	174	211	253
1.8	86	101	122	147	179	215	259
2.0	87	104	124	150	182	221	265
2.2	89	105	127	153	186	225	271
2.4	90	107	129	157	190	230	276
2.6	92	110	131	160	194	234	281
2.8	93	111	134	163	197	239	287
3.0	95	113	137	166	201	243	292

¹ These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99,9} value at the lower temperature, and at the higher pH.

TABLE 30-CT VALUES (CT_{99,9}) FOR 99.9 PERCENT INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 15.0 °C(59°F)¹

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0

pH

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	49	59	70	83	99	118	140
0.6	50	60	72	86	102	122	146
0.8	52	61	73	88	105	126	151
1.0	53	63	75	90	108	130	156
1.2	54	64	76	92	111	134	160
1.4	55	65	78	94	114	137	165
1.6	56	66	79	96	116	141	169
1.8	57	68	81	98	119	144	173
2.0	58	69	83	100	122	147	177
2.2	59	70	85	102	124	150	181
2.4	60	72	86	105	127	153	184
2.6	61	73	88	107	129	156	188
2.8	62	74	89	109	132	159	191
3.0	63	76	91	111	134	162	195

¹ These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99,9} value at lower temperature, and at the higher pH.

TABLE 31-CT VALUES (CT_{99,9}) FOR 99.9 PERCENT INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 20 °C(68°F)¹

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	36	44	52	62	74	89	105
0.6	38	45	54	64	77	92	109
0.8	39	46	55	66	79	95	113
1.0	39	47	56	67	81	98	117
1.2	40	48	57	69	83	100	120
1.4	41	49	58	70	85	103	123
1.6	42	50	59	72	87	105	126
1.8	43	51	61	74	89	108	129
2.0	44	52	62	75	91	110	132
2.2	44	53	63	77	93	113	135
2.4	45	54	65	78	95	115	138
2.6	46	55	66	80	97	117	141
2.8	47	56	67	81	99	119	143
3.0	47	57	68	83	101	122	146

¹ These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99,9} value at the lower temperature, and at the higher pH.

TABLE 32-CT VALUES (CT_{99,9}) FOR 99.9 PERCENT INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 25 °C(77°F)¹ AND HIGHER

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	24	29	35	42	50	59	70
0.6	25	30	36	43	51	61	73
0.8	26	31	37	44	53	63	75
1.0	26	31	37	45	54	65	78
1.2	27	32	38	46	55	67	80

1.4	27	33	39	47	57	69	82
1.6	28	33	40	48	58	70	84
1.8	29	34	41	49	60	72	86
2.0	29	35	41	50	61	74	88
2.2	30	35	42	51	62	75	90
2.4	30	36	43	52	63	77	92
2.6	31	37	44	53	65	78	94
2.8	31	37	45	54	66	80	96
3.0	32	38	46	55	67	81	97

¹ These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT_{99,9} value at the lower temperature, and at the higher pH.

TABLE 33-CT VALUES (CT_{99,9}) PERCENT INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY CHLORINE DIOXIDE AND OZONE¹

	Temperature					
	<1°C	5 °C	10 °C	15 °C	20 °C	>25 °C
Chlorine dioxide	63	26	23	19	15	11
Ozone	2.9	1.9	1.4	0.95	0.72	0.48

¹ These CT values achieve greater than 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT_{99,9} value at the lower temperature for determining CT_{99,9} values between indicated temperatures.

TABLE 34-CT VALUES (CT_{99,9}) FOR 99.9 PERCENT INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY CHLORAMINES¹

	Temperature					
	<1°C	5 °C	10 °C	15 °C	20 °C	25 °C
	3,800	2,200	1,850	1,500	1,100	750

¹ These values are for pH values of 6 to 9. These CT values may be assumed to achieve greater than 99.99 percent inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system must demonstrate, based on demonstration studies or other information, as approved by the Department, that the system is achieving at least 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT_{99,9} value at the lower temperature for determining CT_{99,9} values between indicated temperatures.

- (D) The total inactivation ratio must be calculated as follows:
- (i) If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio based on either of the following two methods:
 - (I) One inactivation ratio (CT_{calc}/CT_{required}) is determined before or at the first customer during peak hourly flow and if the CT_{calc}/CT_{required} is greater than or equal to 1.0, the *Giardia lamblia* inactivation requirement has been achieved; or
 - (II) Successive CT_{calc}/CT_{required} values representing sequential inactivation ratios, are determined between the point of disinfection application and a point before or at the first customer during peak hourly flow. Under this alternative, the following

method must be used to calculate the total inactivation ratio:

Step 1: Determine $CT_{calc}/CT_{required}$ for each sequence

Step 2: Add the $CT_{calc}/CT_{required}$ values together

Step 3: If $(CT_{calc}/CT_{required})$ is greater than or equal to 1.0, the *Giardia lamblia* inactivation requirement has been achieved.

- (ii) If the system uses more than one point of disinfectant application before or at the first customer, the system must determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The $CT_{calc}/CT_{required}$ value of each sequence and $CT_{calc}/CT_{required}$ must be calculated using the methods in paragraph (4)(a)(D)(i)(II) of this rule to determine if the system is in compliance with OAR 333-061-032 (3)(a) or (5)(a).
- (E) The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day. If there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies prescribed in Table 35.

Table 35

Population	Samples per day
500 or Less	1
501 to 1,000	2
1,001 to 2,500	3
2,501 to 3,300	4

The day's samples cannot be taken at the same time. The sampling intervals are subject to Department review and approval. If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is 0.2 mg/l.

- (F) The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the

same time as total coliforms are sampled, as specified in section (5) of this rule, except that the Department may allow a public water system which uses both a surface water source or a groundwater source under the direct influence of surface water, and a groundwater source, to take disinfectant residual samples at points other than the total coliform sampling points if the Department determines that such points are more representative of treated (disinfected) water quality within the distribution system.

- (b) A public water system that uses a surface water source or a groundwater source under the direct influence of surface water that does provide filtration treatment must monitor water quality as specified in this subsection when filtration treatment is installed.
 - (A) Turbidity measurements as required by section OAR 333-061-0032(4) must be performed on representative samples of the system's filtered water, measured prior to any storage, every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Department. Calibration of all turbidimeters must be performed according to manufacturer's specifications, but no less frequently than quarterly. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the Department may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. Systems using lime softening may acidify representative samples prior to analysis using a method approved by the Department.
 - (B) The actual CT value achieved must be calculated each day the treatment plant is in operation. The parameters necessary to determine the actual CT value must be monitored as follows:
 - (i) The temperature of the disinfected water must be measured at least once per day at each residual disinfectant concentration sampling point as prescribed in (5)(b)(B)(iv) of this rule.
 - (ii) If the system uses chlorine, the pH of the disinfected water must be measured at least once per day at each chlorine residual disinfectant concentration sampling point.
 - (iii) The disinfectant contact time(s) ("T") in minutes must be determined for each day during peak hourly flow, based

on results of a tracer study conducted according to OAR 333-061-0050(6)(a)(R), or other method approved by the Department.

- (iv) The residual disinfectant concentration(s) ("C") in mg/l before or at the first customer must be measured each day during peak hourly flow.
 - (v) If a system uses a disinfectant other than chlorine, the system may demonstrate to the Department, through the use of protocol approved by the Department for on-site disinfection challenge studies or other information satisfactory to the Department, or other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by OAR 333-061-0032(5)(a).
- (C) The inactivation ratio calculations as prescribed in paragraph (5)(a)(D) of this rule.
 - (D) Monitoring for the residual disinfectant concentration entering the distribution system shall be performed as prescribed in paragraph (5)(a)(E) of this rule.
 - (E) Monitoring for the residual disinfectant concentration in the distribution system shall be performed as prescribed in paragraph (5)(a)(F) of this rule.
 - (F) Water systems using membrane filtration must perform direct integrity testing on each filter canister at least daily, per OAR 333-061-0050(4)(c)(J).
- (c) Inactivation credit for water systems using a disinfectant other than chlorine for pathogen inactivation.
 - (A) Calculation of CT values. CT is the product of the disinfectant concentration (C, in milligrams per liter) and actual disinfectant contact time (T, in minutes). Systems with treatment credit for chlorine dioxide or ozone as prescribed by paragraphs (5)(c)(B) or (C) of this rule must calculate CT at least once per day, with both C and T measured during peak hourly flow as specified in (5)(b)(B) of this rule.
 - (i) Systems with several disinfection segments in sequence must calculate CT for each segment where treatment credit is sought, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. If using this approach, water systems must add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.
 - (B) CT values for chlorine dioxide and ozone.

- (i) Systems receive the *Cryptosporidium* treatment credit listed in Table 36 by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in paragraph (5)(b)(A) of this rule.

Table 36: CT Values (mg-min/L) for *Cryptosporidium* Inactivation by Chlorine Dioxide*

Log Credit	Water Temperature, Deg. C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
0.25	159	153	140	128	107	90	69	45	29	19	12
0.5	319	305	279	256	214	180	138	89	58	38	24
1.0	637	610	558	511	429	360	277	179	116	75	49
1.5	956	915	838	767	643	539	415	268	174	113	73
2.0	1275	1220	1117	1023	858	719	553	357	232	150	98
2.5	1594	1525	1396	1278	1072	899	691	447	289	188	122
3.0	1912	1830	1675	1534	1286	1079	830	536	347	226	147

*Systems may use this equation to determine log credit between the indicated values: $\text{Log credit} = (0.001506 \times (1.09116)^{(\text{temp})}) \times \text{CT}$.

- (ii) Systems receive the *Cryptosporidium* treatment credit listed in Table 37 by meeting the corresponding ozone CT values for the applicable water temperature, as described in paragraph (5)(b)(A) of this rule.

Table 37: CT Values (mg-min/L) for *Cryptosporidium* Inactivation by Ozone*

Log Credit	Water Temperature, Deg. C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
0.25	6.0	5.8	5.2	4.8	4.0	3.3	2.5	1.6	1.0	0.6	0.39
0.5	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2	0.78
1.0	24	23	21	19	16	13	9.9	6.2	3.9	2.5	1.6
1.5	36	35	31	29	24	20	15	9.3	5.9	3.7	2.4
2.0	48	46	42	38	32	26	20	12	7.8	4.9	3.1
2.5	60	58	52	48	40	33	25	16	9.8	6.2	3.9
3.0	72	69	63	57	47	39	30	19	12	7.4	4.7

*Systems may use this equation to determine log credit between the indicated values: $\text{Log credit} = (0.0397 \times (1.09757)^{(\text{temp})}) \times \text{CT}$.

- (C) Site-specific study. The Department may approve alternative chlorine dioxide or ozone CT values to those listed in Table 36 or Table 37 on a site-specific basis. The Department must base this approval on a site-specific study conducted by a water system that follows a Department-approved protocol.
- (D) Ultraviolet light. Systems receive *Cryptosporidium*, *Giardia lamblia*, and virus treatment credits for ultraviolet light reactors (UV) by achieving the corresponding UV dose values shown in paragraph (5)(c)(D)(i) of this rule. Systems must validate and monitor UV reactors as described in OAR 333-061-0050(5)(k) and paragraphs (5)(c)(D)(ii) and (iii) of this rule to demonstrate that they are achieving a particular UV dose value for treatment credit.

- (i) UV dose table. The treatment credits listed in this table are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems must demonstrate an equivalent germicidal dose through reactor validation testing as specified in OAR 333-061-0050(5)(k). The UV dose values in this table are applicable only to post-filter applications of UV in filtered water systems and not to unfiltered systems.

Table 38: UV Dose Table for *Cryptosporidium*, *Giardia lamblia*, and Virus Inactivation Credit

Log Credit	<i>Cryptosporidium</i> UV dose (mJ/cm ²)	<i>Giardia Lamblia</i> UV dose (mJ/cm ²)	Virus UV dose (mJ/cm ²)
0.5	1.6	1.5	39
1.0	2.5	2.1	58
1.5	3.9	3.0	79
2.0	5.8	5.2	100
2.5	8.5	7.7	121
3.0	12	11	143
3.5	15	15	163
4.0	22	22	186

- (ii) Reactor monitoring. Systems must monitor their UV reactors to determine if the reactors are operating within validated conditions, as prescribed by OAR 333-061-0050(5)(k). This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the Department designates based on UV reactor operation. Water systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with the EPA UV Disinfection Guidance Manual.
- (iii) Water systems must monitor the percentage of water delivered to the public that was treated within validated conditions for the required UV dose. If less than 95% of water delivered was within validated conditions, Tier 2 public notice must be issued as prescribed by OAR 333-061-0042(3)(b).
- (d) In addition to subsection (5)(b) of this rule, water systems using surface water or groundwater under the direct influence of surface water where treatment includes conventional filtration treatment or direct filtration treatment must conduct continuous turbidity monitoring for each individual filter and must calibrate turbidimeters using the procedure specified by the manufacturer. Individual filter monitoring results must be recorded every 15 minutes. If there is a failure in the continuous turbidity monitoring equipment, the water system must conduct grab sampling every four hours in lieu of

continuous monitoring until the turbidimeter is repaired and back on-line. The water system serving at least 10,000 people has a maximum of five working days after failure to repair the equipment or the water system is in violation. The water system serving less than 10,000 people has a maximum of 14 days to resume continuous monitoring before a violation is incurred. If the water system's conventional or direct filtration treatment plant consists of two or fewer filters, continuous monitoring of the combined filter effluent turbidity may be substituted for continuous monitoring of individual filter effluent turbidity. For systems serving less than 10,000 people, the recording and calibration requirements that apply to individual filters also apply when continuous monitoring of the combined filter effluent turbidity is substituted for the continuous monitoring of individual filter effluent turbidity;

- (e) Source water monitoring. Wholesale water systems, as defined in OAR 333-061-0020(204), must comply with the requirements of this rule based on the population of the largest water system in the combined distribution system. Water systems required to provide filtration treatment must comply with the requirements of this rule whether or not the water system is currently operating filtration treatment. The requirements of this rule for unfiltered water systems only apply to those water systems that met and continue to meet the requirements of OAR 333-061-0032(2) and (3).

(A) Initial round. Water systems must conduct monitoring as prescribed by this paragraph, and following the schedule specified in paragraph (5)(e)(C) of this rule, unless the system meets the monitoring exemption criteria specified in paragraph (5)(e)(D) of this rule.

- (i) Filtered water systems serving at least 10,000 people must sample their source water for *Cryptosporidium*, *E. coli*, and turbidity at least monthly for 24 months.
 - (ii) Unfiltered water systems serving at least 10,000 people must sample their source water for *Cryptosporidium* at least monthly for 24 months.
 - (iii) Filtered water systems serving less than 10,000 people must sample their source water for *E. coli* at least once every two weeks for 12 months.
- (I) Filtered water systems serving fewer than 10,000 people may avoid *E. coli* monitoring if the system monitors for *Cryptosporidium* as prescribed in paragraph (5)(e)(A)(iv) of this rule. The water system must notify the Department no later than 3 months prior to the date the system is otherwise

required to start *E. coli* monitoring under paragraph (5)(e)(C) of this rule.

- (iv) Filtered water systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months if they meet one of the following, based on monitoring conducted in accordance with paragraph (5)(e)(A)(iii) of this rule:
 - (I) For systems using lake/reservoir sources, the annual mean *E. coli* concentration is greater than 10 *E. coli*/100 mL;
 - (II) For systems using flowing stream sources, the annual mean *E. coli* concentration is greater than 50 *E. coli*/100 mL;
 - (III) The water system does not conduct *E. coli* monitoring as described in paragraph (5)(e)(A)(iii) of this rule; or
 - (IV) Water systems using groundwater under the direct influence of surface water must comply with the requirements of this paragraph based on the *E. coli* level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to water systems using lake/reservoir sources.
- (v) Unfiltered water systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months.
- (vi) Water systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.
- (B) Water systems must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in paragraph (5)(e)(A) of this rule, and according to the schedule in paragraph (5)(e)(C) of this rule, unless they meet the monitoring exemption criteria specified in paragraph (5)(e)(D) of this rule.
- (C) Monitoring schedule. Systems must begin monitoring as required in paragraphs (5)(e)(A) and (B) of this rule no later than the month beginning with the date listed in Table 39.

Table 39: Source water monitoring start dates

Systems that serve

Must begin the first round
of source water

And must begin the second
round of source water

	monitoring no later than the month beginning	monitoring no later than the month beginning
At least 100,000 people	October 1, 2006	April 1, 2015
From 50,000 to 99,999 people	April 1, 2007	October 1, 2015
From 10,000 to 49,999 people	April 1, 2008	October 1, 2016
Fewer than 10,000 people and monitor for <i>E. coli</i> (filtered water systems only)	October 1, 2008	October 1, 2017
Fewer than 10,000 and monitor for <i>Cryptosporidium</i> *	April 1, 2010	April 1, 2019
State-Regulated water systems	April 1, 2012	April 1, 2021

*Applies to filtered water systems that meet the conditions of paragraph (4)(e)(A)(iv) of this rule and unfiltered water systems.

(D) Monitoring avoidance.

- (i) Filtered water systems are not required to conduct source water monitoring as prescribed by this subsection if the system will provide a total of at least 5.5-log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of Bin 4 in OAR 333-061-0032(4)(g) and OAR 333-061-0032(13) through (18).
- (ii) Unfiltered water systems are not required to conduct source water monitoring as prescribed by this subsection if the system will provide a total of at least 3-log *Cryptosporidium* inactivation, equivalent to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L in OAR 333-061-0032(3)(e).
- (iii) If a water system chooses to provide the level of treatment specified in paragraph (5)(e)(D)(i) or (ii) of this rule, rather than conducting source water monitoring, the water system must notify the Department in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring as prescribed by OAR 333-061-0036(5)(f)(A). A water system may choose to cease source water monitoring at any point after it has initiated monitoring if it notifies the Department in writing that it will provide this level of treatment. Water systems must install and operate technologies to provide this level of treatment by the applicable treatment compliance date in OAR 333-061-0032(1)(a)(F).

- (E) Seasonal plants. Systems with surface water or GWUDI treatment plants that operate for only part of the year must conduct source water monitoring in accordance with this subsection, but with the following modifications:

- (i) Water systems must sample their source water only during the months that the plant is in use unless the Department specifies another monitoring period based on plant operating practices.
 - (ii) Water systems with treatment plants that operate less than six months per year, and that monitor for *Cryptosporidium*, must collect at least six *Cryptosporidium* samples per year for two years of monitoring. Samples must be evenly spaced throughout the period the plant operates.
 - (F) New sources. A water system that begins using a new source of surface water or GWUDI after the system is required to begin monitoring as prescribed in paragraph (5)(e)(C) of this rule must monitor the new source on a schedule the Department approves. Source water monitoring must meet the requirements of this subsection, and the water system must also meet the bin classification and *Cryptosporidium* treatment requirements of OAR 333-061-0032 for the new source on a schedule the Department approves.
 - (i) This applies to water systems using surface water or GWUDI sources that begin operation after the monitoring start date applicable to the system's size specified in Table 39.
 - (ii) The water system must begin a second round of source water monitoring no later than 6 years following determination of the mean *Cryptosporidium* level or initial bin classification as prescribed by OAR 333-061-0032(2) or (4) respectively, as applicable.
 - (G) Failure to collect any source water sample in accordance with the sampling requirements, schedule, sampling location, analytical method, approved laboratory, and reporting requirements of this section is a monitoring violation.
 - (H) Grandfathering monitoring data. Systems may use monitoring data collected prior to the applicable monitoring start date in paragraph (5)(e)(C) of this rule to meet the initial source water monitoring requirements in paragraph (5)(e)(A) of this rule. Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in subsection (5)(h) of this rule.
- (f) Source water sampling schedules.
- (A) Water systems required to conduct source water monitoring as prescribed in subsection (5)(e) of this rule must submit a

sampling schedule that specifies the calendar dates when the system will collect each required sample.

- (i) Water systems must submit sampling schedules to the Department, no later than 3 months prior to the applicable date listed in paragraph (5)(e)(C) of this rule, for each round of required monitoring.
 - (ii) If the Department does not respond to a water system regarding its sampling schedule, the system must sample at the reported schedule.
- (B) Water systems must collect samples within a five-day period, starting two days before the scheduled sampling date and ending two days after. The five-day period applies to each of the dates indicated in the sampling schedule unless one of the following conditions applies:
- (i) An extreme condition or situation exists that may pose danger to the sample collector or that cannot be avoided, and that prevents the water system from sampling in the scheduled five-day period. In this case, the water system must sample as close to the scheduled date as possible unless the Department approves an alternative sampling date. The water system must submit an explanation for the delayed sampling date to the Department concurrent with the submittal of the sample to the laboratory; or
 - (ii) A water system is unable to report a valid analytical result for the scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements (including the quality control requirements), or the failure of an approved laboratory to analyze the sample. In this case the water system must collect a replacement sample as prescribed in paragraphs (5)(f)(B)(ii)(I) and (II) of this rule.
 - (I) The system must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the water system demonstrates that collecting a replacement sample within this time frame is not feasible or the Department approves an alternative re-sampling date. The system must submit an explanation for the delayed sampling date to the Department concurrent with the submittal of the sample to the laboratory.

- (II) Water systems that fail to meet the criteria of paragraph (5)(f)(B) of this rule for any required source water sample must revise their sampling schedules to add dates for collecting all missed samples. Water systems must submit the revised sampling schedule to the Department for approval prior to beginning collecting the missed samples.
- (g) Source water sampling locations.
 - (A) Water systems required to conduct source water monitoring as prescribed in subsection (5)(e) of this rule must collect samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the Department may approve one set of monitoring results to be used to satisfy the requirements for all treatment plants.
 - (B) Water systems must collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants, unless the system meets the following condition:
 - (i) The Department may approve a water system to collect a source water sample after chemical treatment if the Department determines that collecting a sample prior to chemical treatment is not feasible for the system and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.
 - (C) Water systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition.
 - (D) Bank filtration.
 - (i) Water systems that receive *Cryptosporidium* treatment credit for bank filtration as an alternate filtration technology as specified by OAR 333-061-0032(8) must collect source water samples in the surface water source prior to bank filtration.
 - (ii) Water systems that use bank filtration as pretreatment to a filtration plant must collect source water samples from the well, after bank filtration. Use of bank filtration during monitoring must be consistent with routine operational practice. Water systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration prescribed by OAR 333-061-0032(9).
 - (E) Multiple sources. Water systems with treatment plants that use multiple water sources, including multiple surface water sources and blended surface water and groundwater sources,

must collect samples as specified in paragraph (5)(g)(E)(i) or (ii) of this rule. The use of multiple sources during monitoring must be consistent with routine operational practice.

- (i) If a sampling tap is available where the sources are combined prior to treatment, water systems must collect samples from this tap.
 - (ii) If a sampling tap where the sources are combined prior to treatment is not available, systems must collect samples at each source near the intake on the same day and must comply with either paragraph (5)(g)(E)(ii)(I) or (II) below for sample analysis.
 - (I) Water systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.
 - (II) Water systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then adding these values.
- (F) Additional requirements. Water systems must submit a description of their sampling location(s) to the Department at the same time as the sampling schedule required under subsection (5)(f) of this rule. This description must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the Department does not respond to a water system regarding sampling location(s), the system must sample at the reported location(s).
- (h) Grandfathering previously collected data.
- (A) Water systems may comply with the initial source water monitoring requirements of paragraph (5)(e)(A) of this rule by grandfathering sample results collected before the system is required to begin. To be grandfathered, the sample results and analysis must meet the criteria in this section and the Department must approve the previously sampled data.
 - (i) A filtered water system may grandfather *Cryptosporidium* samples to meet the monitoring

requirements of paragraph (5)(e)(A) of this rule when the system does not have corresponding *E. coli* and turbidity samples. A water system that grandfathers *Cryptosporidium* samples is not required to collect the *E. coli* and turbidity samples when the system completes the requirements for *Cryptosporidium* monitoring under paragraph (5)(e)(A) of this rule.

- (B) The analysis of grandfathered *E. coli* and *Cryptosporidium* samples must meet the analytical method and approved laboratory requirements of subsections (1)(a) and (1)(c) of this rule.
- (C) The sampling location of grandfathered samples must meet the conditions specified in subsection (5)(g) of this rule.
- (D) Grandfathered *Cryptosporidium* samples must have been collected no less frequently than each calendar month on a regular schedule, and no earlier than January 1999. Sample collection intervals may vary for the conditions specified in paragraph (5)(f)(B)(i) through (ii) of this rule if the system provides documentation of the condition when reporting monitoring results.
 - (i) The Department may approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the water system conducts additional monitoring as specified by the Department to ensure that the data used to comply with the initial source water monitoring requirements of paragraph (5)(e)(A) of this rule are seasonally representative and unbiased.
 - (ii) Water systems may grandfather previously collected data where the sampling frequency within each month varied. If the *Cryptosporidium* sampling frequency varied, water systems must follow the monthly averaging procedure in OAR 333-061-0032(2)(d)(B) or (4)(f)(E) as applicable, when calculating the bin classification for filtered water systems or the mean *Cryptosporidium* concentration for unfiltered water systems.
- (E) Reporting monitoring results for grandfathering. Water systems that request to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this paragraph.
 - (i) Water systems must report that they intend to submit previously collected monitoring. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water monitoring

to meet the requirements of paragraph (5)(e)(A) of this rule. Water systems must report this information no later than the date the sampling schedule is required as prescribed by subsection (5)(f) of this rule.

(ii) Water systems must report previously collected monitoring results for grandfathering, along with the associated documentation listed in paragraphs (5)(h)(F)(ii)(I) through (IV) of this rule, no later than two months after the applicable date listed in paragraph (5)(e)(C) of this rule.

(I) For each sample result, water systems must report the applicable data elements specified by OAR 333-061-0040(1)(m).

(II) Water systems must certify that the reported monitoring results include all results the system generated during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under this paragraph and analyzed in accordance with subsection (1)(a) of this rule.

(III) Water systems must certify that the samples were representative of a plant's source water(s) and that the source water(s) have not changed. Water systems must report a description of the sampling location(s), which must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including points of chemical addition and filter backwash recycle.

(IV) For *Cryptosporidium* samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria in accordance with subsection (1)(a) of this rule were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, IPR, OPR, and method blank sample associated with the reported results.

(F) If the Department determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the system, such as a drought, the Department may disapprove the data.

Alternatively, the Department may approve the previously collected data if the water system reports additional source water monitoring data, as determined by the Department, to ensure that the data set used under OAR 333-061-0032(4)(f) or 0032(2)(d) represents average source water conditions for the system.

- (G) If a water system submits previously collected data that fully meets the number of samples required for initial source water monitoring required by paragraph (5)(e)(A) of this rule, and some of the data is rejected due to not meeting the requirements of this subsection, systems must conduct additional monitoring to replace rejected data on a schedule the Department approves. Water systems are not required to begin this additional monitoring until two months after notification that data has been rejected and that additional monitoring is necessary.
 - (i) The results of test data collected to meet the requirements prescribed in OAR 333-061-0036 shall be reported as prescribed in OAR 333-061-0040.

(6) Microbiological contaminants:

- (a) Routine sampling for pathogens is not required but may be required by the Department when specific evidence indicates the possible presence of such organisms.
- (b) Samples shall be collected and analyzed for the purpose of determining compliance with the maximum contaminant levels for coliform bacteria as follows:
 - (A) Samples shall be collected from points which are representative of conditions, including impacts of multiple sources, within the distribution system at regular time intervals throughout the reporting period.
 - (B) The standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 ml.
 - (C) Community water systems utilizing surface water, groundwater under the direct influence of surface water, or ground water sources must monitor at a frequency no less than set forth in Table 40.
 - (D) Non-Transient Non-Community, Transient Non-Community, and State Regulated water systems using surface water, or groundwater under the direct influence of surface water must monitor at a frequency no less than set forth in Table 40. Monitoring must begin at this frequency immediately for systems using surface water sources, or no later than 6 months after the Department has determined that the groundwater source is under the direct influence of surface water when applicable.

- (E) Non-Transient Non-Community and Transient Non-Community water systems utilizing groundwater sources, and serving more than 1000 persons per day, must monitor at a frequency no less than set forth in Table 40.

Table 40

Population	Samples Per Month
up to 1,000	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240

- (F) For Non-Transient Non-Community and Transient Non-Community water systems utilizing ground water sources and serving 1000 persons or fewer per day, and State Regulated water systems using groundwater sources, the analyses shall be made in each calendar quarter during which water is provided to the public.
- (G) Public water systems must collect total coliform samples at sites which are representative of water throughout the distribution system according to a written sampling site plan. The plan must include, at a minimum, a brief narrative of the water system components, a map of the distribution system showing the representative routine and repeat sampling sites, and sampling protocols. These plans must be approved by the Department.

- (H) Any public water system that uses surface water or groundwater under the direct influence of surface water and does not provide filtration treatment as defined by these rules must collect at least one sample at the first customer for each day the turbidity level of the source water measured as prescribed in OAR 333-061-0036(5)(a)(B) exceeds 1 NTU. This sample must be analyzed for the presence of total coliforms. When one or more turbidity measurements in any day exceed 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance or as early as possible the next business day, unless the Department determines that the system cannot have the sample analyzed within 30 hour of collection due to logistical reasons outside the system's control. Sample results from this coliform monitoring must be included in determining compliance with the microbiological MCL prescribed in 333-061-0030(4).
- (c) When a routine sample is total coliform-positive, a set of repeat samples must be collected within 24 hours of being notified of the positive results by the certified laboratory.
 - (A) Systems which collect more than one routine sample/month must collect at least three repeat samples for each total coliform-positive routine sample found.
 - (B) Systems which collect one routine sample/month or less must collect at least four repeat samples for each total coliform-positive sample found.
- (d) The system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If the original sampling site is at or near the end of the distribution system, the Department may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site. All repeat samples must be collected on the same day.
- (e) Systems with a single service connection may be allowed by the Department to collect the required set of repeat samples over a four-day period.
- (f) The Department may extend the 24-hour limit in subsection (5)(c) of this rule on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control.
- (g) Results of all routine and repeat samples not invalidated by the Department must be included in determining compliance with the MCL for total coliforms required in OAR 333-061-0030(4).

- (h) If one or more repeat samples in the set is total-coliform positive, the public water system must collect an additional set of repeat samples in the manner specified in subsections (5)(c),(d) and (e) of this rule. The additional samples must be collected within 24 hours of being notified of the positive result, unless the Department extends the limit as provided in subsection (5)(f) of this rule. The system must repeat this process until either total coliforms are not detected in one complete set of repeat samples or The Department determines that the MCL for total coliforms in OAR 333-061-0030(4) has been exceeded. After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of a routine sample.
- (i) If a system collecting fewer than five routine samples/month has one or more total coliform-positive samples and the Department does not invalidate the sample(s) under subsection (5)(k) of this rule, the system must collect at least five routine samples during the next month the system provides water to the public. The Department may waive this requirement if:
 - (A) The Department performs a site visit before the end of the next month the system provides water to the public and determines that additional monitoring and/or corrective action is not needed; or
 - (B) The Department determines why the sample was total coliform-positive and establishes that the system has corrected the problem before the end of the next month the system serves water to the public. The Department must document in writing this decision, have it approved and signed by the supervisor of the official who recommends such a decision, and make this document available to the public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem. The Department cannot waive this requirement solely on the grounds that all repeat samples are total-coliform negative. Under this paragraph, a system must still take at least one routine sample before the end of the next month it serves water to the public and use it to determine compliance with the MCL for total coliforms required in OAR 333-061-0030(4) unless the Department determines that the system has corrected the contamination problem before the system took the set of repeat samples required in subsection

(5)(c)(d) and (e) of this rule, and all repeat samples were total coliform negative.

- (j) When the maximum microbiological contaminant level for total coliform is exceeded or when the maximum contaminant level for fecal coliform or fecal and total coliform is exceeded the water supplier shall report to the Department as prescribed in OAR 333-061-0040 and notify the public as prescribed in OAR 333-061-0042(2)(b)(A) for total coliform and 333-061-0042(2)(a)(A) for fecal coliform/*E. Coli*. If the water system has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, the system must report to the Department as prescribed in OAR 333-061-0040 and notify the public as prescribed in OAR 333-061-0042;
- (k) The Department may invalidate a total coliform-positive sample if:
 - (A) The laboratory establishes that improper sample analysis caused the total coliform-positive result; or
 - (B) The Department determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem on the basis of the results of repeat samples collected as required by subsections (5)(c),(d) and (e) of this rule. The Department cannot invalidate a sample on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected within five service connections of the original tap are total coliform-negative. (The Department cannot invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the public water system has only one service connection); or
 - (C) The Department has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required by subsections (5)(c) through (h) of this rule and use them to determine compliance with the microbiological MCL prescribed in OAR 333-061-0030(4). To invalidate a total coliform-positive sample under this paragraph, the decision with its rationale must be documented in writing, approved and signed by the supervisor of the Department official who recommended the decision. The Department must make this document available to the public. The written documentation must state the specific cause of the total coliform-positive sample and what action the system has taken, or will take, to correct this problem. The Department may not invalidate a total

coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

- (l) A certified laboratory must invalidate a total coliform sample (unless total coliforms are detected) if the sample produced a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple-Tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g., Membrane Filter Technique). If a certified laboratory invalidates a sample because of such interference, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The system must continue to resample within 24 hours and have the samples analyzed until it obtains a valid result. The Department may waive the 24-hour time limit on a case-by-case basis.
- (m) Any total coliform-positive sample invalidated under subsections (5)(k) or (l) of this rule shall not count towards meeting the minimum monitoring requirements as prescribed in subsections (5)(a) through (e) of this rule.
- (n) If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine if fecal coliforms are present. The system may test for *E. coli* in lieu of fecal coliforms. If fecal coliforms or *E. coli* are present, the system must notify the Department by the end of the day when the system is notified of the test result or, if the Department office is closed, by the end of the next business day.
- (o) The Department may allow a water system to forgo testing for fecal coliform or *E. coli* on total coliform-positive samples as prescribed in subsection (5)(n) of this rule if the system assumes that the total coliform-positive sample is fecal coliform-positive or *E. coli* positive. The system must notify the Department as specified in subsection (5)(n) of this rule and the provisions of OAR 333-061-0030(4) apply.
- (p) Public water systems which do not collect five or more routine samples per month must undergo an initial sanitary survey by June 29, 1994 for Community water systems and June 29, 1999 for Non-Transient and Transient Non-Community water systems. Thereafter, systems must undergo another sanitary survey every five years, except that Non-Transient and Transient Non-Community water systems using only protected and disinfected groundwater as defined by the Department, must undergo subsequent sanitary surveys at least every ten years after the initial survey. The Department must review the results of each survey to determine whether the existing monitoring

frequency is adequate and what additional measures, if any, the system needs to undertake to improve drinking water quality.

- (q) Beginning on December 1, 2009, groundwater systems must conduct triggered source water monitoring if the conditions identified in paragraphs (6)(q)(A) and (6)(q)(B) of this rule exist.
 - (A) The groundwater system does not provide at least 4-log treatment of viruses before or at the first customer for each groundwater source; and
 - (B) The groundwater system is notified that a sample collected as prescribed in subsection (6)(b) of this rule is total coliform-positive and the sample is not invalidated as prescribed in subsection (6)(k) of this rule.
- (r) If a groundwater system is notified, after November 30, 2009, that a sample collected in accordance with subsection (6)(b) of this rule is total coliform-positive, the water system must collect at least one source water sample, within 24 hours of the notification, from each groundwater source in use at the time the total coliform-positive sample was collected, except as provided in paragraph (6)(r)(B) of this rule.
 - (A) The Department may extend the 24-hour time limit on a case-by-case basis if the water system cannot collect the groundwater source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the Department must specify how much time the water system has to collect the sample.
 - (B) If approved by the Department, water systems with more than one groundwater source may meet the requirements of subsection (6)(r) of this rule by sampling a representative groundwater source(s). If directed by the Department, water systems must submit for the Department's approval a triggered source water monitoring plan that identifies one or more groundwater sources that the system intends to use for representative sampling as prescribed by this subsection, and that are representative of each monitoring site in the water system's coliform sampling plan as prescribed by paragraph (6)(b)(F) of this rule.
 - (C) A groundwater system serving 1,000 people or less may use a repeat sample collected from a groundwater source to meet the requirements of subsections (6)(c) and (6)(r) of this rule for that groundwater source. If the repeat sample collected from the groundwater source is *E. coli* positive, the system must comply with subsection (6)(s) of this rule.
 - (D) Any groundwater source sample required by this subsection must be collected at a location prior to any treatment of the

groundwater source, unless the Department approves an alternative sampling location. If the water system's configuration does not allow for sampling at the groundwater source, the water system must collect a sample at a Department-approved location representative of source water quality.

- (s) Beginning on December 1, 2009, if the Department does not require corrective action as prescribed by OAR 333-061-0032(6)(b) for an *E. coli* -positive source water sample collected in accordance with subsection (6)(r) of this rule and not invalidated as prescribed by subsection (6)(x) of this rule, the water system must collect five additional source water samples from the same groundwater source within 24 hours of being notified of the *E. coli*-positive sample.
- (t) In addition to the other requirements of this rule, and beginning on December 1, 2009, a purchasing water system that has a total coliform-positive sample collected in accordance with subsection (6)(b) of this rule must notify the wholesale groundwater system(s) within 24 hours of being notified of the total coliform-positive sample.
- (u) In addition to the other requirements of this rule, and beginning on December 1, 2009, a wholesale groundwater system must comply with this subsection.
 - (A) If a wholesale groundwater system receives notice from a purchasing water system it serves that a sample collected in accordance with subsection (6)(b) of this rule is total coliform-positive, it must collect a sample from its groundwater source(s) as prescribed in subsection (6)(r) of this rule and analyze it for the *E. coli* within 24 hours of being notified.
 - (B) If a sample collected in accordance with paragraph (A) of this subsection is *E. coli*-positive, the wholesale groundwater system must notify all purchasing water systems served by that groundwater source of the *E. coli*-positive source water sample within 24 hours of being notified of the positive sample result, and must also meet the requirements of subsection(6)(s) of this rule.
- (v) A groundwater system is not required to comply with the source water monitoring requirements of subsections (6)(r) through (6)(u) of this rule if either of the following conditions exists:
 - (A) The Department determines, and documents in writing, that the total coliform-positive sample collected in accordance with subsection (6)(b) of this rule is caused by a distribution system deficiency; or
 - (B) The total coliform-positive sample is collected at a location that meets Department criteria for distribution system conditions that will cause total coliform-positive samples.

- (w) Beginning on December 1, 2009, groundwater systems that use chlorine, ultraviolet light, or another oxidant for disinfection, but do not achieve 4-log inactivation of viruses, must conduct assessment monitoring of the groundwater source to determine the potential for viral contamination.
 - (A) Water systems monitoring in accordance with this subsection must:
 - (i) Collect at least 1 annual groundwater source sample; and
 - (ii) Collect samples from each groundwater source unless the water system obtains written approval from the Department to conduct monitoring at one or more representative groundwater sources within the system that draw water from the same hydrogeologic setting.
 - (B) A groundwater system conducting source water assessment monitoring may use a sample collected in accordance with subsection (6)(r) of this rule or a sample collected for determination of Groundwater Under the Direct Influence of Surface Water in accordance with OAR 333-061-0032(8), to meet the requirements of this subsection.
 - (C) Additional Source Water Assessment Monitoring
 - (i) Water Systems must conduct additional source water assessment monitoring if at least one of the following conditions occur. These conditions include, but are not limited to:
 - (I) At least 1 total coliform-positive sample in the groundwater source water;
 - (II) A groundwater source having been determined by the Department to be susceptible to fecal contamination through a Source Water Assessment (or equivalent hydrogeologic assessment wherein susceptibility is defined as a result of a highly sensitive source due to aquifer characteristics, vadose zone characteristics, monitoring history, or well construction) and the presence of a fecal contaminant source within the 2-year time-of-travel zone, outreach area, and/or zone 1 area;
 - (III) A source that draws water from an aquifer that the department has identified as being fecally contaminated; or
 - (IV) A determination by the source water assessment or equivalent hydrogeologic analysis that the groundwater source is highly sensitive, and that the source is located within an area that has a high density of Underground Injection Control Wells.

- (ii) Additional source water assessment monitoring must comply with the following:
 - (I) Collection of 12 consecutive monthly groundwater source samples for water systems that operate year-round, or monthly samples that represent each month the water system provides groundwater to the public for water systems that operate seasonally;
 - (II) Collection of a standard sample volume of at least 100 mL for *E. coli* analysis regardless of the analytical method used;
 - (III) Analysis of all groundwater source samples, for the presence of *E. coli*, using an analytical method as prescribed by section (1) of this rule;
 - (IV) Collection of groundwater source samples at a location prior to any treatment unless the Department approves a sampling location after treatment; and
 - (V) Collection of samples at the groundwater source, unless the water system's configuration does not allow for raw water sampling and the Department approves an alternate sampling location that is representative of the water quality of that groundwater source.
- (D) The Department may require a groundwater source to be re-evaluated as prescribed by this subsection if geologic conditions, source pumping conditions, or fecal contaminant source conditions change over time.
- (x) A groundwater system may obtain Department invalidation of a *E. coli*-positive groundwater source sample collected in accordance with subsection (6)(r) of this rule only under the following conditions:
 - (A) The water system provides the Department with written notice from the laboratory that improper sample analysis occurred; or
 - (B) The Department determines and documents in writing that there is substantial evidence that an *E. coli* -positive groundwater source sample is not related to source water quality.
- (y) If the Department invalidates an *E. coli* -positive groundwater source sample, the groundwater system must collect another source water sample as prescribed by subsection (6)(r) of this rule within 24 hours of being notified of the invalidation. The Department may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the Department must specify how much time the system has to collect the sample.

- (z) The Department may direct any groundwater system placing a new groundwater source into service after November 30, 2009 to conduct source water assessment monitoring as prescribed by subsection (6)(w) of this rule. Source water assessment monitoring, as prescribed by this subsection, must begin before the groundwater source is used to provide water to the public.

(7) Radionuclides:

- (a) Gross alpha particle activity, Radium 226, Radium 228, and Uranium:

- (A) Initial Monitoring. Community Water Systems without acceptable historical data, as defined below, must conduct initial monitoring to determine compliance with OAR 333-061-0030(5) by December 31, 2007.

- (i) Samples must be collected from each entry point to the distribution system during 4 consecutive quarters before December 31, 2007 according to the following schedule:

Population	Begin initial monitoring	Complete initial monitoring by
300 or More	First quarter 2005	Fourth quarter 2005
100-299	First quarter 2006	Fourth quarter 2006
Less than 100	First quarter 2007	Fourth quarter 2007

- (ii) New systems or systems using a new source must conduct initial monitoring beginning the first quarter of operation, followed by three consecutive quarterly samples.
- (iii) The Department may waive the final two quarters of the initial monitoring at an entry point if the results of the samples from the first two quarters are below the method detection limit.
- (iv) Grandparenting of historical data. A system may use monitoring data from each source or entry point collected between June 2000 and December 8, 2003 to satisfy the initial monitoring requirements.
- (v) If the average of the initial monitoring results for a sampling point is above the MCL, the system must collect and analyze quarterly samples at the entry point until the system has results from four consecutive quarters that are at or below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Department.

- (B) Reduced Monitoring. Radionuclide monitoring may be reduced to once every three years, once every six years, or once every nine years based on the following criteria:

- (i) If the average of the initial monitoring result for each contaminant (gross alpha particle activity, radium-226, radium-228, and uranium) at a given entry point is below

the detection limit, sampling for that contaminant may be reduced to once every nine years.

- (ii) For gross alpha particle activity, combined radium 226 and radium 228, and uranium, if the average of the initial monitoring results is at or above the detection limit but at or below 1/2 the MCL, sampling for that contaminant may be reduced to once every six years.
 - (iii) For gross alpha particle activity, combined radium 226 and radium 228, and uranium, if the average of the initial monitoring results is above 1/2 the MCL but at or below the MCL, the system must collect one sample at that sampling point at least once every three years.
 - (iv) Systems must use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods.
 - (v) If a system has a monitoring result that exceeds the MCL while on reduced monitoring, the system must collect and analyze quarterly samples at that entry point until the system has results from four consecutive quarters that are below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Department.
- (C) Compositing of samples. A system may composite up to four consecutive quarterly samples from a single entry point if the analysis is done within a year of the first sample. If the analytical result from the composited sample is greater than 1/2 the MCL, the Department may direct the system to take additional quarterly samples before allowing the system to sample under a reduced monitoring schedule.
- (D) Substitution of results.
- (i) A gross alpha particle activity measurement may be substituted for the required radium-226 measurement if the gross alpha particle activity does not exceed 5 pCi/L.
 - (ii) A gross alpha particle activity measurement may be substituted for the required uranium measurement if the gross alpha particle activity does not exceed 15 pCi/L.
 - (iii) The gross alpha measurement shall have a confidence interval of 95% (1.65 where 1/2 is the standard deviation of the net counting rate of the sample) for radium-226 and uranium.
 - (iv) When a system uses a gross alpha particle activity measurement in lieu of a radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring

frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, the method detection limit will be used to determine compliance and the future monitoring frequency.

- (b) Beta particle and photon radioactivity:
 - (A) Community water systems designated by the Department as "vulnerable" must sample for beta particle and photon radioactivity as follows. No waivers shall be granted:
 - (i) Initial samples must be collected by December 31, 2007.
 - (ii) Quarterly samples for beta emitters and annual samples for tritium and strontium-90 must be taken at each entry point to the distribution system. Systems already designated by the state must continue to sample until the state removes the designation.
 - (iii) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sample point has a running annual average less than or equal to 50 pCi/l, sampling for contaminants prescribed in paragraph (6)(b)(A)(i) of this rule maybe reduced to once every three years.
 - (B) Community water systems designated by the Department as "contaminated" by effluents from nuclear facilities and must sample for beta particle and photon radioactivity as follows. No waivers shall be granted.
 - (i) Systems must collect quarterly samples for beta emitters as detailed below and iodine-131 and annual samples for tritium and strontium-90 at each entry point to the distribution system. Sampling must continue until the Department removes the designation.
 - (ii) Quarterly monitoring for gross beta particle activity is based on the analysis of monthly samples or the analysis of a composite of three monthly samples.
 - (iii) For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. More frequent monitoring may be required if iodine-131 is detected.
 - (iv) Annual monitoring for strontium-90 and tritium shall be conducted by means of the analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples.
 - (v) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at an entry point has a running annual average less than or equal to 15 pCi/l, the Department may reduce the frequency of

monitoring for contaminants prescribed in paragraph (6)(b)(B)(i) of this rule at that entry point to every three years.

- (C) For systems in the vicinity of a nuclear facility, the Department may allow the substitution of appropriate environmental surveillance data taken in conjunction with operation of a nuclear facility for direct monitoring of man-made radioactivity by the water supplier where such data is applicable to a particular Community water system. In the event of a release, monitoring must be done at the water system's entry points.
 - (D) Systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. Systems are allowed to subtract the potassium-40 beta particle activity value from the total gross beta particle activity value to determine if the screening level is exceeded. The potassium-40 beta particle activity must be calculated by multiplying elemental potassium concentrations (in mg/l) by a factor of 0.82.
 - (E) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the screening level, an analysis of the sample must be performed to identify the major radioactive constituents present in the sample and the appropriate doses must be calculated and summed to determine compliance with OAR 333-061-0030(5). Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.
 - (F) Systems must monitor monthly at the entry point(s) which exceed the MCL listed in OAR 333-061-0030(5) beginning the month after the exceedance occurs. Systems must continue monthly monitoring until the system has established, by a rolling average of three monthly samples, that the MCL is being met. Systems who establish that the MCL is being met must return to quarterly monitoring until they meet the requirements set forth in (6)(b)(A)(ii) or (6)(b)(B)(v) of this rule.
- (c) General monitoring and compliance requirements for radionuclides.
- (A) The Department may require more frequent monitoring than specified in subsections (6)(a) and (b) of this rule, or may require confirmation samples at its discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.
 - (B) Each system shall monitor at the time designated by the Department during each compliance period. To determine compliance with 333-061-0030(5), averages of data shall be

used and shall be rounded to the same number of significant figures as the MCL of the contaminant in question.

- (C) Compliance.
 - (i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. If the average of any sampling point is greater than the MCL, then the system is out of compliance with the MCL.
 - (ii) For systems monitoring more than once per year, if any sample result will cause the running average to exceed the MCL at any entry point, the system is out of compliance with the MCL immediately.
 - (iii) Systems must include all samples taken and analyzed under the provisions of this section in determining compliance, even if that number is greater than the minimum required.
 - (iv) If a system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.
 - (v) If a sample is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 and/or uranium. In that case, if the gross alpha particle activity result is less than detection, 1/2 the detection limit will be used to calculate the annual average.
 - (D) The Department has the discretion to delete results of obvious sampling or analytical errors.
 - (E) When the average annual maximum contaminant level for radionuclides as specified in Table 6 is exceeded, the water supplier shall, within 48 hours, report the analysis results to the Department as prescribed in OAR 333-061-0040 and initiate the public notification procedures prescribed in 333-061-0042(2)(b)(A).
- (8) Secondary contaminants:
- (a) The levels listed in Table 7 of OAR 333-061-0030 represent reasonable goals for drinking water quality, but routine sampling for these secondary contaminants is not required.
 - (b) The Department may however, require sampling and analysis under the following circumstances:
 - (A) User complaints of taste, odor or staining of plumbing fixtures.
 - (B) Where treatment of the water is proposed and the levels of secondary contaminants are needed to determine the method and degree of treatment.

- (C) Where levels of secondary contaminants are determined by the Department to present an unreasonable risk to health.
 - (c) If the results of the analyses do not exceed levels for secondary contaminants, listed in Table 7 of OAR 333-061-0030, subsequent sampling and analysis shall be at the discretion of the Department.
 - (d) If the results of the analyses indicate that the levels for secondary contaminants, listed in Table 7 of OAR 333-061-0030 are exceeded, the Department shall determine whether the contaminant levels pose an unreasonable risk to health or interfere with the ability of a water treatment facility to produce a quality of water complying with the Maximum Contaminant Levels of these rules and specify follow-up actions to be taken.
 - (e) During the period while any measures called for in subsection (7)(d) of this rule are being implemented, the water supplier shall follow the procedures relating to variances and permits which are prescribed in OAR 333-061-0045.
- (9) Monitoring of disinfectant residuals:
- (a) Public water systems that practice continuous disinfection or disinfectant residual maintenance, as well as purchasing water systems that receive water from a public water system that practices continuous disinfection or disinfectant residual maintenance must maintain a detectable residual disinfectant throughout the distribution system and shall measure and record the residual:
 - (A) At least twice per week;
 - (B) At one or more representative points; and
 - (C) At a frequency that is sufficient to detect variations in chlorine demand and changes in water flow.
 - (b) Public water systems that add chlorine for other purposes, such as oxidation of metals or taste and odor control, when the source(s) is known to be free of contamination must ensure that the chlorine residual entering the distribution system after treatment is less than 4.0 mg/l.
 - (c) Where chlorine is used as the disinfectant, the measurement of residual chlorine shall be by the DPD or other EPA-approved method in accordance with Standard Methods for the Examination of Water and Waste-water, and shall measure the free chlorine residual or total chlorine residual as applicable;
 - (d) The water supplier shall maintain a summary report of the residual disinfectant measurements and shall retain this summary report at a convenient location within or near the area served by the water system.