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STATUTORY MINOR CORRECTION

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CHAPTER 333
OREGON HEALTH AUTHORITY
PUBLIC HEALTH DIVISION

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AGENCY ATTESTS THE FOLLOWING CHANGES HAVE BEEN MADE, ACCORDING TO ORS 183.335(7):

Correcting spelling
Correcting statutory or rule references

AMEND: 333-061-0036

RULE TITLE: Sampling and Analytical Requirements

RULE SUMMARY: Corrected spelling of term in subsection (3)(a). Corrected rule reference in subparagraph (5)(e)(D)(iii).

RULE TEXT:
(1) General:
(a) Samples required by these rules must be analyzed using United States Environmental Protection Agency (U.S. EPA) approved methods set forth in 40 CFR 141 by a laboratory accredited according to OAR chapter 333, division 064 and the Oregon Environmental Laboratory Accreditation Program (ORELAP). The laboratory must be certified to analyze drinking water samples using the specific method for the contaminant being analyzed.
(A) The Oregon Health Authority (Authority) will only accept sample results that have been handled and documented according to ORELAP standards, except as prescribed by subsection (1)(i) of this rule.
(B) Samples required by these rules must 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 samples for lead or copper in tap water which must be collected as prescribed by

subsection (10)(b) of this rule.
(b) Accredited laboratories are considered either a primary or subcontracted laboratory as specified by paragraphs (1)(b)(A) and (B) of this rule.
(A) A primary laboratory is the first accredited laboratory that receives a compliance sample for analysis, and is responsible for chain of custody documentation (if applicable), performing the analytical method on a compliance sample (if applicable), final report review, and submission of results to the water system and the Authority as specified in OAR 333-061-0040(1)(b)(B). Primary laboratories must hold primary or secondary ORELAP accreditation.
(B) A subcontracted laboratory is an accredited laboratory that performs the analytical method on a compliance sample, and is responsible for sample analysis and result reporting to the primary laboratory as specified in OAR 333-061-0040(1)(b)(B). Subcontracted laboratories must hold ORELAP primary or secondary accreditation for the appropriate method(s).
(c) Alternate Analytical Methods:
(A) With the written permission of the Authority, and concurred in by the Administrator of the U.S. EPA, 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 maximum contaminant level (MCL); and
(B) The use of the alternate analytical method shall not decrease the frequency of sampling required by these rules.
(d) Monitoring at purchasing water systems:
(A) When a public water system obtains its water, in whole or in part, from one or more public water systems, the monitoring requirements imposed by these rules on the purchasing water system may be modified by the Authority 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 Authority 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 Authority and concurred in by the Administrator of the U.S. EPA.
(e) Water suppliers shall monitor each water source individually for contaminants listed in OAR 333-061-0030, except for coliform bacteria, haloacetic acids (five) (HAA5s), total trihalomethanes (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 Authority.
(A) At water systems drawing water from more than one source and where sources are combined before distribution, water suppliers 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 water system draws water from multiple ground water sources which are not combined before distribution, the water supplier 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 Authority may require additional sampling and analysis for the contaminants included in OAR 333-061-0030 when necessary to determine whether an unreasonable risk to health exists. The Authority may also require sampling and analysis for additional contaminants not included in OAR 333-061-0030 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 and the name of the person

collecting the sample.
(i) Measurements for turbidity, disinfectant residual, temperature, alkalinity, calcium, conductivity, chlorite, bromide, total organic carbon (TOC), specific ultraviolet absorption SUVA, dissolved organic carbon, 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 Authority.
(j) Nothing in these rules precludes the Authority or any of its duly authorized representatives from collecting samples and from using the results of such samples to determine compliance with applicable requirements of these rules.
(k) Wellfield Determination.
(A) At water systems possessing two or more wells that separately supply water to the distribution system, the Authority may consider those wells as a wellfield source for monitoring purposes provided the requirements of this rule are met. The Authority will determine whether the wellfield designation is appropriate based on information in a water system's source water assessment report.
(B) To be classified as a wellfield, wells must meet the following criteria:
(i) The wells must be within 2,500 feet of one another or as determined in a state approved hydrogeological study to minimize inter-well interference drawdowns. For wells located in a low-impact land use area, this criterion may be waived at the discretion of the Authority.
(ii) The wells must produce water from the same aquifer. This criterion is determined using source water assessment results, based on well reports, maps and other hydrogeological information.
(C) To be considered for wellfield designation, water suppliers must submit the following to the Authority:
(i) A schematic drawing showing all sources, entry points and relevant sample taps;
(ii) A map and description of the land use activities within the respective wellhead protection areas (WHPAs) (using the inventory section of the Source Water Assessment Report); and
(iii) A description of the pumping patterns.
(D) If a water system's wells are considered to comprise a wellfield, the susceptibility analysis conducted during the source water assessment is utilized to determine the sampling point(s). Table 14 summarizes the alternatives.
(E) To determine the most susceptible well, the area within the two-year time-of-travel (TOT is considered). The Authority will consider the potential contaminant source inventory determined during the source water assessment, the aquifer sensitivity as defined in OAR 333-061-0050, pumping patterns and other pertinent hydrogeological information.
(F) The Authority may still designate more than one entry point within the wellfield as a sampling point if well construction or land use practices warrant. For a large area containing numerous wells, sub-wellfields may be identified, each with its own sample site designation.
(2) Inorganic chemicals.
(a) antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium.
(A) Sampling at water systems for regulated inorganic chemicals shall be conducted as follows:
(i) At community and non-transient non-community (NTNC) water systems using surface water or groundwater under the direct influence of surface water (GWUDI) sources solely or in combination with groundwater sources, water suppliers must monitor 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. Initial monitoring must be conducted annually at each sampling point. Samples must be collected at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
(ii) At community and NTNC water systems using groundwater sources, water suppliers must monitor 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. Monitoring must be conducted once every three years at each sampling point. Samples must be collected at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
(iii) At new transient non-community (TNC) water systems or existing TNC water systems with new sources, water

suppliers must monitor once for arsenic. Samples must 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, samples must be collected at an entry point to the distribution system during periods of normal operating conditions when water is representative of all the sources being used.
(v) Monitoring after the installation of arsenic treatment.
(I) At water systems where centralized treatment is approved to reduce concentrations of arsenic, water suppliers must monitor for arsenic at least once every calendar quarter according to paragraph (2)(a)(B) of this rule. Monitoring may be reduced to one sample per year after monitoring results are below the MCL for arsenic for at least four consecutive calendar quarters. Monitoring may not be reduced to less frequently than once per year.
(II) At water systems where point-of-use (POU) treatment is approved to reduce concentrations of arsenic, water suppliers must monitor for arsenic once at every device, immediately after installation, followed by monitoring at one-third of the POU devices every calendar quarter, such that monitoring is conducted at every POU device at least once within three calendar quarters. If both the initial and quarterly monitoring results for every POU device are below the MCL for arsenic, monitoring may be reduced to at least one sample collected at one-third of the POU devices every year. Water suppliers must monitor every POU device at least once every three years. If monitoring at any POU device exceeds the MCL for arsenic, the water supplier must monitor at every POU device within 90 days. Monitoring must be increased to once every calendar quarter for at least one year at any POU device where the MCL was exceeded.
(vi) At water systems with two or more wells that have been determined to constitute a wellfield as specified in subsection (1)(k) of this rule, the Authority may approve monitoring at those entry point(s) determined to represent water quality throughout the wellfield.
(B) At water systems where samples exceed a MCL identified in OAR 333-061-0030, water suppliers must monitor quarterly beginning in the next calendar quarter after the sample result exceeded the MCL. The Authority may decrease the quarterly monitoring requirement to the frequencies prescribed in paragraph (2)(a)(A) of this rule when the Authority determines that sample results are reliably and consistently below the MCL. Before such a decrease is permitted for a groundwater system, water suppliers must collect at least two quarterly samples or a minimum of four quarterly samples at water systems supplied by a surface water source.
(C) Water suppliers may apply to the Authority for a waiver from the monitoring frequencies specified in paragraph (2)(a)(A) of this rule on the condition that at least one sample is collected while the waiver is effective and the effective period for the waiver shall not exceed one nine-year compliance cycle.
(i) The Authority may grant a waiver provided water suppliers have monitored annually for at least three years at water systems supplied by surface water sources or have conducted a minimum of three rounds of monitoring (at least one sample shall have been collected since January 1, 1990) at water systems supplied by groundwater sources, and all analytical results are less than the MCLs prescribed in OAR 333-061-0030 for inorganic chemicals. At water systems with a new water source, a waiver may not be granted until three rounds of monitoring from the new source have been completed.
(ii) Waivers granted by the Authority shall be in writing and shall set forth the basis for the determination. The Authority shall review and revise, where appropriate, its determination of the appropriate monitoring frequency when the water supplier submits new monitoring data or where other data relevant to the appropriate monitoring frequency at the water system becomes available. In determining the appropriate reduced monitoring frequency, the Authority 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 water system configuration, changes in operating procedures, or changes in stream flows or characteristics.
(D) The Authority may allow compositing of samples from a maximum of five sampling points, 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. 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 of sample validation by the laboratory, 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 water supplier may use these instead of resampling. The duplicates must be analyzed and the results reported to the Authority within 14 days of collection. For a water system serving more than 3,300 people, only samples from that water system may be composited. For water systems serving 3,300 people or less, samples from multiple water systems may be composited if the five sample limit is maintained.

(E) At new water systems or systems that use a new source of water, water suppliers must demonstrate compliance with the MCL within a period of time specified by the Authority. The water supplier must also comply with the initial sampling frequencies specified by the Authority to demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted according to the requirements in this section.

(b) Asbestos:

(A) At community and NTNC water systems regardless of source, sampling must be conducted for Asbestos at least once during the initial three-year compliance period of each nine-year compliance cycle unless a waiver is granted by the Authority according to paragraph (2)(b)(B) of this rule.

(B) The Authority may grant a waiver from the monitoring prescribed by paragraph (2)(b)(A) of this rule if a 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. If granted, the water supplier 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) At water systems vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe, one sample must be collected at a tap served by the asbestos-cement pipe under conditions where asbestos contamination is most likely to occur.

(D) At water systems vulnerable to asbestos contamination due solely to asbestos in source water shall, one sample must be collected at the entry point to the distribution system after any treatment.

(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) If a sample result exceeds the MCL for asbestos as prescribed in subsection (2)(h) of this rule, the water supplier shall monitor quarterly beginning in the next quarter after the violation occurred. If the Authority determines that the sample results are reliably and consistently below the MCL based on a minimum of two quarterly samples for groundwater systems or a minimum of four quarterly samples for water systems using surface water sources, the monitoring may be returned to the frequency prescribed in paragraph (2)(b)(A) of this rule.

(c) Nitrate:

(A) At community and NTNC water systems using surface water or GWUDI sources, water suppliers must monitor nitrate every calendar quarter 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. The Authority may allow a water supplier to reduce the sampling frequency to annually provided that all analytical results from four consecutive quarters are less than 50 percent of the MCL. At surface water systems, monitoring shall return to quarterly if nitrate in any one sample is 50 percent of the MCL or greater.

(B) At community and NTNC water systems using groundwater sources, water suppliers must monitor nitrate annually 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. The Authority shall require quarterly monitoring for a least one year following any one sample in which the concentration of nitrate is 50 percent of the MCL or greater. Monitoring may return to annual after four consecutive quarterly samples are found to be reliably and consistently below the MCL.

(C) At TNC water systems, water suppliers must monitor nitrate annually 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. At TNC water systems, water suppliers must monitor quarterly for at least one year following any one sample

in which the concentration of nitrate is 50 percent of the MCL or greater. Monitoring may return to annual after four consecutive quarterly samples are found to be reliably and consistently below the MCL.
(D) After the initial round of quarterly sampling is completed at community and NTNC water systems where monitoring is annually, water suppliers must collect subsequent samples during the quarter(s) which previously resulted in the highest analytical result.
(d) Nitrite:
(A) At community, NTNC, and TNC water systems, water suppliers must collect one sample for nitrite 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.
(B) After the initial sample, at systems where analytical results for nitrite are <50 percent of the MCL, water suppliers must monitor once during each subsequent compliance period.
(C) Water suppliers must monitor every quarter for at least one year following any one sample in which the concentration is ≥50 percent of the MCL. A water system may change to annual monitoring after four consecutive quarterly samples are found to be reliably and consistently below 50 percent of the MCL.
(D) At water systems where an analytical result ≥50 percent of the MCL, water suppliers may never monitor less frequently than annually. At systems where monitoring is annually, water suppliers must collect each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.
(E) The Authority may grant a waiver from the monitoring frequency specified in paragraph (2)(d)(B) of this rule provided that water systems have conducted a minimum of three rounds of monitoring (at least one sample shall have been collected since January 1, 1993), and all analytical results are less than 50 percent of the MCL prescribed in OAR 333-061-0030. At water systems that have been granted a waiver, water suppliers must monitor once during each nine-year compliance cycle. Waivers must be granted as prescribed by subparagraph (2)(a)(C)(ii) of this rule.
(F) At water systems with two or more wells that have been determined to constitute a wellfield as specified in subsection (1)(k) of this rule, the Authority may approve monitoring at those entry point(s) determined to represent water quality throughout the wellfield.
(e) Sodium:
(A) Samples of water which is delivered to users shall be analyzed for sodium as follows:
(i) At community and NTNC water systems using surface water or GWUDI sources, water suppliers must monitor once per year for each source.
(ii) At community and NTNC water systems using groundwater sources, water suppliers must monitor once every three years for each source.
(B) The water supplier shall report to the Authority the results of the analyses for sodium as prescribed in OAR 333-061-0040. The Authority shall notify local health officials of the test results.
(f) Confirmation Samples:
(A) Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium or thallium exceed the MCL prescribed in OAR 333-061-0030 for inorganic chemicals, the Authority may require one additional sample to be collected as soon as possible after the initial sample was collected (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, water suppliers must collect one additional sample within 24 hours of notification of the results of the initial sample at the same sampling point. Water suppliers unable to comply with the 24-hr sampling requirement must initiate consultation with the Authority as soon as practical, but no later than 24 hours after learning of the violation and must immediately notify their users as prescribed in OAR 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 Authority is collected for any contaminant, 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)(h) of this rule.

(g) The Authority may require more frequent monitoring than specified in subsections (2)(a) through (f) of this rule or may require confirmation samples for positive and negative results. Systems may apply to the Authority to conduct more frequent monitoring than is required in this section.
(h) Compliance with the inorganic MCLs as listed in OAR 333-061-0030(1) (Table 1) shall be determined based on the analytical result(s) obtained at each sampling point as follows:
(A) For water systems where the monitoring frequency is greater than annual, compliance with the MCLs for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium or thallium is determined by a running annual average (RAA) at any sampling point. If the average of sample results 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 water system is out of compliance. If any single sample result 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 U.S. EPA analytical method shall be calculated at zero for the purpose of determining the annual average. If a water supplier fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
(B) At water systems where monitoring is annual or less frequent for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium or thallium, water suppliers must begin quarterly sampling if the level of a contaminant at any sampling point is greater than the MCL listed in OAR 333-061-0030(1). The water supplier must then determine compliance with the MCL by RAA at the sampling point. The water system will not be considered in violation of the MCL until one year of quarterly monitoring is completed. If any sample result will cause the RAA to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately. If a water supplier 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 or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with paragraph (2)(f)(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 MCL, the water supplier shall report the analysis results to the Authority within 48 hours as prescribed in OAR 333-061-0040 and initiate the public notice procedures as prescribed by OAR 333-061-0042.
(E) A water system's RAA is calculated by averaging the analytical results for the current monitoring period and the previous monitoring periods within a one-year time frame. For water systems where monitoring is less frequently than quarterly, the first sample result that exceeds the MCL is considered to be the initial sample result for determination of the RAA. Multiple sample results within any monitoring period will be averaged and then rounded to the same number of significant figures as the MCL of the contaminant in question. For the purposes of calculating a RAA, a monitoring period may be a calendar month or calendar quarter.
(F) At water systems where POU treatment is approved to reduce concentrations of a chemical listed in subsection (2)(a) of this rule, compliance with the MCL for the water system is determined by RAA for each treatment device.
(3) Organic chemicals:
(a) At community and NTNC water systems, water suppliers must monitor according to this section for the following regulated synthetic organic chemicals (SOC): 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) Initial sampling.
(i) At sampling points served by surface water or GWUDI sources, samples must be collected 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. At least four consecutive quarterly samples must be collected at each sampling point during each compliance period. Samples must be collected from the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
(ii) At sampling points served by groundwater sources only, samples must be collected at every entry point to the distribution system after any application of treatment. Samples must be collected annually for three consecutive years at each sampling point during each compliance period. Samples must be collected 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 (DWPA), or within an area well characterized by area-wide source water assessments or past monitoring results as determined by the Authority, may be eligible for a reduction in initial monitoring from three consecutive annual samples to one sample if no detections occur and if, based on the system's source water assessment, the Authority determines that the new well is producing from the same and only the same aquifer or does not significantly modify the existing DWPA.
(iii) If a system draws water from more than one source and sources are combined before distribution, samples must be collected at an entry point to the distribution system during periods of normal operating conditions when water is representative of all the sources being used.
(iv) At water systems with two or more wells that have been determined to constitute a wellfield as specified in subsection (1)(k) of this rule, sampling may be reduced to only those entry points designated by the Authority.
(B) If the initial analyses as specified in subparagraphs (3)(a)(A)(i) or (ii) of this rule does not detect any contaminant listed in subsection (3)(a) of this rule, then monitoring at each sampling point should be conducted as follows:
(i) At water systems serving more than 3,300 people, two quarterly samples in the same calendar year during each repeat 3-year compliance period; or
(ii) At systems serving 3,300 people or less, one sample in each repeat 3-year compliance period.
(C) Water suppliers may apply to the Authority for a waiver from the monitoring frequencies specified in subparagraphs (3)(a)(A)(i) or (ii) or paragraph (3)(a)(B) of this rule. If the Authority determines there was no previous use of a contaminant within a watershed or zone of influence, a waiver may be granted. If the Authority determines that a contaminant was used previously or the use of a contaminant is unknown then the factors specified in subparagraph (3)(a)(C)(iii) of this rule shall determine whether a waiver is granted. A waiver must be in place prior to the year in which the monitoring is to be conducted. Water suppliers must reapply for a waiver for each compliance period. Regardless of waiver status, monitoring must occur at the minimum frequencies specified in subparagraph (3)(a)(C)(v) or (vi) of this rule.
(i) The DWPA delineated during the source water assessment must be used according to Authority procedures and guidance.
(ii) For waivers based on the use of a contaminant, the criteria considered by the Authority includes but is not limited to the use, storage, distribution, transport and disposal of the contaminant within the delineated recharge or watershed area.
(iii) For waivers based on susceptibility to contamination, the criteria considered by the Authority includes but is not limited to the history of bacteria or nitrate contamination, well construction, agricultural management practices, infiltration potential, contaminant mobility and persistence, previous analytical results, the proximity of the system to a potential point or non-point source of contamination, and use of polychlorinated biphenyls (PCBs) in equipment used in the production, distribution, or storage of water.
(iv) The Authority may establish area-wide waivers based on historical monitoring data, land use activity, and the results of source water assessments or waivers based on use or susceptibility.
(v) Monitoring must be conducted at least once every six years for all SOCs if an Authority approved drinking water protection plan exists for the water system.
(vi) Monitoring must be conducted at least once every nine years for those SOCs not used within the DWPA if no Authority approved drinking water protection plan exists for a water system. Monitoring must be conducted at least once every six years or once every nine years as determined by the Authority, for those SOCs used within the DWPA

based upon SOC chemical characteristics, aquifer characteristics and well construction.
(D) If a contaminant listed in subsection (3)(a) of this rule is detected at a water system equal to or greater than the minimum detection limit listed in Table 15, then the water supplier shall monitor quarterly at each sampling point where a detection occurred. If a contaminant is detected at a concentration greater than the MCL, monitoring must be conducted as prescribed by paragraph (3)(a)(E) of this rule.
(i) The Authority may reduce the monitoring frequency required by paragraph (3)(a)(D) of this rule to annually if at least two quarterly samples for groundwater sources or four quarterly samples for surface water sources are reliably and consistently below the MCL. Annual monitoring according to this subparagraph must be conducted during the quarter that previously yielded the highest analytical result.
(ii) At systems where three consecutive annual samples are collected with no detection of a contaminant, water suppliers may apply to the Authority for a waiver. Monitoring may not be reduced to less often than annually except upon receipt of a waiver granted by the Authority.
(iii) If monitoring required by paragraphs (3)(a)(A) through (D) of this rule results in the detection of either heptachlor or heptachlor epoxide, then subsequent monitoring shall analyze for both contaminants.
(E) If a contaminant listed in subsection (3)(a) of this rule is detected at a concentration greater than the MCL, then the water supplier must monitor quarterly. After a minimum of four quarterly samples, if results are reliably and consistently below the MCL and in compliance with paragraph (3)(a)(H) of this rule, then the water supplier may monitor annually.
(F) The Authority may require confirmation samples for positive or negative results. If a confirmation sample is required by the Authority, the result must be averaged with the original sample result (unless the previous sample has been invalidated by the Authority) and the average used to determine compliance.
(G) The Authority may allow compositing of samples to reduce the number of samples to be analyzed at a water 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 conducted 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 collected and analyzed within 14 days at each sampling point included in the composite, and be analyzed for that contaminant. Duplicates collected for the original composite samples may be used instead of re-sampling provided the duplicates are analyzed and the results reported to the Authority within 14 days of collection. For water systems serving more than 3,300 people, the Authority may allow compositing at sampling points only within a single system. For systems serving 3,300 people or less, the Authority may allow compositing among different systems, provided the 5-sample limit is maintained.
(H) Compliance with the MCL for 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 water system is in violation of the MCL. At water systems where monitoring is more than once per year, compliance with the MCL is determined by a RAA at each sampling point. At systems where annual or less frequent monitoring takes place, if sample results exceed the regulatory detection limit prescribed in paragraph (3)(a)(D) of this rule (Table 15), monitoring must be increased to quarterly. A water system will not be considered in violation of the MCL until one year of quarterly monitoring is completed. If any single sample result will cause the RAA to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately. If a water supplier 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).
(I) The RAA for a contaminant is calculated by averaging the analytical results for the current monitoring period and the previous monitoring periods within a one-year time frame. For water systems where monitoring is less frequent than quarterly, the first sample result that exceeds the detection limit or MCL is considered to be the initial sampling result for determination of the RAA. Multiple sample results within any monitoring period will be averaged and then rounded to the same number of significant figures as the MCL for the contaminant in question. For the purposes of calculating a RAA, a monitoring period may be a calendar month or calendar quarter. Special samples, as described by paragraph

(1)(h)(C) of this rule, will not be included in the calculation of the RAA at a water system.
(J) At new water systems or systems where a new source of water is added, water suppliers must demonstrate compliance with the MCL within a period of time specified by the Authority. The water supplier must also comply with the initial sampling frequencies specified by the Authority to demonstrate compliance with the MCL.
(b) Water suppliers responsible for community and NTNC water systems must conduct monitoring according to this section for the following regulated volatile organic chemicals (VOCs): 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) Initial monitoring:
(i) At sampling points served by surface water or GWUDI sources, samples must be collected 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. At least four consecutive quarterly samples must be collected at each sampling point during each compliance period. Samples must be collected from the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
(ii) At sampling points served by groundwater sources only, samples must be collected at every entry point to the distribution system after any application of treatment. Samples must be collected annually for three consecutive years at each sampling point during each compliance period. Samples must be collected 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 DWPA, or within an area well characterized by area-wide source water assessments or past monitoring results as determined by the Authority, may be eligible for a reduction in initial monitoring from three consecutive annual samples to one sample if no detections occur and if, based on the system's source water assessment, the Authority determines that the new well is producing from the same and only the same aquifer or does not significantly modify the existing DWPA.
(iii) The Authority may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determines consumer exposure to VOCs.
(iv) If a water system draws water from more than one source and the sources are combined before distribution, the samples must be collected at entry points to the distribution system during periods of normal operating conditions when water is representative of all sources being used.
(v) A water system with two or more wells that have been determined to constitute a wellfield as specified in subsection (1)(k) of this rule may reduce sampling to only those entry point(s) designated by the Authority.
(B) If the initial analyses conducted according to subparagraphs (3)(b)(A)(i) or (ii) of this rule do not detect any contaminant listed in subsection (3)(b) of this rule, then monitoring for all of the VOCs should be conducted as follows:
(i) For sampling points served by surface water or GWUDI sources, one sample every year per entry point; or
(ii) For sampling points served only by groundwater sources, one sample every three years per entry point.
(C) Water suppliers may apply to the Authority for a waiver from the monitoring frequencies specified in paragraph (3)(b)(B) of this rule. Waivers will be granted according to the criteria and procedures specified in subparagraphs (3)(a)(C)(i) through (vi) of this rule if the Authority determines there were no detections of any contaminant listed in subsection (3)(b) of this rule and if an Authority approved drinking water protection plan exists for the water system or for those VOCs used within a portion of the DWPA that the Authority has determined is not susceptible to VOC contamination.
(i) Waivers granted for monitoring at groundwater systems shall be effective for no more than six years.
(I) Waivers must be in place prior to the year in which monitoring is to be conducted, and water suppliers must reapply for a waiver from VOC monitoring every two compliance periods (six years).
(II) As a condition of a waiver, water suppliers must collect one sample at each sampling point during the time the waiver is in effect and update the vulnerability assessment for the water system addressing those factors listed in

subparagraphs (3)(a)(C)(ii) and (iii) of this rule. The Authority must be able to confirm that a system is not susceptible within three years of the original determination, and every time the vulnerability assessment is updated, or the waiver is invalidated and monitoring must be conducted as specified in paragraph (3)(b)(B) of this rule.
(ii) At water systems using surface water that have been determined not to be vulnerable to VOC contamination by the Authority, monitoring must be conducted at the frequency prescribed by the Authority. Water suppliers must update the vulnerability assessment for such water systems during each compliance period and submit the vulnerability assessment to the Authority regardless of the frequency of monitoring.
(iii) The Authority may establish area-wide waivers based on historical monitoring data, land use activity, the results of source water assessments or waivers granted for use of VOCs or susceptibility to VOC contamination.
(D) If a contaminant listed in subsection (3)(b) of this rule (except vinyl chloride) is detected in any sample at a concentration greater than the minimum detection limit of 0.0005 mg/l, then the water supplier shall monitor quarterly at each sampling point where a detection occurred except as provided in subparagraph (3)(b)(D)(i) of this rule.
(i) The Authority may reduce the monitoring frequency specified in this paragraph to annually if results for the water system are reliably and consistently below the MCL for at least two quarters for sample points served only by groundwater sources and four quarters for sample points served by surface water or GWUDI sources.
(I) For annual monitoring, samples must be collected during the quarter that previously yielded the highest analytical result.
(II) If a contaminant is detected at a concentration greater than 0.0005 mg/l but below the MCL in one of the annual samples as prescribed by subparagraph (3)(b)(D)(i) of this rule, the water supplier must monitor at the frequency specified by the Authority but in no case less frequently than annually.
(ii) At water systems or sampling points where three consecutive annual samples are collected with no detection of a contaminant, water suppliers may apply to the Authority for a waiver. Monitoring may not be reduced to less often than annually except upon by a waiver granted by the Authority.
(iii) At water systems using groundwater sources where one or more of the following two-carbon organic compounds was detected: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene or 1,1-dichloroethylene, the water supplier shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be collected 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 Authority may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. Water suppliers responsible for surface water systems are required to monitor for vinyl chloride at the discretion of the Authority.
(E) If a contaminant listed in subsection (3)(b) of this rule is detected at a concentration greater than the MCL, then the water supplier must monitor quarterly. After a minimum of four consecutive quarterly samples, if results are reliably and consistently below the MCL and in compliance with paragraph (3)(b)(H) of this rule, then the water supplier may monitor annually. Annual samples must be collected during the quarter which previously yielded the highest analytical result.
(F) The Authority may require confirmation samples for positive or negative results. If a confirmation sample is required by the Authority, the result must be averaged with the original sample result and the average used to determine compliance.
(G) The Authority 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 conducted in the laboratory and samples must be analyzed within 14 days of sample collections. If the concentration in the composite sample is 0.0005 mg/l or greater for any contaminant listed in subsection (3)(b) of this rule, then a follow-up sample must be collected and analyzed within 14 days at each sampling point included in the composite and be analyzed for that contaminant. Duplicates collected for the original composite samples may be used instead of resampling provided the duplicates are analyzed and the results reported to the Authority within 14 days of collection. For water systems serving a population greater than 3,300 people, the Authority may allow compositing at sampling points only within a single water system. For

water systems serving population of 3,300 people or less, the Authority may allow compositing among different water systems provided the 5-sample limit is maintained.
(H) 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 water system is in violation of the MCL. For systems where monitoring is more than once per year, compliance with the MCL is determined by a RAA at each sampling point. At systems where annual or less frequent monitoring takes place, if sample results exceed the MCL, monitoring must be increased to quarterly. The system will not be considered in violation of the MCL until at least one year of quarterly sampling is completed. If any single 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 water supplier 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 water supplier shall follow the reporting and public notification procedures as prescribed in 333-061-0040 and 333-061-0042(2)(b)(A).
(I) The RAA for a contaminant is calculated by averaging the analytical results for the current monitoring period and the previous monitoring periods within a one-year time frame. For water systems where monitoring is less frequent than quarterly, the first sample result that exceeds the detection limit or MCL is considered to be the initial sampling result for determination of the RAA. Multiple sample results within any monitoring period will be averaged and then rounded to the same number of significant figures as the MCL for the contaminant in question. For the purposes of calculating a RAA, a monitoring period may be a calendar month or calendar quarter. Special samples, as described by paragraph (1)(h)(C) of this rule, will not be included in the calculation of the running annual average at a water system.
(J) At new water systems or water systems using a new source of water, water suppliers must demonstrate compliance with the MCL within a period of time specified by the Authority. The water supplier must also comply with the initial sampling frequencies specified by the Authority to 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 NTNC water systems where a disinfectant (oxidant) is added 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 except that compliance with paragraph (4)(i)(B) is required at TNCs where chlorine dioxide is used as a disinfectant or oxidant.
(A) Water suppliers must collect all samples during normal operating conditions.
(B) Failure to monitor in accordance with the monitoring plan as specified in paragraph (4)(c)(B) of this rule is a monitoring violation.
(C) Failure to monitor will be treated as a violation for the entire period covered by the annual average where compliance is based on a RAA of monthly or quarterly samples or averages and where a water supplier's failure to monitor makes it impossible to determine compliance with MCLs or maximum residual disinfectant levels (MRDLs).
(D) Water suppliers may use only data collected under the provisions of this rule to qualify for reduced monitoring.
(E) All samples collected 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.
(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)(c) and (4)(d) of this rule, determine compliance with the MCLs for TTHM and HAA5 as specified in OAR 333-061-0030. Water suppliers for NTNC water systems serving less than 10,000 people are exempt from the requirements of this subsection.
(A) Water suppliers that begin adding a disinfectant to the drinking water supply at a water system must submit a schedule to the Authority for approval which identifies when the water supplier will submit a plan for either standard monitoring or a system specific study as described in paragraphs (4)(b)(B) or (C) of this rule. Upon approval by the Authority of the schedule and plan, water suppliers must complete the IDSE by conducting either the standard monitoring or a system specific study as described in the plan. Water suppliers must consult with the Authority after completing the IDSE to identify compliance monitoring locations prior to developing a monitoring plan as prescribed in

paragraph (4)(c)(B) of this rule that includes monitoring locations identified through the IDSE process. Samples collected to conduct an IDSE will not be used for the purpose of determining compliance with MCLs as prescribed by OAR 333-061-0030(2)(b).
(B) Standard monitoring.
(i) Standard monitoring plans must include the elements specified in sub-subparagraphs (4)(b)(B)(i)(I) through (III) of this rule:
(I) 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;
(II) An explanation of standard monitoring location selection, and a summary of data relied on to justify the selection; and
(III) The population served and source water classification for the water system.
(ii) Water suppliers must monitor as indicated in Table 16. Water suppliers must collect dual sample sets at each monitoring location, and at least one round of monitoring must be conducted during the peak historical month for TTHM or HAA5 levels, or during the month of warmest water temperature. Water suppliers 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.
(iii) Samples must be collected at locations spread throughout the distribution system.
(iv) If the number of entry points to the distribution system is fewer than the number of entry point monitoring locations specified in Table 16, 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 16, the samples must be collected at entry points having the highest annual water flows.
(v) Monitoring in accordance with Table 16 may not be reduced according to the provisions of subsection (1)(d) of this rule.
(vi) IDSE report. Water suppliers must submit an IDSE report to the Authority within 90 days of completing standard monitoring that includes the following elements:
(I) All TTHM and HAA5 analytical results collected according to this rule, and all standard monitoring analytical results collected during the period of the IDSE as individual analytical results and a locational running annual average (LRAA) presented in a format acceptable to the Authority. If changed from the standard monitoring plan prescribed by subparagraph (4)(b)(B)(i) of this rule, the report must also include a schematic of the distribution system, the population served, and the source water type.
(II) An explanation of any deviations from the approved standard monitoring plan.
(III) Recommended times and locations for the compliance monitoring required by subsections (4)(c) and (4)(d) of this rule, based on the protocol prescribed by subparagraph (4)(b)(D)(iii) of this rule, including an explanation for why the locations were selected.
(C) System Specific Study. A system specific study must be based on modeling as prescribed by subparagraph (4)(b)(C)(i) of this rule.
(i) Modeling. Water suppliers may 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 percent of pipe volume; (2) 50 percent 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 sub-subparagraph (C)(i)(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 (that is, 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; (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 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 subparagraph (4)(b)(C)(i) of this rule, the system must correct the deficiencies and respond to Authority inquiries concerning the model. Failure to correct deficiencies or respond to inquiries by the Authority will result in the system having to conduct standard monitoring as prescribed by paragraph (4)(b)(B) of this rule.
(ii) IDSE report. Water suppliers must submit the IDSE report to the Authority within 90 days of completing the system specific study, and the report must include the following elements:
(I) The IDSE report must include 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 Authority. 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 sub-subparagraph (4)(b)(C)(i) of this rule, the water supplier must include final information for the elements described in subparagraphs (4)(b)(C)(i)(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)(c) and (4)(d) of this rule;
(III) The water supplier must recommend monitoring locations selected for monitoring in accordance with subsections (4)(c) and (4)(d) of this rule based on the protocol in paragraph (4)(b)(D) of this rule. It must also recommend and justify the timing of the monitoring to be conducted at these monitoring locations.
(IV) The IDSE report must include an explanation of any deviations from the approved system specific study plan.
(V) The IDSE report must include the analytical and modeling results, and the justification for recommending the monitoring locations selected for monitoring in accordance with subsections (4)(c) and (4)(d) 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)(c) and (4)(d) of this rule should be conducted. Recommendations must be based on the criteria in subparagraphs (4)(b)(D)(ii) through (v) of this rule.
(ii) Water suppliers must collect samples as prescribed by Table 17. The number of samples and recommended locations must be used for monitoring in accordance with subsections (4)(c) and (4)(d) of this rule, unless the Authority requires different or additional locations. Monitoring locations should be dispersed throughout the distribution system to the maximum extent possible.
(iii) Water suppliers must recommend locations for monitoring in accordance with subsections (4)(c) and (4)(d) of this

rule based on standard monitoring results or system specific study results. Water suppliers must comply with the protocol specified in sub-subparagraphs (4)(b)(D)(iii)(I) through (VI) of this rule. If a water system is required to monitor at more than six locations, the protocol must be repeated as necessary. 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 TTHM LRAA not previously selected through this protocol;
(IV) Location with the highest TTHM LRAA not previously selected through this protocol;
(V) Location with the highest HAA5 LRAA not previously selected through this protocol; and
(VI) Location with the highest HAA5 LRAA not previously selected through this protocol.
(iv) A water supplier may recommend locations other than those determined through subparagraph (4)(b)(D)(iii) of this rule, if the system includes a rationale for selecting other locations. If the Authority approves the alternate locations, the water system must monitor at these locations to determine compliance with subsections (4)(c) and (4)(d) of this rule.
(v) The water system's recommended monitoring schedule must include the month of historically highest TTHM and HAA5 concentration, unless the Authority 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) Monitoring requirements for TTHM and HAA5:
(A) Routine Monitoring Frequency. At water systems for which an IDSE report was submitted, samples must be collected at the locations and during the months recommended in the IDSE report as prescribed by paragraph (4)(b)(D) of this rule, unless the Authority requires other or additional locations after its review. At NTNC water systems serving less than 10,000 people and for water systems granted a waiver by the U.S. EPA exempting the water supplier from completing an IDSE, samples must be collected at the location(s) and dates identified in the monitoring plan developed as prescribed in paragraph (4)(c)(B) of this rule. Samples must be collected at no fewer than the number of locations identified in Table 18.
(B) A monitoring plan must be developed for every water system where monitoring is required according to this subsection and must be maintained and made available for inspection by the Authority 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) For water systems where an IDSE report was not required as prescribed in paragraphs (4)(b)(B) or (4)(b)(C) of this rule the monitoring plan must identify the required number of monitoring locations for monitoring in accordance with subsections (4)(c) and (4)(d) of this rule. Water suppliers 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 suppliers must also provide a rationale for identifying the locations as having high levels of TTHM or HAA5.
(iii) For water systems using surface water or GWUDI sources serving more than 3,300 people, a copy of the monitoring plan must be submitted to the Authority prior to the date the water supplier conducts initial monitoring according to this subsection, unless the IDSE report submitted as prescribed in subsection (4)(b) of this rule contains all the information required in paragraph (4)(c)(B) of this rule.
(iv) Revisions to monitoring plans. Water suppliers 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 Authority-approved reasons, after consultation with the Authority 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 Authority 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 Authority prior to the date required to comply with the revised monitoring plan.

(C) A water system monitoring for TTHM or HAA5 in accordance with subsections (4)(c), (4)(d) or (4)(e) of this rule is in violation of the MCL specified in OAR 333-061-0030(2)(b) when the LRAA calculation at any monitoring location 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.
(D) Compliance calculations and determinations. For water systems where quarterly monitoring is required, water suppliers must make compliance calculations at the end of every calendar quarter beginning with the fourth quarter of the initial monitoring period. 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 suppliers required to conduct monitoring at a frequency less than quarterly must make compliance calculations every time samples are collected.
(i) Water suppliers must calculate the LRAA for TTHM and HAA5 to determine that each LRAA does not exceed the MCL listed in OAR 333-061-0030(2)(b) for water systems where quarterly monitoring is required. Water suppliers 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 suppliers that collect more than one sample per quarter at a specific monitoring location must average all samples collected in the quarter for that location to determine a quarterly average to be used in the LRAA calculation.
(ii) For water systems where monitoring is yearly or less frequent, water suppliers 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)(e) 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 supplier required to conduct quarterly monitoring at a water system is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if monitor is not conducted.
(d) Reduced monitoring. Water suppliers may reduce monitoring to the frequency specified in Table 19 any time the LRAA is ≤0.040 mg/L for TTHM and ≤0.030 mg/L for HAA5 at all monitoring locations.
(A) Water suppliers may only use data collected under the provisions of subsections (4)(c) and (4)(d) 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)(d)(D) and subsection (4)(k) of this rule.
(B) Water suppliers 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 suppliers must resume routine monitoring as prescribed in subsection (4)(c) of this rule, or begin increased monitoring as prescribed in subsection (4)(e) 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. For water systems using surface water or GWUDI sources, TOC samples must be collected every 30 days 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)(k) 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 Authority's discretion.

(e) Increased Monitoring:

(A) At water systems where annual or less frequent monitoring is required according to subsections (4)(c) or (4)(d) of this rule, monitoring must be increased to dual sample sets collected every 90 days at all locations if a TTHM or HAA5 sample exceeds the MCL at any location.

(B) At water systems where increased monitoring is conducted according to paragraph (4)(e)(A) of this rule, samples must be collected at the monitoring locations specified in the monitoring plan developed according to paragraph (4)(c)(B) of this rule.

(C) Monitoring may be returned to routine 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.

(f) Operational Evaluation Levels:

(A) The Operational evaluation level for TTHM or HAA5 has been exceeded 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) At water systems where the operational evaluation level for either TTHM or HAA5 is exceeded, water suppliers must conduct an operational evaluation and submit a written report of the evaluation to the Authority 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 Authority may allow water suppliers to limit the scope of the evaluation if the water supplier 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 subparagraph (4)(f)(B)(i) of this rule for submitting the written report. The Authority must approve this limited scope of evaluation in writing, and the water system must keep that approval with the completed report.

(g) Chlorite monitoring and compliance for community and NTNC water systems where chlorine dioxide is used for disinfection or oxidation.

(A) Routine monitoring.

(i) Daily monitoring. Samples must be collected every day at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the water supplier must collect additional samples in the distribution system the following day at the locations required by paragraph (4)(g)(B) of this rule, in addition to the sample required at the entrance to the distribution system.

(ii) Monthly monitoring. A three-sample set must be collected every month in the distribution system. The water supplier must collect 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 water supplier may use the results of additional monitoring conducted under paragraph (4)(g)(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 water supplier is required to collect 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 subparagraph (4)(g)(A)(i) of this rule may not be reduced.
(ii) Chlorite monitoring in the distribution system required by subparagraph (4)(g)(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 subparagraph (4)(g)(A)(ii) of this rule has exceeded the chlorite MCL and the system has not been required to conduct monitoring under paragraph (4)(g)(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 subparagraph (4)(g)(A)(ii) of this rule exceeds the chlorite MCL or the system is required to conduct monitoring under paragraph (4)(g)(B) of this rule, at which time the system must revert to routine monitoring.
(D) Compliance must be based on an arithmetic average of each three-sample set taken in the distribution system as required by subparagraph (4)(g)(A)(ii) of this rule and paragraph (4)(g)(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 Authority as required by OAR 333-061-0040.
(h) Bromate monitoring and compliance for water systems where ozone is used for disinfection or oxidation.
(A) Routine monitoring. One sample must be collected every month for each treatment plant in the water system using ozone. Water suppliers must collect samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.
(B) Reduced monitoring. Bromate monitoring may be reduced from monthly to quarterly if the bromate concentration is less than or equal to 0.0025 mg/L as a running annual average based on monthly bromate measurements for the most recent four quarters. Water suppliers may continue 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 water supplier must resume routine monitoring as required by paragraph (4)(h)(A) of this rule.
(C) 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 collected during the month) collected by the water supplier as required by this subsection. 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 Authority as required by OAR 333-061-0040. If a water supplier 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.
(i) Monitoring and compliance requirements for disinfectant residuals.
(A) Chlorine and chloramines.
(i) Routine monitoring. At water systems where chlorine or chloramines are used, water suppliers 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). At water systems where surface water or GWUDI sources are used, 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, may be used in lieu of collecting separate samples. Compliance with this rule is achieved when the running annual average of monthly averages of samples collected 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 subparagraph (4)(i)(A)(i) of this rule is not allowed.
(iii) Compliance requirements for chlorine and chloramines.

(I) Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the water supplier as required by paragraph (4)(i)(A) of this rule. If the average covering any consecutive four quarter period exceeds the MRDL, the MRDL is exceeded and the water supplier must notify the public as required by OAR 333-061-0042(2)(b)(A), in addition to reporting to the Authority as required by OAR 333-061-0040.
(II) In cases where water suppliers switch between the use of chlorine and chloramines for residual disinfection at a water system 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.
(B) Chlorine dioxide.
(i) Routine monitoring. At water systems where chlorine dioxide is used for disinfection or oxidation, water suppliers must collect daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the water supplier must collect samples in the distribution system the following day at the locations required by subparagraph (4)(i)(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 water supplier is required to collect 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 (that is, no booster chlorination), the water supplier must collect 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 (that is, booster chlorination), the water supplier must collect 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 subparagraph (4)(i)(B)(ii) of this rule.
(iv) Compliance requirements for chlorine dioxide.
(I) Acute violations. Compliance must be based on consecutive daily samples collected by the water system as required by paragraph (4)(i)(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 Authority 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 Authority as required by OAR 333-061-0040.
(II) Non-acute violations. Compliance must be based on consecutive daily samples collected by the system as required by paragraph (4)(i)(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 Authority 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 Authority as required by OAR 333-061-0040.

(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 subsection (4)(i) of this rule.
(k) Monitoring requirements for disinfection byproduct precursors (DBPP).
(A) Routine monitoring. At water systems where surface water or GWUDI sources are used and where conventional filtration treatment is used, monitoring must be conducted at each treatment plant for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water. Monitoring for TOC must be conducted 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 collected, all water suppliers must also measure alkalinity in the source water prior to any treatment. Water suppliers must collect one paired sample and one source water alkalinity sample per month per treatment plant at a time representative of normal operating conditions and influent water quality.
(B) Reduced monitoring. At water systems using surface water or GWUDI sources 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, monitoring may be reduced 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.
(C) Compliance must be determined as specified by OAR 333-061-0032(9)(e). Water suppliers 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(9)(d)(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(9)(d)(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(9)(e)(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 Authority pursuant to OAR 333-061-0040.
(l) Disinfection Profiling and Disinfection Benchmarking. For any community, NTNC, or TNC utilizing surface water or GWUDI sources where a significant change to the disinfection treatment process as defined by OAR 333-061-0060(1)(e)(A) through (1)(e)(D) is proposed, the water supplier must conduct disinfection profiling and benchmarking for Giardia lamblia and viruses. For any community or NTNC water system where surface water or GWUDI sources are used and where the running annual average greater than or equal to 0.064 mg/l for TTHM or 0.048 mg/l for HAA5, the water supplier must conduct disinfection profiling for Giardia lamblia.
(A) For water systems serving at least 10,000 people, water suppliers must conduct the disinfection profiling in accordance with the U.S. EPA Disinfection Profiling and Benchmarking Guidance Manual. The profile must be based on daily inactivation rate calculations over a period of 12 consecutive months. If chloramines, ozone, or chlorine dioxide is used 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 Authority.
(B) At water systems serving less than 10,000 people, the disinfection profiling must be conducted in accordance with or the U.S. EPA 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. If chloramines, ozone, or chlorine dioxide are used 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 Authority.
(C) At water systems using either a single or multiple points of disinfection, monitoring must be conducted according to the following parameters to determine total log inactivation for each disinfection segment:

(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.
(D) Water suppliers required to develop disinfection profiles as prescribed by OAR 333-061-0060(1)(e) must meet the requirements of subparagraphs (4)(l)(D)(i) through (iii) of this rule:
(i) Water systems must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for Giardia lamblia and viruses. If water systems monitor more frequently, the monitoring frequency must be evenly spaced. Water systems that operate for fewer than 12 months per year must monitor weekly during the period of operation;
(ii) Water systems must determine log inactivation for Giardia lamblia through the entire plant, based on CT99.9 values in Tables 21 through 28 in OAR 333-061-0036(5) as applicable; and
(iii) Water systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the Authority.
(E) Water suppliers 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.
(I) Water systems must determine one inactivation ratio (CTcalc/CT99.9) before or at the first customer during peak hourly flow; or
(II) Must determine successive (CTcalc/CT99.9) 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 (CTcalc/CT99.9) for each sequence and then adding the (CTcalc/CT99.9) values together to determine ∑(CTcalc/CT99.9).
(ii) For water systems where there is more than one point of disinfectant application before the first customer, water suppliers must determine the (CTcalc/CT99.9) 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 (CTcalc/CT99.9) value of each segment and ∑(CTcalc/CT99.9) must be calculated using the method in sub-subparagraph (4)(l)(E)(i)(II) of this rule.
(iii) The system must determine the total log of inactivation by multiplying the value calculated in subparagraphs (4)(l)(E)(i) or (ii) of this rule by 3.0.
(F) In lieu of conducting new monitoring as prescribed by paragraph (4)(l)(C) of this rule, water suppliers may elect to meet the requirements of subparagraphs (4)(l)(F)(i) or (ii) of this rule as follows:
(i) For 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 water supplier has not made a significant change to treatment practices nor changed sources since the data were collected. Water suppliers may develop disinfection profiles using up to three years of existing data.
(ii) Water suppliers 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 (4)(l)(G) of this rule must develop a virus profile using the same monitoring data on which the Giardia lamblia profile is based.
(G) Water suppliers must calculate the log of inactivation for viruses using a similar protocol as described in paragraph (4)(l)(D) of this rule, using a CT99.99 and a multiplication factor of 4.0.
(H) A water system subject to OAR 333-061-0060(1)(e) must calculate a disinfection benchmark using the procedures specified in subparagraphs (4)(l)(H)(i) and (ii) of this rule to calculate a disinfection benchmark.

(i) For each year of profiling data collected and calculated as prescribed by paragraphs (4)(I)(A) through (G) 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.
(I) Water systems must retain the disinfection profile data in graphic form, such as a spreadsheet, which must be available for review by the Authority as part of a sanitary survey or other field visit contact.
(5) Surface Water Treatment.
(a) At public water systems that use a surface water source that do not provide filtration treatment, water suppliers must monitor water quality as specified in this subsection. At water systems using GWUDI sources, the monitoring must begin no later than 6 months after the Authority identified the source as being GWUDI.
(A) Fecal coliform or total coliform density measurements as required by OAR 333-061-0032(2)(a)(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 20 each week the system serves water to the public. These samples must be collected on separate days. 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 nephelometric turbidity units (NTU) (these samples count towards the weekly coliform sampling requirement) unless the Authority determines that the system, for logistical reasons outside of its control, cannot have the sample analyzed within 30 hours of collection.
(B) Turbidity measurements to determine compliance with OAR 333-061-0030(3)(a) 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 Authority. Systems using continuous turbidity monitoring must report the turbidity data to the Authority in the same manner that grab sample results are reported. The Authority 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 CT99.9 values in Tables 21 through 28. 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 ultraviolet light (UV), the system may demonstrate to the Authority, through the use of protocol approved by the Authority for on-site disinfection challenge studies or other information satisfactory to the Authority, that CT99.9 values other than those specified in the Tables 27 and 28 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).
(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 (CTcalc/CTrequired) is determined before or at the first customer during peak hourly flow and if the CTcalc/CTrequired is greater than or equal to 1.0, the Giardia lamblia inactivation requirement has been achieved; or
(II) Successive CTcalc/CTrequired 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 CTcalc/CTrequired for each sequence.
Step 2: Add the CTcalc/CTrequired values together.
Step 3: If the sum of successive CTcalc/CTrequired values 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 CTcalc/CTrequired value of each sequence and CTcalc/CTrequired must be calculated using the methods in subparagraph (5)(a)(D)(i)(II) of this rule to determine if the system is in compliance with OAR 333-061-0032(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. Water systems serving more than 3,300 people without an operator present during treatment operations must have an auto-dial alarm or auto-shutoff for low chlorine when chlorine is used as a disinfectant. If there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five 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 29. The day's samples cannot be taken at the same time. The sampling intervals are subject to Authority 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 four 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 (6) of this rule, except that the Authority 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 Authority 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:
(i) 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 Authority.
(ii) Calibration of all turbidimeters must be performed according to manufacturer's specifications, but no less frequently than quarterly.
(iii) At water systems using conventional filtration, water suppliers must measure settled water turbidity every day.
(iv) Water systems using conventional or direct filtration must conduct turbidity profiles for individual filters every calendar quarter.

(v) Water systems using conventional or direct filtration without an operator onsite during treatment operations must have an auto-dial alarm or auto-shutoff for high turbidity.
(vi) For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the Authority may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance.
(vii) Systems using lime softening may acidify representative samples prior to analysis using a method approved by the Authority.
(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 subparagraph (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 Authority.
(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 Authority, through the use of protocol approved by the Authority for on-site disinfection challenge studies or other information satisfactory to the Authority, 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 333-061-0036(5)(d)(B).
(G) Water systems using cartridge filtration must maintain pressure gages before and after each filter, and water suppliers must replace filters according to the manufacturer's recommended pressure differential.
(c) Inactivation credit for water systems using a disinfectant other than chlorine for pathogen inactivation.
(A) Calculation of CT values.
(i) 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 paragraph (5)(b)(B) of this rule.
(ii) 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 30 by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in paragraph (5)(c)(A) of this rule.
(ii) Systems receive the Cryptosporidium treatment credit listed in Table 31 by meeting the corresponding ozone CT values for the applicable water temperature, as described in paragraph (5)(c)(A) of this rule.
(C) Site-specific study. The Authority may approve alternative chlorine dioxide or ozone CT values to those listed in

Table 30 or Table 31 on a site-specific basis. The Authority must base this approval on a site-specific study conducted by a water system that follows an Authority approved protocol.
(D) Ultraviolet light. Systems receive Cryptosporidium, Giardia lamblia, and virus treatment credits for ultraviolet light (UV) reactors by achieving the corresponding UV dose values shown in subparagraph (5)(c)(D)(i) of this rule. Systems must validate and monitor UV reactors as described in OAR 333-061-0050(5)(k) and subparagraphs (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 Table 32 are applicable to post-filter applications of UV in filtered water systems, unfiltered water systems, and groundwater systems required to disinfect as prescribed by OAR 333-061-0032(6).
(ii) Water suppliers must monitor UV reactors according to this subparagraph.
(I) UV reactors must be monitored continuously to determine if the reactors are operating within validated conditions, as prescribed by OAR 333-061-0050(5)(k)(I)(i), including but not limited to UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the Authority designates based on UV reactor operation.
(II) UV transmittance must be monitored based on the validation method for the UV reactor.
(III) The calibration of UV sensors must be verified at least once every month and sensors must be recalibrated according to the U.S. EPA UV Disinfection Guidance Manual as necessary.
(iii) Water suppliers must monitor the percentage of water delivered to the public that was treated within validated conditions for the required UV dose. It is a violation of this rule if less than 95 percent of water delivered within a calendar month was treated to within validated conditions, and a Tier 2 public notice must be issued as prescribed by OAR 333-061-0042(3)(b).
(d) Requirements for individual filter effluent turbidity monitoring.
(A) At water systems where conventional or direct filtration treatment is used for surface water or GWUDI sources, continuous turbidity monitoring must be conducted for each individual filter.
(i) Water suppliers must calibrate turbidimeters using the procedure specified by the manufacturer.
(ii) Individual filter monitoring results must be recorded every 15 minutes.
(iii) If there is a failure in the continuous turbidity monitoring equipment, the water supplier must conduct grab sampling every four hours until the continuous turbidity monitoring equipment is repaired and returned to service.
(I) At water systems serving at least 10,000 people, continuous turbidity monitoring equipment must be repaired within five working days.
(II) At water systems serving less than 10,000 people, continuous turbidity monitoring equipment must be repaired within 14 days.
(iv) If a water system's conventional or direct filtration treatment 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 water systems serving less than 10,000 people, the recording and calibration requirements that apply to individual filters also apply when continuous monitoring of combined filter effluent turbidity is substituted for continuous monitoring of individual filter effluent turbidity.
(B) Direct integrity testing for membrane filtration. Water systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process, and that meets the requirements described in this paragraph. A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (that is, one or more leaks that could result in contamination of the filtrate).
(i) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the water system for the purpose of integrity testing or other maintenance.
(ii) The direct integrity method must have a resolution of three micrometers or less, where resolution is defined as the

size of the smallest integrity breach that contributes to a response from the direct integrity test.
(iii) The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the Authority, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either sub-subparagraphs (5)(d)(B)(iii)(I) or (II) of this rule as applicable to the type of direct integrity test the system uses.
(I) For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation:

LRVDIT = LOG10 (Qp /(VCF x Qbreach)).
Where:
LRVDIT = the sensitivity of the direct integrity test;
Qp = total design filtrate flow from the membrane unit;
Qbreach = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured; and
VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

(II) For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation:

LRVDIT = LOG10(Cf)-LOG10(Cp).
Where:
LRVDIT = the sensitivity of the direct integrity test;
Cf = the typical feed concentration of the marker used in the test; and
Cp = the filtrate concentration of the marker from an integral membrane unit.

(iv) Water systems must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the Authority.
(v) If the result of a direct integrity test exceeds the control limit established under subparagraph (5)(d)(B)(iv) of this rule, the water system must remove the membrane unit from service. Water systems must conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.
(vi) Water systems must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The Authority may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for Cryptosporidium, or reliable process safeguards.
(C) Indirect integrity monitoring for membrane filtration. Water systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria specified in this paragraph. Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A water system that implements continuous direct integrity testing of membrane units in accordance with the criteria specified in subparagraphs (5)(d)(B)(i) through (v) of this rule is not subject to the requirements for continuous indirect integrity monitoring. Water systems must submit a monthly report to the Authority summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.
(i) Unless the Authority approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.
(ii) Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.
(iii) Continuous monitoring must be separately conducted on each membrane unit.
(iv) If indirect integrity monitoring includes turbidity and the filtrate turbidity readings are above 0.15 NTU for a period

greater than 15 minutes (that is, two consecutive 15-minute readings above 0.15 NTU), direct integrity testing in accordance with subparagraphs (5)(d)(B)(i) through (v) of this rule must immediately be performed on the associated membrane unit.
(v) If indirect integrity monitoring includes an Authority-approved alternative parameter and if the alternative parameter exceeds an Authority approved control limit for a period greater than 15 minutes, direct integrity testing in accordance with subparagraphs (5)(d)(B)(i) through (v) of this rule must immediately be performed on the associated membrane unit.
(e) Source water monitoring. Wholesale water systems, as defined in OAR 333-061-0020(162), 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. The E. coli monitoring specified in this subparagraph may be avoided if the system monitors for Cryptosporidium as prescribed in subparagraph (5)(e)(A)(iv) of this rule. The water system must notify the Authority no later than three 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 subparagraph (5)(e)(A)(iii) of this rule:
(I) The annual mean E. coli concentration, in the surface water source, is greater than 100 E. coli/100 mL;
(II) The water system does not conduct E. coli monitoring as described in subparagraph (5)(e)(A)(iii) of this rule; or
(III) 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 specified in sub-subparagraph (5)(e)(A)(iv)(I) of this rule.
(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.
(vii) The Authority may approve monitoring for an indicator other than E. coli to comply with the monitoring prescribed by subparagraph (5)(e)(A)(iii) of this rule for filtered water systems serving fewer than 10,000 people. The Authority may approve an alternative to the E. coli concentrations that trigger Cryptosporidium monitoring as specified in sub-subparagraphs (5)(e)(A)(iv)(I) and (III) of this rule. The Authority's approval to the system will be in writing and will include the basis for the Authority's determination that the alternative indicator or trigger level will provide a more accurate identification of whether a water system will exceed the Bin 1 Cryptosporidium level specified in Table 8 in OAR 333-061-0032(4)(f)(F).
(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. At water systems using a new surface water or GWUDI source, water suppliers must begin

source water monitoring as required in paragraphs (5)(e)(A) and (B) of this rule at a schedule approved by the Authority and according to the requirements of subsection (5)(e) of this rule..
(i) The water supplier must also meet the bin classification and Cryptosporidium treatment requirements of OAR 333-061-0032 for the new water source at a schedule approved by the Authority.
(ii) The water supplier must begin a second round of source water monitoring no later than six 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.
(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 333-061-0032(12) through (17).
(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 subparagraph (5)(e)(D)(i) or (ii) of this rule, rather than conducting source water monitoring, the water system must notify the Authority 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 Authority 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)(C).
(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 Authority 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) 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.
(G) 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 Authority, no later than three months prior to the applicable date listed in paragraph (5)(e)(C) of this rule, for each round of required monitoring.
(ii) If the Authority 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 Authority approves an alternative sampling date. The water system must submit an explanation for the delayed sampling date to the Authority 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.
(I) In this case the water system must collect a replacement sample as prescribed in sub-subparagraph (5)(f)(B)(ii)(II) of this rule.
(II) 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 Authority approves an alternative re-sampling date. The system must submit an explanation for the delayed sampling date to the Authority concurrent with the submittal of the sample to the laboratory.
(iii) 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 Authority 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 Authority 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 Authority approves the system to collect a source water sample after chemical treatment if the Authority 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(8).
(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 subparagraph (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 sub-subparagraph (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 Authority 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 Authority 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 monitoring. To be grandfathered, the sample results and analysis must meet the criteria in this section and the Authority 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.
(ii) 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 subparagraph (5)(f)(B)(i) through (ii) of this rule if the system provides documentation of the condition when reporting monitoring results.
(i) The Authority 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 Authority 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)(c)(B) or OAR-333-061-0032(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 sub-subparagraphs (5)(h)(E)(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)(o).
(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, initial precision recovery (IPR), ongoing precision recovery (OPR), and method blank sample associated with the reported results.
(F) If the Authority 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 Authority may disapprove the data. Alternatively, the Authority may approve the previously collected data if the water system reports additional source water monitoring data, as determined by the Authority, to ensure that the data set used under OAR 333-061-0032(4)(f) or 0032(2)(c) 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 Authority 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.
(6) Coliform Bacteria and Microbiological Contaminants.
(a) General requirements for coliform bacteria sampling.
(A) Sample Handling Requirements and Sample Types.
(i) The standard sample volume required for analysis, regardless of analytical method used, is 100 ml.
(ii) Only the presence or absence of total coliforms and E. coli is required to be determined, not a determination of density.
(iii) Test medium incubation must be initiated within 30 hours of sample collection. Samples should be held below 10 deg. C during transit.
(iv) If water having residual chlorine (measured as free, combined, or total chlorine) is to be analyzed, sufficient sodium thiosulfate ($Na_2S_2O_3$) must be added to the sample bottle before sterilization to neutralize any residual chlorine in the water sample. Dechlorination procedures are addressed in Section 9060A.2 of Standard Methods for the Examination of Water and Wastewater (20th and 21st editions).
(v) There are three types of samples collected in the distribution system for coliform bacteria.
(I) Routine samples are collected to satisfy the monitoring requirements specified in this rule from established sampling locations according to a water system's coliform sampling plan. These samples are used to calculate compliance with the MCL for E. coli prescribed in OAR 333-061-0030(4) and with the coliform investigation triggers specified in OAR 333-061-0078.
(II) Repeat samples are collected according to subsection (6)(g) of this rule as a follow-up to a total coliform-positive routine sample and are used to calculate compliance with the MCL for E. coli prescribed in OAR 333-061-0030(4) and with the coliform investigation triggers specified in OAR 333-061-0078.
(III) Special samples are not considered representative of the water system and are outside the scope of normal water quality assurance and control procedures. Examples of when special samples may be collected include, but are not limited to, investigating user complaints, verifying disinfection after construction or repair and samples from sources not in service. Analyses of special samples must be made available to the Authority upon request and records of such analyses shall be maintained according to OAR 333-061-0040(2)(b).
(B) Water suppliers must comply with the repeat monitoring requirements and E. coli analytical requirements specified

in subsection (6)(g) of this rule following any total coliform-positive sample collected according to subsections (6)(b) through (6)(f) of this rule.
(C) Water suppliers must determine whether a coliform investigation trigger as specified in OAR 333-061-0078(2) has been exceeded once all monitoring as required by subsections (6)(b) through (6)(g) of this rule has been completed for a calendar month.
(D) If a routine or repeat sample is total coliform-positive, the sample must be analyzed to determine if E. coli are present. If E. coli are present, the water supplier must notify the Authority by the end of the day when the water supplier is notified of the test result, unless the water supplier is notified of the result after the Authority office is closed, in which case the water supplier must notify the Authority before the end of the next business day.
(E) The Authority may, on a case-by-case basis, allow a water supplier to forgo E. coli testing on a total coliform-positive sample if that water supplier assumes that the total coliform-positive sample is E. coli-positive. Accordingly, the water supplier must notify the Authority as specified in paragraph (6)(a)(D) of this rule and take action appropriate for exceeding the MCL for E. coli as specified in OAR 333-061-0030(4).
(F) The Authority may invalidate a total coliform-positive sample only if the conditions specified in subparagraph (6)(a)(F)(i), (ii), or (iii) of this rule are met. A total coliform-positive sample invalidated according to this paragraph does not count toward meeting the minimum monitoring requirements of this rule.
(i) The laboratory establishes that improper sample analysis caused the total coliform-positive result.
(ii) The Authority, on the basis of the results of repeat samples collected as required by subsection (6)(g) of this rule, determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem in which coliform was present only in samples collected at a specific service connection within a public water system with more than one service connection. The Authority 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 at a location other than the original tap are total coliform-negative (for example, the Authority 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 water system has only one service connection).
(iii) The Authority has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition that does not reflect water quality in the distribution system. In this case, the water supplier must still collect all repeat samples required by subsection (6)(g) of this rule and use them to determine whether a coliform investigation trigger as specified in OAR 333-061-0078(2) has been exceeded. To invalidate a total coliform-positive sample under this paragraph, the decision and supporting rationale must be documented in writing, and approved and signed by the supervisor of the Authority official who recommended the decision. The written documentation must state the specific cause of the total coliform-positive sample, and what action the water supplier has taken, or will take, to correct this problem. The Authority will not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative. If the Authority invalidates a sample according to this subparagraph the written documentation will be made available to the U.S. EPA or the public upon request.
(G) A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (for example, 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 where there is continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete, or produces colonies too numerous to count where the total number of bacterial colonies exceeds 200 on a 47 mm diameter membrane filter with an analytical method using a membrane filter (for example, Membrane Filter Technique). If a 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 water supplier must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The Authority may waive the 24-hour time limit on a case-by-case basis.
(H) A total coliform-positive sample invalidated according to paragraphs (6)(a)(F) or (G) of this rule does not count

toward meeting the minimum monitoring requirements specified in this section.
(I) Water suppliers must develop a written coliform sampling plan for every water system that they own or operate or for which they are responsible according to the criteria in this paragraph by March 31, 2016. The plan must identify sampling sites and a sample collection schedule that is representative of water throughout the distribution system. Water suppliers must collect total coliform samples according to the plan. Plans are subject to Authority review and revision.
(i) Monitoring required by subsections (6)(b) through (6)(g) of this rule may take place at a customer's premises, dedicated sampling station, or other designated sampling location. Routine and repeat sample sites and any sampling points necessary to meet the requirements of subsection (6)(i) of this rule must be reflected in the coliform sampling plan.
(ii) Samples must be collected at regular time intervals throughout the month, except that groundwater systems serving 4,900 or fewer people may collect all required samples on a single day if they are collected at different sites.
(iii) Water suppliers must collect at least the minimum number of required samples every month even if the MCL for E. coli as specified in OAR 333-061-0030(4) was exceeded or a coliform investigation trigger as specified in OAR 333-061-0078(2) was exceeded.
(iv) Water suppliers may use monitoring as a tool to assist in investigating problems whereby additional samples beyond the number required by this section may be collected to investigate potential problems in the distribution system. A water supplier collecting more routine samples than required in a month must include the results of the additional sampling in calculating whether a coliform investigation trigger as specified in OAR 333-061-0078(2) has been exceeded only if the samples are collected in accordance with an existing coliform sampling plan and are representative of water throughout the distribution system.
(v) Water suppliers must identify repeat monitoring locations in the coliform sampling plan. At least one repeat sample must be collected from the sampling tap where the original total coliform-positive sample was collected, at least one repeat sample must be collected at a tap within five service connections upstream and at least one repeat sample must be collected at a tap within five service connections downstream of the original sampling site unless the provisions of sub-subparagraphs (6)(a)(I)(v)(I) or (6)(a)(I)(v)(II) of this rule are met. If a total coliform-positive sample is at the end of the distribution system, or one service connection away from the end of the distribution system, the Authority may allow an alternative sampling location in lieu of the requirement to collect at least one repeat sample upstream or downstream of the original sampling site. Except as provided for in sub-subparagraph (6)(a)(I)(v)(II) of this rule, at water systems where triggered source water monitoring is required according to paragraph (6)(i)(A), groundwater source samples must be collected in addition to repeat samples as required by subsection (6)(g) of this rule.
(I) Water suppliers may propose repeat monitoring locations to the Authority that the water supplier believes to be representative of a pathway for contamination of the distribution system. A water supplier may elect to specify either alternative fixed locations or criteria for selecting repeat sampling sites on a situational basis in a standard operating procedure (SOP) in its coliform sampling plan. The water supplier must design its SOP to focus the repeat samples at locations that best verify and determine the extent of potential contamination of the distribution system area based on specific situations. The Authority may modify the SOP or require alternative monitoring locations as needed.
(II) For groundwater systems serving 1,000 people or less, repeat sampling locations may be proposed that differentiate potential source water and distribution system contamination (for example, by sampling at entry points to the distribution system). A water system with a single groundwater source and a single service connection may request to collect repeat samples at the location for triggered source water monitoring. The Authority may approve the request if the water supplier demonstrates that the coliform sampling plan remains representative of water quality in the distribution system. If approved by the Authority, the sample result may be used to meet the monitoring requirements in both subsection (6)(g) and (6)(i) of this rule.
(III) Triggered source water monitoring locations as required by subsection (6)(i) of this rule must be identified in the plan in addition to the repeat samples required by subsection (6)(g) of this rule.
(IV) The Authority may review, revise, and approve, as appropriate, repeat sampling proposed by systems under sub-

subparagraphs (6)(a)(I)(v)(I) and (II) of this rule. The water supplier must demonstrate that the coliform sampling plan remains representative of the water quality in the distribution system. The Authority may determine that monitoring at the entry point to the distribution system (especially for groundwater systems without disinfection) is effective to differentiate between potential source water and distribution system problems.
(b) At NTNC and TNC water systems using only groundwater as defined in OAR 333-061-0020(68) and serving 1,000 people or less, one routine sample must be collected for coliform bacteria every calendar quarter the water system provides water to the public. At seasonal water systems as defined in OAR 333-061-0020(120), monitoring must be conducted at least once every month the system is in operation.
(A) For the purpose of determining a water supplier's eligibility to continue or qualify for quarterly monitoring according to the provisions of subparagraphs (6)(b)(C)(iv) or (6)(b)(D)(ii) of this rule at a TNC, the Authority may elect to not consider monitoring violations according to paragraph (6)(p)(A) of this rule if the missed sample is collected no later than the end of the monitoring period following the monitoring period in which the sample was missed. The water supplier must collect the make-up sample in a different week than the routine sample for that monitoring period and should collect the sample as soon as possible during the monitoring period.
(B) Water suppliers must submit to a special monitoring evaluation during each sanitary survey as specified in OAR 333-061-0076 to review the status of a water system, including the distribution system, and determine whether the system is on an appropriate monitoring schedule. After the Authority has performed the special monitoring evaluation, it may modify the system's monitoring schedule, as necessary, or it may allow the system to stay on its existing monitoring schedule, consistent with the provisions of this subsection.
(C) Monitoring must be increased to monthly the month following any of the events identified in subparagraphs (6)(b)(C)(i) through (6)(b)(C)(iv) of this rule. Monthly monitoring must continue until the requirements in paragraph (6)(b)(D) of this rule are met. A water system prescribed monthly monitoring for reasons other than those identified in subparagraphs (6)(b)(C)(i) through (6)(b)(C)(iv) of this rule is not considered to be on increased monitoring for the purposes of this paragraph and will be restored to quarterly monitoring at the discretion of the Authority.
(i) One level 2 coliform investigation or two level 1 coliform investigations are triggered as specified in OAR 333-061-0078(2) at a water system in a rolling 12-month period.
(ii) The MCL for E. coli is exceeded at a water system.
(iii) A violation as specified in OAR 333-061-0078(5) occurs at a water system.
(iv) Two violations as specified in subsection (6)(p) of this rule occur, or one violation as specified in subsection (6)(p) of this rule occurs and one level 1 coliform investigation as prescribed by OAR 333-061-0078(2) is triggered during a rolling 12-month period for a water system.
(D) The Authority may reduce the monitoring frequency from monthly monitoring as specified in paragraph (6)(b)(C) of this rule to quarterly monitoring if the criteria specified in subparagraphs (6)(b)(D)(i) and (6)(b)(D)(ii) of this rule are met.
(i) A sanitary survey, level 2 coliform investigation or an equivalent site visit was completed by the Authority or another party authorized by the Authority within the previous 12 months, and the water system was found to be free of sanitary defects and to have a protected water source; and
(ii) The water supplier ensured the following criteria were met at the water system during the previous 12 months:
(I) No MCL exceedances as prescribed by OAR 333-061-0030(4),
(II) That all samples required by this rule were collected and reported to the Authority,
(III) No coliform investigation trigger exceedances as prescribed by OAR 333-061-0078(2), and
(IV) No coliform investigation violations as prescribed by OAR 333-061-0078(5).
(E) Additional routine monitoring the month following a total coliform-positive sample. At least three routine samples must be collected during the next month following one or more total coliform-positive samples at water systems prescribed quarterly monitoring. The Authority may waive this requirement if the conditions of subparagraphs (6)(b)(E)(i), (6)(b)(E)(ii), or (6)(b)(E)(iii) of this rule are met. Samples may either be collected at regular time intervals throughout the month or may be collected on a single day if samples are collected at different sites. The results from the analysis of additional routine samples must be used to determine if a coliform investigation trigger was exceeded as

specified in OAR 333-061-0078(2).
(i) The Authority may waive the requirement to collect three routine samples as required by paragraph (6)(b)(E) of this rule if the Authority, or a party authorized by the Authority, performs a site visit before the end of the next month in which the system provides water to the public. The site visit must be sufficiently detailed to allow the Authority to determine whether additional monitoring or any corrective action is needed. A representative of the water supplier may not perform this site visit, even if the representative is a party authorized by the Authority to perform sanitary surveys.
(ii) The Authority may waive the requirement to collect three routine samples as required by paragraph (6)(b)(E) of this rule if the Authority has determined why the sample was total coliform-positive and has established that the water supplier has corrected the problem or will correct the problem before the end of the next month in which the water system serves water to the public. In this case, the Authority must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by an Authority supervisor who recommends such a decision, and make this document available to the U.S. EPA and public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the water supplier has taken or will take to correct this problem.
(iii) The Authority will not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the Authority determines that the water supplier has corrected the contamination problem before the set of repeat samples required by subsection (6)(g) of this rule is collected, and all repeat samples were total coliform-negative, the Authority may waive the requirement for additional routine monitoring the next month.
(c) At community water systems using only groundwater as defined in OAR 333-061-0020(68) serving 1,000 people or less, one routine sample must be collected for coliform bacteria every month.
(d) At water systems using surface water or GWUDI serving 1,000 people or less, one routine sample must be collected for coliform bacteria every month.
(e) At public water systems serving more than 1,000 people, the monitoring frequency for total coliform bacteria is based on the population served by the system, as specified in Table 33.
(f) At water systems using surface water or GWUDI without filtration treatment as specified in OAR 333-061-0032(2) and (3), at least one sample must be collected near the first service connection every day the turbidity level measured as specified in OAR 333-061-0036(5)(a)(B) exceeds 1 NTU. The sample must be analyzed for the presence of total coliform bacteria and must be collected within 24 hours of the first exceedance, unless the Authority determines that the water supplier, for logistical reasons beyond its control, cannot have the sample analyzed within 30 hours of collection and identifies an alternative sample collection schedule. Sample results from this coliform monitoring must be included in determining whether a coliform investigation trigger as specified in OAR 333-061-0078(2) was exceeded.
(g) If a sample collected as prescribed by subsections (6)(b) through (6)(f) of this rule is total coliform-positive, a set of repeat samples must be collected within 24 hours of being notified of the positive result. No fewer than three repeat samples must be collected for each total coliform-positive sample found.
(A) The Authority may extend the 24-hour limit on a case-by-case basis if a logistical problem beyond its control prevents a water supplier from collecting the repeat samples within 24 hours.
(B) All repeat samples must be collected on the same day, except that at water systems with only a single service connection the Authority may allow the required set of repeat samples to be collected over a three-day period, or the collection of a larger volume repeat sample(s) in one or more sample containers of any size as long as the total volume collected is at least 300 ml.
(C) An additional set of repeat samples must be collected if one or more repeat samples in the current set of repeat samples is total coliform-positive. The additional set of repeat samples must be collected within 24 hours of being notified of the positive result, unless the Authority extends the limit as specified in paragraph (6)(g)(A) of this rule. Water suppliers must continue to collect additional sets of repeat samples until either total coliforms are not detected in one complete set of repeat samples or the water supplier determines that a coliform investigation trigger as specified in OAR 333-061-0078(2) was exceeded as a result of a repeat sample being total coliform-positive and notifies the Authority. If

a trigger identified in OAR 333-061-0078(2) is exceeded as a result of a routine sample being total coliform-positive, water suppliers are required to conduct only one round of repeat monitoring for each total coliform-positive routine sample.
(D) After a water supplier 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 be total coliform-positive, then the water supplier may count the subsequent sample(s) as a repeat sample instead of as a routine sample.
(E) Repeat samples collected at a groundwater source.
(i) If a repeat sample as specified in this subsection was collected at the location for triggered source water monitoring as specified in paragraph (6)(i)(A) of this rule and is E. coli-positive, the MCL for E. coli as specified in OAR 333-061-0030(4) was exceeded and the water supplier must also comply with subsection (6)(j) of this rule. If more than one repeat sample is collected at the monitoring location required for triggered source water monitoring, the water supplier may reduce the number of additional source water samples required by subsection (6)(j) of this rule by the number of repeat samples taken at that location that were not E. coli-positive.
(ii) If more than one repeat sample is collected at the location for triggered source water monitoring as specified in paragraph (6)(i)(A) of this rule, and more than one repeat sample is E. coli-positive, the MCL for E. coli was exceeded and the water supplier must also comply with OAR 333-061-0032(6).
(iii) If all repeat samples collected at the location for triggered source water monitoring as specified in paragraph (6)(i)(A) of this rule are E. coli-negative and a repeat sample collected at a monitoring location other than one required for triggered source water monitoring is E. coli-positive, the MCL for E. coli was exceeded, but the water supplier is not required to comply with subsection (6)(j) of this rule.
(h) Sampling for additional pathogens may be required by the Authority when specific evidence indicates the possible presence of such organisms.
(i) Groundwater source sampling requirements:
(A) At least one sample must be collected from every groundwater source for which at least 4-log treatment of viruses is not applied before or at the first customer within 24 hours of notification of a total coliform-positive sample collected as prescribed by subsections (6)(b) through (6)(f) of this rule that is not invalidated according to paragraphs (6)(a)(F) or (G) of this rule.
(i) The sample must be collected from every groundwater source in use at the time the total coliform-positive sample was collected, except as provided by subparagraph (6)(i)(A)(ii) of this rule.
(ii) If approved by the Authority, the sampling required by this subsection may be conducted at a representative groundwater source or sources at water systems with more than one ground water source. If directed by the Authority, water suppliers must request approval of a triggered source water monitoring plan that identifies one or more ground water sources that are representative of each monitoring site in a system's coliform sampling plan according to paragraph (6)(a)(I) of this rule and that the water supplier intends to use for representative sampling under this paragraph.
(iii) The Authority may extend the 24-hour time limit for the collection of samples on a case-by-case basis if the water supplier cannot collect the sample(s) within 24 hours due to circumstances beyond its control. In the case of an extension, the Authority will specify how much time the water supplier has to collect the sample(s).
(iv) A water supplier is not required to comply with the source water monitoring requirements specified in this paragraph if either of the following conditions exists:
(I) The Authority determines, and documents in writing, that the total coliform-positive sample collected as prescribed by subsections (6)(b) through (6)(f) of this rule is caused by a distribution system deficiency; or
(II) The total coliform-positive sample collected as prescribed by subsections (6)(b) through (6)(f) of this rule is collected at a location that meets Authority criteria for distribution system conditions that will cause total coliform-positive samples.
(v) Groundwater source samples required by this subsection must be collected at a location prior to any treatment unless

the Authority 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 an Authority-approved location representative of source water quality.
(B) Additional Requirements related to wholesale water systems that use groundwater sources without providing at least 4-log inactivation of viruses for each groundwater source and purchasing water systems.
(i) If a sample collected according to subsections (6)(b) through (6)(f) of this rule at a purchasing water system is total coliform-positive, the water supplier for that purchasing system must notify the water supplier for the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample.
(ii) If the water supplier for a wholesale system receives notice that a sample collected according to subsections (6)(b) through (6)(f) of this rule at a purchasing water system it serves is total coliform-positive, the wholesaler must collect a sample from its groundwater source(s) as prescribed by paragraph (6)(i)(A) of this rule and have it analyzed for E. coli within 24 hours of notification.
(iii) If a sample collected according to paragraph (6)(i)(A) of this rule at a wholesale system is E. coli-positive, the water supplier must notify the water supplier(s) for all purchasing water systems served by the groundwater source of the E. coli-positive source water sample within 24 hours of being notified of the result. The water supplier for the wholesale system must also meet the requirements of subsection (6)(j) of this rule.
(j) Five additional samples must be collected from the same source within 24 hours of notification of an E. coli-positive sample collected as prescribed by paragraph (6)(i)(A) or (6)(k) of this rule at a groundwater source and not invalidated according to subsection (6)(l) of this rule if the Authority does not require corrective action as prescribed by OAR 333-061-0032(6).
(k) At water systems with groundwater sources where chlorine, UV, or another oxidant is used for disinfection, but where 4-log inactivation of viruses is not achieved, assessment monitoring must be conducted at every groundwater source to determine the potential for viral contamination.
(A) Assessment monitoring according to this subsection must include the collection of at least one sample from each groundwater source every year. The Authority may grant written approval to conduct monitoring at one or more representative groundwater sources within a water system that draw water from the same hydrogeologic setting.
(B) A sample collected according to paragraph (6)(i)(A) of this rule or a sample collected for GWUDI determination according to OAR 333-061-0032(7) may be used to meet the requirements of this subsection.
(C) Additional Source Water Assessment Monitoring.
(i) The Authority may require additional source water assessment monitoring if at least one of the following conditions occur:
(I) At least one total coliform-positive sample was collected from the groundwater source;
(II) A groundwater source having been determined by the Authority 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 two-year TOT zone, outreach area, or zone one area;
(III) A source that draws water from an aquifer that the Authority has identified as being fecally contaminated;
(IV) A determination by a 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; or
(V) Other criteria at the discretion of the Authority.
(ii) Requirements for additional source water assessment monitoring include, but are not limited to:
(I) Collecting 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) Collecting a standard sample volume of at least 100 mL for E. coli analysis regardless of the analytical method used;

(III) Analysis of all samples for the presence of E. coli, using an analytical method as prescribed by section (1) of this rule;
(IV) Collecting samples at a location prior to any treatment unless the Authority approves a sampling location after treatment; and
(V) Collecting samples at the groundwater source, unless the water system's configuration does not allow for raw water sampling and the Authority approves an alternate sampling location that is representative of the water quality of that groundwater source.
(D) The Authority 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.
(l) The Authority may invalidate an E. coli-positive groundwater source sample collected according to subsections (6)(i), (j) or (k) of this rule only under the following conditions:
(A) The water supplier or laboratory notifies the Authority in writing that improper sample analysis occurred; or
(B) The Authority determines and documents in writing that there is substantial evidence that an E. coli -positive sample is not related to source water quality.
(m) If the Authority invalidates an E. coli -positive groundwater source sample according to subsection (6)(l) of this rule, the water supplier must collect another source water sample as prescribed by subsection (6)(i) of this rule within 24 hours of being notified of the invalidation. The Authority 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 Authority must specify how much time the system has to collect the sample.
(n) The Authority may direct a water supplier to conduct source water assessment monitoring as prescribed by subsection (6)(k) of this rule when a new groundwater source is placed into service. Monitoring as prescribed by this subsection must begin before the groundwater source is used to provide water to the public.
(o) The Authority may require a water supplier to provide any existing information that will enable the Authority to perform an assessment to determine whether the groundwater system obtains water from a hydrogeologically sensitive aquifer.
(p) Monitoring violations.
(A) Failure to collect every required routine or additional routine sample in a compliance period is a violation of this rule.
(B) Failure to analyze for E. coli following a total coliform-positive routine sample is a violation of this rule.
(q) Every water system must undergo a sanitary survey at least every five years at a frequency determined by the authority. The Authority will review the results of each survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the water supplier needs to undertake to improve drinking water quality.
(r) For any samples collected or analyzed for coliform bacteria on March 31, 2016 or earlier or for any repeat samples collected or analyzed for coliform bacteria after March 31, 2016 in response to a positive sample collected on March 31, 2016 or earlier, the provisions of 40 CFR 141.21(b), (c), (e), (f) and (g) apply to processing and analysis of that sample.
(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).
(i) At new water systems or systems using a new source, water suppliers must conduct initial monitoring in the first quarter of operation, followed by three consecutive quarterly samples.
(ii) The Authority 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.
(iii) 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.
(iv) 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

Authority.
(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 one-half 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 one-half 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 Authority.
(vi) A water system with two or more wells that have been determined to constitute a "wellfield" as specified in subsection (1)(k) of this rule may reduce sampling to only those entry point(s) designated by the Authority.
(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 one-half the MCL, the Authority 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 percent (1.65 where one-half 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 or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 or uranium. If the gross alpha particle activity result is less than detection, half 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 Authority as "vulnerable" must sample for beta particle and photon radioactivity as follows. No waivers shall be granted:
(i) 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.
(ii) 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 subparagraph (7)(b)(A)(i) of this rule maybe reduced to once every three years.
(B) Community water systems designated by the Authority 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 Authority

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 Authority may reduce the frequency of monitoring for contaminants prescribed in subparagraph (7)(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 Authority 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 subparagraph (7)(b)(A)(ii) or (7)(b)(B)(v) of this rule.
(c) General monitoring and compliance requirements for radionuclides.
(A) The Authority may require more frequent monitoring than specified in subsections (7)(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 Authority 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 or uranium. In that case, if the gross alpha particle activity result is less than detection, one-half the detection limit will be used to calculate the annual average.

(D) The Authority has the discretion to delete results of obvious sampling or analytical errors.
(E) When the average annual MCL for radionuclides as specified in Table 5 in OAR 333-061-0030 is exceeded, the water supplier shall, within 48 hours, report the analysis results to the Authority 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 6 of OAR 333-061-0030 represent reasonable goals for drinking water quality, but routine sampling for these secondary contaminants is not required.
(b) The Authority 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 Authority to present an unreasonable risk to health.
(c) If the results of the analyses do not exceed levels for secondary contaminants, listed in Table 6 of OAR 333-061-0030, subsequent sampling and analysis shall be at the discretion of the Authority.
(d) If the results of the analyses indicate that the levels for secondary contaminants, listed in Table 6 of OAR 333-061-0030 are exceeded, the Authority 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 MCLs of these rules and specify follow-up actions to be taken.
(e) During the period while any measures called for in subsection (8)(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 in the distribution system:
(a) All public water systems that add a disinfectant to the water supply at any point in the treatment process, or deliver water in which a disinfectant has been added to the water supply, must maintain a detectable disinfectant residual throughout the distribution system and shall measure and record the residual:
(A) At one or more representative points at a frequency that is sufficient to detect variations in chlorine demand and changes in water flow but in no case less often than twice per week; and
(B) At the same points in the distribution system and at the same times as total coliforms are sampled as prescribed by subsections (6)(b) through (6)(f) of this rule.
(b) The Authority may allow a water supplier to collect disinfectant residual samples as specified in paragraph (9)(a)(B) of this rule at points other than the total coliform sampling points at public water systems which use both a surface water source or GWUDI source and a groundwater source, if the Authority determines that such points are more representative of treated (disinfected) water quality within the distribution system. At water systems where surface water or GWUDI is used, the results of residual disinfectant concentration sampling conducted as prescribed by subsection (5)(a) of this rule for unfiltered systems or subsection (5)(b) of this rule for systems which filter, may be used in lieu of collecting separate samples.
(c) All public water systems that add chlorine for any purpose must ensure that the chlorine residual entering the distribution system after treatment is less than 4.0 mg/l.
(d) The Authority may waive the monitoring requirements specified in subsection (9)(a) of this rule for water systems that add chlorine for purposes such as the oxidation of metals or taste and odor control if a water system measures and records the residual daily and verifies that there is no remaining disinfectant residual at or before the first customer.
(e) Where chlorine is used as the disinfectant, the measurement of residual chlorine shall be by the N, N-diethyl-p-phenylenediamine (DPD) or other U.S. 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;
(f) 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.
(10) Lead and copper monitoring at community and NTNC water systems:
(a) Site selection criteria for lead and copper monitoring in tap water.

(A) Water suppliers must complete a materials evaluation of the distribution system at every water system to which this section applies in order to identify a pool of targeted sampling sites that meet the requirements of this subsection. The sample sites identified must be sufficient to ensure the number of tap water samples required by subsection (10)(c) of this rule can be collected every monitoring period. All sample sites from which first draw samples are collected must 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.
(B) Water suppliers must review the sources of information listed in this paragraph to identify a sufficient number of sampling sites but may consider additional information if approved by the Authority.
(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 water distribution system; and
(ii) All existing water quality information, which includes the results of all prior analyses at the water system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.
(C) The sampling sites selected for a community water system's sampling pool must consist of buildings constructed as single-family residences that are used as either a residence or a place of business and that contain copper pipes with lead solder installed from January 1, 1983 through June 30, 1985 or are buildings served by lead pipes, lead goosenecks or similar appurtenances. When multiple-family residences comprise at least 20 percent of the structures served by a water system, the water supplier may include these types of structures in the sampling pool. These sample sites constitute tier 1 sampling sites.
(D) At community water systems with insufficient tier 1 sampling sites to satisfy the monitoring requirements in subsection (10)(c) of this rule, water suppliers must complete the sampling pool with sample sites at buildings, including multiple-family residences that contain copper pipes with lead solder installed from January 1, 1983 through June 30, 1985 or at buildings served by lead pipes, lead goosenecks or similar appurtenances. These sample sites constitute tier 2 sampling sites.
(E) At community water systems with insufficient tier 1 and tier 2 sampling sites, water suppliers must complete the sampling pool with sample sites at single family structures that contain copper pipes with lead solder installed before 1983. These sample sites constitute tier 3 sampling sites.
(F) At community water systems with insufficient tier 1, tier 2 and tier 3 sampling sites to satisfy the monitoring requirements in subsection (10)(c) of this rule, water suppliers must complete the sampling pool with representative sites throughout the distribution system at which the plumbing materials used at that site are commonly found at other sites served by the water system.
(G) The sampling sites selected for NTNC water systems must consist of buildings that contain copper pipes with lead solder installed from January 1, 1983 through June 30, 1985 or sample sites served by lead pipes, lead goosenecks or similar appurtenances. These sample sites constitute tier 1 sampling sites for NTNC water systems.
(H) At NTNC water systems with insufficient tier 1 sites, water suppliers must complete the sampling pool with sites that meet the criteria specified in paragraph (10)(a)(D) of this rule or if necessary, complete the sampling pool with sites served by copper pipes with lead solder installed before 1983. If additional sites are still needed to satisfy the monitoring requirements in subsection (10)(c) of this rule, the water supplier shall use representative sites throughout the distribution system with plumbing materials commonly found at other sites served by the water system.
(I) For any water system where the sampling pool does not consist exclusively of tier 1 sites, water suppliers must submit a letter to the Authority according to OAR 333-061-0040(1)(g)(A)(i) indicating why a review of the information in paragraph (10)(a)(B) of this rule was inadequate to locate a sufficient number of tier 1 sites. For community water systems which include tier 3 sampling sites in the sampling pool, water suppliers must indicate in such a letter why a sufficient number of tier 1 and tier 2 sampling sites could not be located.
(b) Sample collection methods for lead and copper monitoring in tap water.
(A) All tap water samples for lead and copper collected according to subsections (10)(a) through (e) of this rule must be

first draw samples consisting of a one-liter sample collected from a tap where the water remained in plumbing pipes for at least six hours and must be collected without flushing the tap first. First-draw samples from residential housing must be collected from the cold-water kitchen tap or bathroom sink. First-draw samples from non-residential buildings must be collected at an interior tap from which water is typically drawn for consumption. First-draw samples may be collected by the water supplier or by residents but only after those residents were instructed of the sampling procedures specified in this paragraph. To avoid the risks associated with residents handling nitric acid, acid fixation of first draw samples may be done up to 14 days after a sample is collected. If a water supplier allows residents to perform sampling, the water supplier may not challenge the accuracy of sampling results based on alleged errors in sample collection.
(B) Water suppliers must collect each first-draw tap sample from the same sampling site from which a previous sample was collected. If a water supplier cannot gain access to a sampling site in order to collect a follow-up tap sample for any reason, the water supplier may collect the follow-up tap sample from another sampling site in the sampling pool as long as the new sample site meets the same targeting criteria and is within the proximity of the original site.
(c) Water suppliers must collect at least the number of samples indicated in Table 34 during each monitoring period according to subsection (10)(d) of this rule. The sample sites selected for reduced monitoring must be representative of the sites identified as standard monitoring sampling sites.
(A) At water systems with fewer than five drinking water taps meeting the sample site criteria specified in subsection (10)(a) of this rule, water suppliers must collect at least one sample from each sampling site and must then collect additional samples on different days during the monitoring period to meet the required number of samples during the monitoring period.
(B) The Authority may allow water suppliers to collect a number of samples less than the number of sampling sites specified in this subsection provided that at least one sample is collected at every tap that can be used for human consumption. The Authority must approve this reduction of the minimum number of samples in writing based on a request from the water supplier or onsite verification by the Authority. The Authority may specify sampling locations when a system is conducting reduced monitoring.
(d) Frequency of monitoring for lead and copper in tap water.
(A) At all water systems, water suppliers must conduct initial tap water monitoring during two consecutive six-month periods.
(i) At water systems serving 50,000 people or less, if sample results are at or below the lead and copper action levels during two consecutive six-month monitoring periods, water suppliers may reduce monitoring according to paragraph (10)(d)(D) of this rule.
(ii) At water systems serving 50,000 people or less, if sample results exceed the action level for lead or copper, water suppliers must implement corrosion control treatment according to OAR 333-061-0034(2) and monitor according to paragraphs (10)(d)(B) and (C) of this rule.
(B) Monitoring after installation of corrosion control and source water treatment.
(i) At any water system where optimal corrosion control treatment is installed according to OAR 333-061-0034(3), water suppliers must monitor during two consecutive six-month periods no later than 12 months after the deadline for installing treatment.
(ii) At any water system where source water treatment is installed according to OAR 333-061-0034(4), water suppliers must monitor during two consecutive six-month periods no later than 12 months after the deadline for installing treatment.
(C) After the Authority specifies water quality parameters for optimal corrosion control according to OAR 333-061-0034(3), water suppliers must monitor during each subsequent six-month monitoring period beginning on the date the Authority specifies the optimal water quality control parameters.
(D) Reduced monitoring:
(i) At water systems where sample results are at or below the lead and copper action levels during each of two consecutive six-month monitoring periods, water suppliers may reduce both the number of samples to the number specified in Table 34 for reduced monitoring sites in (10)(c) of this rule, and the monitoring frequency to once per year. In

no case may the number of samples required be reduced below the minimum number specified in paragraph (10)(c)(B) of this rule or at least one sample per available tap. This monitoring must begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.
(I) At water systems with optimal corrosion control treatment, monitoring may be reduced only if the range of optimal water quality control parameters specified by the Authority are met and after written approval from the Authority.
(II) At water systems with optimal corrosion control treatment, the Authority shall review monitoring, treatment, and other relevant information submitted by the water supplier and notify the water supplier in writing when it determines the reduced monitoring may begin. The Authority shall review, and where appropriate, revise its determination when the water supplier submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.
(ii) At water systems where sample results are at or below the lead and copper action levels during three consecutive years of monitoring, water suppliers may reduce the monitoring frequency for lead and copper to once every three years.
(I) At water systems with optimal corrosion control treatment, monitoring may be reduced only if the range of optimal water quality control parameters specified by the Authority are met and after written approval from the Authority.
(II) The Authority shall review monitoring, treatment, and other relevant information submitted by the water supplier and shall notify the water supplier in writing when it determines monitoring once every three years may begin. The Authority shall review, and where appropriate, revise its determination when the water supplier submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.
(III) Monitoring conducted once every three years must be completed no later than every third calendar year.
(iii) At water systems where the required number of samples is reduced, water suppliers must collect the samples from representative sites included in the pool of targeted sampling sites identified according to subsection (10)(a) of this rule. At systems where monitoring is annual or less frequent, water suppliers must conduct the lead and copper tap sampling between June 1 and September 30, inclusive. For water suppliers collecting a reduced number of samples, the Authority may approve a different seasonal period for lead and copper tap water monitoring. Such a seasonal period shall be no longer than four consecutive months and must represent a time of normal operation, when the highest concentrations of lead are most likely to occur.
(I) At a NTNC water system which is not operated during the months of June through September and for which a period of normal operation is unknown where the highest concentrations of lead are most likely to occur, the Authority shall designate a monitoring period that represents a time of normal operation for the water system. This monitoring shall begin during the period designated by the Authority in the calendar year immediately following the end of the monitoring period for which samples were collected at the water system.
(II) At community and NTNC water systems where monitoring is annual or less frequent and the Authority approved sample collection during the months of June through December, water suppliers must collect the 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.
(iv) At water systems subject to reduced monitoring and serving 50,000 people or less, if lead or copper samples exceed the action level, water suppliers must resume monitoring at the frequency specified in paragraph (10)(d)(A) of this rule and collect the number of samples specified for standard monitoring specified in subsection (10)(c) of this rule. Water suppliers must also monitor water quality parameters according to subsection (10)(f) of this rule during the period in which the lead or copper action level was exceeded.
(I) At water systems where monitoring was increased according to subparagraph (10)(d)(D)(iv) of this rule, water suppliers may resume annual tap water monitoring for lead and copper according to subparagraph (10)(d)(D)(i) of this rule at the reduced number of sampling sites after two subsequent consecutive six-month rounds of lead and copper sample results are at or below the applicable action levels. This annual monitoring must begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.
(II) Water suppliers may resume triennial monitoring for lead and copper in tap water at the reduced number of sampling sites after meeting the criteria specified in subparagraph (10)(d)(D)(ii) of this rule.

(v) At water systems subject to reduced monitoring, if sample results exceed the lead action level during any four-month monitoring period or if optimal water quality control parameters are not at or above the minimum values or within the range of values specified by the Authority for more than nine days in any six-month period as specified in paragraph (10)(f)(F), water suppliers must complete the actions specified in sub-subparagraphs (10(d)(D)(v)(I) through (III) of this rule:
(I) Resume monitoring at the frequency specified in paragraph (10)(d)(A) of this rule.
(II) Collect the number of samples specified for standard monitoring specified in subsection (10)(c) of this rule; and
(III) Resume monitoring for water quality parameters within the distribution system, if applicable, according to paragraph (10)(f)(C) of this rule.
(IV) This monitoring must 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.
(vi) At water systems where monitoring was increased according to subparagraph (10)(d)(D)(v) of this rule, water suppliers may resume both reduced tap water monitoring for lead and copper and reduced water quality parameter monitoring within the distribution system if the Authority approves the monitoring reduction in writing and after two subsequent six-month rounds of lead and copper monitoring met the criteria specified in subparagraph (10)(d)(D)(i) of this rule.
(I) This annual monitoring must begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.
(II) At such water systems, water suppliers may resume reduced triennial monitoring for lead and copper in tap water after meeting the criteria specified in specified in subparagraph (10)(d)(D)(ii) of this rule. Water suppliers may also reduce water quality parameter distribution monitoring according to sub-subparagraphs (10)(f)(F)(vi)(I) and (II) of this rule.
(III) Water suppliers must demonstrate they have re-qualified for triennial monitoring for water quality parameters in distribution before beginning this monitoring.
(vii) At water systems where sample results are less than or equal to 0.005 mg/l for lead and 0.65 mg/l for copper when calculated according to OAR 333-061-0030(1) for two consecutive six-month monitoring periods, water suppliers may reduce the number of samples according to subsection (10)(c) of this rule and the sampling frequency to once every three calendar years.
(viii) At water systems subject to reduced monitoring according to paragraph (10)(d)(D) of this rule, water suppliers must notify the Authority in writing of any upcoming, long-term change to treatment practices or the addition of a new water source. The Authority shall review and approve the addition of the source or change in treatment practices before the project is implemented by the water supplier. The Authority may require the water supplier to resume standard monitoring or take other appropriate steps to evaluate water quality such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment.
(e) The results of any monitoring conducted in addition to the requirements of this section must be considered by the water supplier and by the Authority when determining whether an action level is exceeded or in making any determinations. The Authority may invalidate lead or copper tap water samples according to the criteria in this subsection.
(A) The Authority may invalidate a lead or copper tap water sample if at least one of the conditions specified in this paragraph is met. The decision and the rationale for the decision shall be documented in writing by the Authority. A sample invalidated by the Authority does not count toward determining if the action level for lead or copper is exceeded or toward meeting the minimum monitoring requirements. Sample results may be invalidated if:
(i) The laboratory establishes that improper sample analysis caused erroneous results;
(ii) The sampling site did not meet the site selection criteria;
(iii) The sample container was damaged in transit; or
(iv) There is substantial reason to believe that the sample was subject to tampering.
(B) Water suppliers must report the results of all samples to the Authority and all supporting documentation for samples

proposed to be invalidated.
(C) The Authority 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.
(D) Water suppliers must collect replacement samples for any samples invalidated if after the invalidation of one or more samples, the number of samples collected for the monitoring period does not meet the minimum requirements specified in subsection (10)(c) of this rule. Replacement samples must be collected as soon as possible, and in no case later than 20 days after the date the Authority invalidates the original sample. Replacement samples must be collected 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) Water suppliers must monitor water quality parameters as specified in paragraphs (10)(f)(D) through (J) of this rule as applicable at:
(A) Water systems serving more than 50,000 people;
(B) Water systems serving 50,000 people or less where the lead or copper action levels were exceeded; or
(C) Water systems where optimal corrosion control treatment is operated.
(D) Sample collection methods:
(i) Distribution samples must be representative of water quality throughout the distribution system taking into account the number of people served by the water system, different sources of water, different treatment methods employed at the system, and seasonal variability. Water quality parameter monitoring is not required to be conducted at taps targeted for lead and copper monitoring.
(ii) Entry point samples must be collected at locations representative of each source after treatment. If a water system draws water from more than one source and the sources are combined before distribution, water suppliers must monitor at an entry point to the distribution system during periods of normal operating conditions when water is representative of all sources being used.
(E) Number of samples:
(i) Water suppliers must collect two distribution samples for applicable water quality parameters during each monitoring period as specified in paragraphs (10)(f)(F) through (H) of this rule from the number of sites identified in Table 35.
(ii) Water suppliers must collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in paragraph (10)(f)(F) of this rule except as provided in subparagraph (10)(f)(G)(iii) of this rule. During each monitoring period specified in paragraphs (10)(f)(G) through (I) of this rule, water suppliers must collect one sample for each applicable water quality parameter at each entry point to the distribution system.
(F) Water suppliers must monitor water quality parameters in the distribution system and at each entry point to the distribution system at water systems as prescribed by subparagraphs (10)(f)(F)(i) or (ii) of this rule. Monitoring must be conducted during each six-month monitoring period for the following parameters: 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. This monitoring must be conducted:
(i) At water systems serving 50,000 people or less, if sample results exceed the lead or copper action level; or
(ii) At water systems serving 50,000 people or more or where a water system grows to serve more than 50,000 people.
(G) At water systems where optimal corrosion control treatment is installed, water suppliers must monitor water quality parameters at the locations and frequencies specified in this paragraph during each six-month monitoring period as specified in paragraph (10)(d)(B) of this rule.
(i) At taps in the distribution system, two samples for: pH, 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) At each entry point to the distribution system, at least one sample for pH, no less frequently than every two weeks except as specified in subparagraph (10)(f)(G)(iii) of this rule. Monitoring must also include if applicable:
(I) The alkalinity concentration and the dosage rate of the chemical used to adjust alkalinity when alkalinity is adjusted as

part of optimal corrosion control; or
(II) The concentration of orthophosphate or silica (whichever is applicable) and the dosage rate of the inhibitor used when a corrosion inhibitor is used as part of optimal corrosion control.
(iii) At groundwater systems, water suppliers may limit entry point monitoring to those entry points that are representative of water quality and treatment conditions throughout the distribution system. If water from untreated ground water sources mixes with water from treated ground water sources, the water supplier must monitor water quality parameters both at representative entry points receiving treatment and no treatment. Water suppliers must provide the Authority written information identifying the selected entry points and documentation, including information about seasonal variability sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system, prior to any monitoring.
(H) Monitoring after the Authority specifies water quality parameters values for optimal corrosion control treatment.
(i) At water systems serving more than 50,000 people where the Authority specifies water quality parameter values for optimal corrosion control according to OAR 333-061-0034(3)(l), water suppliers must monitor the applicable water quality parameters specified in paragraph (10)(f)(G) of this rule every six months. Water suppliers must also determine compliance with the minimum optimal water quality parameter values set by the Authority every six months, beginning with the first six-month period on either January 1 or July 1, whichever comes first, after the Authority specifies the values. Compliance with the Authority-designated optimal water quality parameter values must be determined according to OAR 333-061-0034(3)(l).
(ii) At water systems serving 50,000 people or less where the Authority specifies water quality parameter values for optimal corrosion control according to OAR 333-061-0034(3)(l), water suppliers must monitor the applicable water quality parameters according to paragraphs (10)(f)(G) or (I) of this rule as appropriate. Water suppliers must also monitor water quality parameters during each six-month monitoring period where sample results exceed the action level for lead or copper.
(I) Reduced monitoring:
(i) At water systems where the range of water quality parameter values for optimal corrosion control treatment are met during two consecutive six-month monitoring periods conducted according to subsection (10)(d) of this rule, water suppliers may collect two distribution samples for the applicable water quality parameters at the reduced number of sites specified in Table 36 during each six-month monitoring period. The monitoring frequency at the entry point(s) to the distribution system must continue as specified in paragraph (10)(f)(G) of this rule.
(ii) At water systems where the range of water quality parameter values for optimal corrosion control treatment are met during every six-month monitoring period for three consecutive years, water suppliers may reduce the monitoring frequency for water quality parameters in distribution to annually. This monitoring must begin during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs.
(iii) At water systems where the range water quality parameter values for optimal corrosion control treatment are met during three consecutive years of annual monitoring, water suppliers may reduce the monitoring frequency for water quality parameters in distribution from annually to once every three years. This monitoring must begin no later than the third calendar year following the end of the monitoring period in which the third consecutive year of annual monitoring occurred.
(iv) Water suppliers may reduce the monitoring frequency for applicable water quality parameters in distribution to once every three years if able to demonstrate that the lead concentration in tap water is less than or equal to 0.005 mg/l, that the copper concentration in tap water is less than or equal to 0.65 mg/l, and that the range of water quality parameter values for optimal corrosion control treatment were met during two consecutive monitoring periods conducted according to subsection (10)(d) of this rule. Monitoring must be conducted at least once every third calendar year.
(v) Water suppliers monitoring annually must collect samples evenly throughout the year to reflect seasonal variability in water quality.
(vi) At water systems where reduced monitoring is conducted, water suppliers that fail to operate optimal corrosion

control treatment within the range of values specified by the Authority according to OAR 333-061-0034(3)(l) for more than nine days during any six-month period must resume distribution monitoring at the number of locations and frequency prescribed by paragraph (10)(f)(H) of this rule. Water suppliers may resume annual monitoring for water quality parameters in distribution at the reduced number of sites after completing two subsequent consecutive six-month rounds of monitoring that meet the criteria specified in subparagraph (10)(f)(I)(i) of this rule.
(J) The results of any monitoring conducted in addition to the minimum requirements specified in this section shall be considered by the water supplier and the Authority in making any determinations.
(g) Monitoring requirements for lead and copper in source water.
(A) At water systems where the action level for either lead or copper is exceeded in tap water samples collected according to subsections (10)(a) through (e) of this rule, water suppliers must collect lead and copper source water samples as specified in this subsection.
(i) At groundwater systems, water suppliers must collect at least one sample at every entry point to the distribution system which is representative of each source after treatment unless conditions make a different sampling point more representative of each source or water treatment plant.
(ii) At surface water systems or water systems with a combination of groundwater and surface water sources, water suppliers must collect at least 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. Water suppliers must collect each sample at equivalent sampling points unless conditions make another sampling point more representative of each source or water treatment plant.
(iii) If a water system draws water from more than one source and the sources are combined before distribution, water suppliers must monitor at an entry point to the distribution system during periods when water is representative of all sources being used.
(B) Where the results of sampling indicate the maximum permissible source water level established in OAR 333-061-0034(4)(b)(D) is exceeded, the Authority may require one additional sample to be collected as soon as possible after the initial sample was collected (but not to exceed two weeks) at the same sampling point. If an Authority-required confirmation sample is collected, the results of the initial and confirmation samples must be averaged to determine compliance with the Authority-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) of 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 of 0.050 mg/l shall either be considered as the measured value or be considered one-half the PQL (0.025 mg/l).
(C) Water suppliers must collect one sample according to paragraph (10)(g)(A) of this rule 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 monitoring occurred, or if the Authority has established an alternate monitoring period, the last day of that period.
(D) At water systems where source water treatment was installed according to OAR 333-061-0034(4)(a)(C), water suppliers must collect at least one sample from each entry point to the distribution system during two consecutive six-month monitoring periods within 36 months after the Authority determines source water treatment is necessary.
(E) Monitoring frequency after the Authority specifies maximum permissible source water levels or determines that source water treatment is not needed.
(i) Water suppliers must monitor at the frequency specified in this paragraph in cases where the Authority specifies maximum permissible source water levels according to OAR 333-061-0034(4)(b)(D) or determines that source water treatment is not required according to OAR 333-061-0034(4)(b)(B).
(I) At water systems using only groundwater sources, water suppliers must collect samples once during the three-year compliance period in effect when the applicable Authority determination is made and thereafter water suppliers must collect samples once every third calendar year.
(II) At water systems using surface water or a combination of groundwater and surface water sources, water suppliers

must collect samples once during each calendar year, with the first annual monitoring period beginning during the year in which the applicable Authority determination is made.
(ii) Water suppliers are not required to conduct source water monitoring if sample results are at or below the action level for lead and copper in tap water samples collected during the same monitoring period.
(F) Reduced monitoring frequency:
(i) At water systems using only groundwater sources, water suppliers may reduce monitoring for lead and copper in source water to once every nine-year compliance cycle, provided samples are collected no later than every ninth calendar year, if:
(I) The water supplier demonstrates that finished drinking water entering the distribution system has concentrations of lead and copper below the maximum permissible lead and copper concentrations specified by the Authority according to OAR 333-061-0034(4)(b)(D) during at least three consecutive compliance periods; or
(II) The Authority determines that source water treatment is not necessary and the water supplier demonstrates during at least three consecutive compliance periods that the concentration of lead in source water was less than or equal to 0.005 mg/l and that the concentration of copper in source water was less than or equal to 0.65 mg/l.
(ii) At water systems using surface water or a combination of groundwater and surface water, water suppliers may reduce monitoring 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, if:
(I) Water suppliers demonstrate that finished drinking water entering the distribution system has concentrations of lead and copper below the maximum permissible lead and copper concentrations specified by the Authority according to OAR 333-061-0034(4)(b)(D) for at least three consecutive years; or
(II) The Authority determines that source water treatment is not necessary and the water supplier demonstrates during at least three consecutive years 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.
(iii) At water systems using a new source of water, water suppliers are not eligible for reduced monitoring for lead 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 Authority according to OAR 333-061-0034(4)(a)(E).
(h) Lead service line inventory requirements.
(A) Inventory requirements:
(i) Water suppliers must develop an inventory to identify the lead status of all public and private service lines connected to the public water distribution system. The inventory must:
(I) Utilize evidence-based methodologies as listed in subparagraph (10)(h)(A)(ii) of this rule;
(II) Categorize each public and private service line as described in subparagraph (10)(h)(A)(iii) of this rule. Water suppliers are not required to physically verify the material composition (for example, copper or plastic) of a service line to identify its lead status in the inventory; and
(III) Be submitted to the Authority no later than October 16, 2024, in a format approved by the Authority.
(ii) Water suppliers must use the Authority approved methodologies specified in sub-subparagraphs (10)(h)(A)(ii)(I) through (V) of this rule to categorize service lines before utilizing the methodology specified in sub-subparagraph (10)(h)(A)(ii)(VI).
(I) Water suppliers must review the following records or sources of information. All construction and plumbing codes, permits, and existing records or other documentation which indicate the service line materials used to connect structures to the distribution system. All water system records, including distribution system maps and drawings, historical records describing each service connection, meter installation records, historical capital improvement or master plans, and standard operating procedures. All inspections and records related to the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system.
(II) Any piping installed after January 1, 1986 can be categorized as non-lead. If a water supplier has a documented construction standard established prior to that date that did not allow lead to be used for service lines, any service line

installed after that date can be categorized as non-lead.
(III) Any service line with a diameter of two inches or greater can be categorized as non-lead.
(IV) Water suppliers may choose to have customers submit data or documentation identifying the lead status of their service line, from a location just inside their building. The water supplier must provide instructions to the building owner and must receive photo or other documentation clearly showing the service line material. When piping material is difficult to categorize visually, a scratch test, magnet test, or other verification must be conducted and documented.
(V) Each service line, or portion of the service line if jointly owned, may be excavated or exposed at one location such that the material can be identified, or the water supplier may inspect the service line as it enters the building.
(VI) If no lead service lines were identified using the methodologies listed in sub-subparagraphs (10)(h)(A)(ii)(I) through (V) of this rule, a random sampling of a portion of the remaining unknown service lines that provides a 95 percent confidence level must be physically inspected as specified in sub-subparagraph (10)(h)(A)(ii)(V) of this rule. If no lead service lines are found in the randomized pool, all remaining unknown service lines can be categorized as non-lead.
(iii) Each service line, or portion of the service line where ownership is split, must be categorized in the inventory in the following manner:
(I) "Lead" where the service line is made of lead.
(II) "Galvanized Requiring Replacement" where a galvanized service line is or was at any time downstream of a lead service line or is currently downstream of a "Lead Status Unknown" service line. If the water supplier is unable to demonstrate that the galvanized service line was never downstream of a lead service line, it must presume there was an upstream lead service line.
(III) "Non-lead" where the service line is determined through an evidence-based record, method, or technique not to be lead or galvanized requiring replacement. The water system may classify the actual material of the service line (for example, plastic or copper) as an alternative to classifying it as "Non-lead."
(IV) "Lead Status Unknown" where the service line material is not known to be lead, galvanized requiring replacement, or a non-lead service line, such as where there is no documented evidence supporting material classification.
(iv) Water suppliers must identify and update service line materials in the inventory as they are encountered during normal water system operations (including, but not limited to, checking service line materials when reading water meters or performing maintenance activities).
(v) If any service lines are categorized as lead, galvanized requiring replacement, or lead status unknown, the inventory updates must be submitted at least at the same frequency as monitoring for lead and copper tap according to subsection (10)(d) of this rule, or annually, whichever is less frequent.
(B) For any lead pipes, goosenecks or similar appurtenances found within a public water distribution system, water suppliers must:
(i) Remove the component upon discovery; or
(ii) Include the component as part of a compliance schedule approved by the Authority according to OAR 333-061-0087(4).
(11) Monitoring requirements when 4-log treatment of viruses is provided at groundwater systems.
(a) At groundwater systems where at least 4-log treatment of viruses (using inactivation, removal or an Authority-approved combination of 4-log virus inactivation and removal) is provided before or at the first customer for a groundwater source, water suppliers must comply with the requirements of this subsection within 30 days of placing the groundwater source in service.
(A) The water supplier must notify the Authority in writing that it provides at least 4-log treatment of viruses. The notification must include engineering, operational, or other information as determined by the Authority necessary to evaluate the submission.
(B) Disinfection and filtration effectiveness and reliability must be monitored as specified in subsections (11)(b) and (c) of this rule.
(C) Groundwater source monitoring according to OAR 333-061-0036(6) must be conducted if 4-log treatment of viruses is subsequently discontinued for the source.

(b) Chemical Disinfection:
(A) At water systems serving more than 3,300 people, water suppliers must continuously monitor the residual disinfectant concentration using analytical methods as specified in OAR 333-061-0036(1) at a location approved by the Authority and must record the lowest residual disinfectant concentration each day water from the groundwater source is served to the public. The minimum residual disinfectant concentration determined by the Authority and according to Table 37 must be maintained every day water from the source is served to the public. If there is a failure in the continuous monitoring equipment, grab sampling must be conducted every four hours until continuous monitoring is restored. Water suppliers in all cases must resume continuous residual disinfectant monitoring within 14 days.
(B) At water systems serving 3,300 or fewer people, water suppliers must monitor the residual disinfectant concentration using analytical methods as specified in OAR 333-061-0036(1) at a location approved by the Authority and record the residual disinfection concentration each day that water from the groundwater source is served to the public. The minimum residual disinfectant concentration determined by the Authority and according to Table 37 must be maintained every day water from the source is served to the public. Daily grab samples must be collected during the hour of peak flow or at another time specified by the Authority. If any daily grab sample measurement falls below the minimum residual disinfectant concentration determined by the Authority, follow-up samples must be collected every four hours until the residual disinfectant concentration is restored to the Authority-determined level. Alternately, continuous monitoring may be conducted according to paragraph (11)(b)(A) of this rule.
(c) At water systems where UV is used, water suppliers must verify reactors are operating within validated conditions as prescribed by OAR 333-061-0050(5)(k) by monitoring at a location approved by the Authority every day water is served to the public.
(A) Water suppliers must determine UV dose every day by monitoring parameters designated by the Authority for reactor operation, which may include, but are not limited to:
(i) UV intensity as measured by a UV sensor;
(ii) Flow rate;
(iii) Lamp status; or
(iv) UV transmittance.
(B) Water suppliers must verify UV sensors are calibrated at least once every month.
(d) At water systems where membrane filtration is used to achieve at least 4-log removal of viruses, water suppliers must monitor and operate the membrane filtration process according to all Authority-specified monitoring and compliance requirements and must ensure:
(A) The membrane has an absolute molecular weight cut-off or an alternate parameter describing the exclusion characteristics of the membrane that can reliably achieve at least 4-log removal of viruses;
(B) The membrane process is operated according to Authority-specified compliance requirements; and
(C) The integrity of the membrane is intact as verified per OAR 333-061-0050(4)(c)(I).
(e) At water systems that use an Authority-approved alternative treatment to provide at least 4-log treatment of viruses (using inactivation, removal, or an Authority-approved combination of 4-log virus inactivation and removal) before or at the first customer, water suppliers must:
(A) Monitor the alternative treatment according to all Authority-specified monitoring requirements; and
(B) Operate the alternative treatment according to all compliance requirements that the Authority determines necessary to verify at least 4-log treatment of viruses.
(f) It is a violation of this rule if a water supplier fails to correct any disruption in treatment within four hours of determining the disruption is occurring at a groundwater system subject to the requirements of subsection (11)(b) of this rule where at least 4-log treatment of viruses (using inactivation, removal, or an Authority approved combination of 4-log virus inactivation and removal) is required before or at the first customer.

STATUTORY/OTHER AUTHORITY: ORS 448.131

STATUTES/OTHER IMPLEMENTED: ORS 448.131, 448.150, 448.273

NOTE: Attachments referenced are attached to this document. You may view the attachment 333-061-0036.pdf from the Attachments panel. Alternately, you may view the attachments at the following link: https://secure.sos.state.or.us/oard/viewAttachment.action?ruleVrsnRsn=341057