

**PART IV
SAMPLING AND ANALYTICAL REQUIREMENTS**

§ 401 PURPOSE

The purpose of this part is to ensure that all sampling and analytical requirements are consistent with the NNSDWA and the NNPDR. A monitoring schedule may be prepared by the Navajo PWSSP staff for use by the public water system owner/operator to ensure compliance with the monitoring requirements.

NOTE: Analytical methodologies for each contaminant group are listed in Appendix A.

§ 402 CERTIFIED LABORATORIES

- A. For the purpose of determining compliance with §§ 404 through 415, Appendix A, C, and D, samples may be considered only if they have been analyzed by a laboratory approved by the EPA, except that measurements for alkalinity, calcium, conductivity, disinfectant residual, orthophosphate, pH, silica, temperature and turbidity may be performed by any person acceptable to the NNEPA.
- B. Nothing in these regulations shall be construed to preclude the Director or authorized representative(s) from taking samples or from using the results from such samples to determine compliance by a public water system owner or operator with applicable requirements of these regulations.

§ 403 SITE-SAMPLING PLAN REQUIREMENTS

All public water systems must collect total coliform samples at sites which are representative of water throughout the distribution system according to a written site-sampling plan. These site-sampling plans are subject to NNEPA review and approval. Public water systems must update their existing site-sampling plans upon promulgation of these regulations and every two years thereafter.

§ 404 MICROBIOLOGICAL SAMPLING AND ANALYTICAL REQUIREMENTS

This section describes the total coliform sampling and analytical requirements for all types of public water systems.

A. ROUTINE SAMPLING

- 1. The monitoring frequency for total coliforms for public water systems is based on the population served by the system, see Table 400.1.

**TABLE 400.1 MINIMUM NUMBER OF TOTAL COLIFORM SAMPLES
BASED ON POPULATION**

POPULATION SERVED	MINIMUM NUMBER OF SAMPLES PER MONTH	POPULATION SERVED	MINIMUM NUMBER OF SAMPLES PER MONTH
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25 to 1,000 ¹	1	59,001 to 70,000	70
1,001 to 2,500	2	70,001 to 83,000	80
2,501 to 3,300	3	83,001 to 96,000	90
3,301 to 4,100	4	96,001 to 130,000	100
4,101 to 4,900	5	130,001 to 220,000	120
4,901 to 5,800	6	220,001 to 320,000	150
5,801 to 6,700	7	320,001 to 450,000	180
6,701 to 7,600	8	450,001 to 600,000	210
7,601 to 8,500	9	600,001 to 780,000	240
8,501 to 12,900	10	780,001 to 970,000	270
12,901 to 17,200	15	970,001 to 1,230,000	300
17,201 to 21,500	20	1,230,001 to 1,520,000	330
21,501 to 25,000	25	1,520,001 to 1,850,000	360
25,001 to 33,000	30	1,850,001 to 2,270,000	390
33,001 to 41,000	40	2,270,001 to 3,020,000	420
41,001 to 50,000	50	3,020,001 to 3,960,000	450
50,001 to 59,000	60	3,960,001 or more	480

¹ Includes public water systems which have at least 15 service connections, but serve fewer than 25 persons.

2. All public water systems must collect samples at regular time intervals throughout the month.
 - a. Systems that use groundwater and serve 4,900 persons or fewer may collect all required samples on a single day only if they are taken from different sites.
 - b. Systems serving 4,901 persons or more shall not collect all required samples on a single day.
 - c. Systems that use Groundwater Under the Direct Influence of Surface Water shall not collect all required samples on a single day.

3. This subsection applies to a public water system that uses surface water or ground water under the direct influence of surface water and does not practice filtration in compliance with Part VIII - General Requirements for Surface Water Treatment.
 - a. Each day the turbidity level of the source water exceeds 1 NTU, as specified in Appendix D § 801-D(C)(2), the system must collect at least one sample to be analyzed for the presence of total coliforms:
 - i. The sample shall be collected near the first service connection.
 - ii. The system shall collect this coliform sample within 24 hours of the first turbidity level exceedance.
 - b. If the public water system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection, the owner/operator shall contact the Director and request for a time extension.
 - c. Sample results from this coliform sampling shall be included in determining compliance with the MCL for total coliforms in § 205.

4. The monitoring frequency for total coliforms for non-community water systems is as follows:
 - a. A non-community water system using only ground water (except GWUDI) and serving 1,000 persons or fewer must monitor each calendar quarter that the system provides water to the public, except that the Director may reduce this monitoring frequency, in writing, if a sanitary survey shows that the system is free of sanitary defects.

The Director cannot reduce the monitoring frequency for a non-community water system using only ground water (except GWUDI) and serving 1,000 persons or fewer to less than once/year.

- b. A non-community water system using only ground water (except GWUDI) and serving more than 1,000 persons during any month must monitor at the same frequency as a like-sized community water system, as specified in subsection (A)(1) of this section, except the Director may reduce this monitoring frequency, in writing, for any month the system serves 1,000 persons or fewer.

The Director cannot reduce the monitoring frequency to less than once/year.

- c. A non-community water system using surface water, in total or in part, must monitor at the same frequency as a like-sized CWS as specified in subsection (A)(1) of this section, regardless of the number of persons it serves.
 - d. A non-community water system using ground water under the direct influence of surface water, as defined in §104, must monitor at the same frequency as a like-sized CWS as specified in subsection (A)(1) of this section. The system must begin monitoring at this frequency beginning six months after the Director determines that the ground water is under the direct influence of surface water.
- 6. Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliforms in § 205.
 - 7. Repeat samples taken pursuant to subsection (B) of this section are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliforms in § 205.

B. REPEAT SAMPLING

- 1. If a routine sample is total coliform-positive, the public water system must collect a set of repeat samples within 24 hours of being notified of the positive result.

The Director may extend the 24-hour limit, on a case-by-case basis, if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. In the case of an extension, the Director must specify how much time the system has to collect the repeat samples.

- a. Public water systems which collect two or more routine samples per month must collect a minimum of three repeat samples for each total coliform-positive sample found.
 - b. Public water systems which collect one routine sample per month or fewer must collect a minimum of four repeat samples for each total coliform-positive found.
- 2. The system must collect at least one repeat sample from:
 - a. the sampling tap where the original total coliform-positive sample was taken; and
 - b. at least one repeat sample at a tap within five service connections upstream of the original sampling site; and
 - c. at least one repeat sample at a sampling tap within five service connections downstream of the original sampling site.

If a total coliform-positive sample is at the beginning or end of the distribution system, the owner/operator shall notify the Director. Upon notification, the Director will designate other sampling points to satisfy the number of repeat sample requirements.

- 3. Public water systems must collect all repeat samples on the same day.

- a. Except with the Director's approval, public water systems with a single service connection may collect:
 - i. repeat samples each day for four consecutive days to meet the number of repeat sample requirements; or
 - ii. 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 to 400 ml (300 ml for systems which collect more than one routine sample per month).
- 4. If one or more repeat samples in one set is total coliform-positive, the public water system must collect an additional set of repeat samples in the manner specified in subsections (B)(1) through (3) of this section.
 - a. The additional samples must be collected within 24 hours of being notified of the positive result, unless the Director extends the limit as provided in subsection B)(1) of this section.
 - b. The water system must repeat this process until:
 - i. either total coliforms are not detected in one complete set of repeat samples; or
 - ii. the system determines that the MCL for total coliforms in § 205 has been exceeded and notifies the Director.
- 5. If a system collecting less than five routine samples per month has one or more total coliform-positive samples and the Director does not invalidate the sample(s) under subsection (D) of this section, then the water system must collect at least five routine samples during the next month the system provides water to the public.

The Director may waive this requirement if (a) or (b) below are met:

- a. The Director may waive the requirement to collect five routine samples if the PWSSP performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Director to determine whether additional monitoring and/or any corrective action is needed. The Director cannot approve an employee of the public water system to perform this site visit, even if the employee is an agent approved by the Director to perform sanitary surveys; or
- b. The Director may waive the requirement to collect five routine samples if the Director has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public.
 - i. The Director must document this decision to waive the following month's additional monitoring requirement in writing and make this document available to the EPA and the public.
 - ii. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken, and/or will take, to correct this problem.
 - iii. The Director cannot waive the requirement to collect five routine samples the next month the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative.
 - iv. Under this subsection, a system must still take at least one routine sample before the end of the next month it serves water to the public and use it to determine compliance with the MCL for total coliforms in § 205, unless the Director has determined that the system has corrected the contamination problem before the system took the set of repeat samples required in subsections (B)(1) through (4) of this section, and all repeat samples were total coliform-negative.

c. The Director cannot waive the requirement for a system to collect repeat samples in subsections (B)(1) through (4) of this section.

6. After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.

7. Results of all routine and repeat samples not invalidated by the Director must be included in determining compliance with the MCL for total coliforms in § 205.

C. REDUCED MONITORING

If a community water system serving 25 to 1,000 persons has no history of total coliform contamination in its current configuration and a sanitary survey conducted in the past five years shows that the system is supplied solely by a protected groundwater source and is free of sanitary defects, the Director may reduce the monitoring frequency to less than one sample per quarter. The Director must approve the reduced monitoring frequency in writing.

D. INVALIDATION OF TOTAL COLIFORM SAMPLES

A total coliform-positive sample invalidated under this subsection (D) does not count towards meeting the minimum sampling requirements of this section.

1. The Director may invalidate a total coliform-positive sample only if the following conditions are met:

a. The laboratory establishes that improper sample analysis caused the total coliform-positive result; or

b. The Director, on the basis of the results of repeat samples collected as required by subsections (B)(1) through (4) of this section, determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The Director cannot invalidate a sample on the basis of a repeat sample result unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected within five service connections of the original tap are total coliform-negative (e.g., the Director cannot invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the public water system has only one service connection); or

c. The Director has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required under subsections (B)(1) through (4) of this section, and use them to determine compliance with the MCL for total coliforms in § 205.

i. To invalidate a total coliform-positive sample under this subsection, the decision with the rationale for the decision must be documented in writing, approved and signed by the Director.

ii. The Director shall make this document available to EPA and the public.

iii. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem.

iv. The Director may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

2. A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if the sample;

- a. produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple-Tube-Fermentation Technique); or
- b. produces a turbid culture in the absence of an acid reaction in the Presence-Absence P-A) Coliform Test; or
- c. exhibits confluent growth with an analytical method using a membrane filter (e.g., Membrane Filter Technique); or
- d. produces colonies too numerous to count with an analytical method using a membrane filter (e.g., Membrane Filter Technique).

If a laboratory invalidates a sample due to (a) through (d) of the above, then the system must collect another sample from the original sample location within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The system must continue to resample within 24 hours and have the samples analyzed until it obtains a valid result. The Director may waive the 24-hour time limit on a case-by-case basis.

E. **FECAL COLIFORMS/*ESCHERICHIA coli* (*E.coli*) TESTING**

1. If any routine or repeat sample is total coliform-positive, the system must analyze the same total coliform-positive culture medium to determine if fecal coliforms are present, or the system may test for *E. coli* in lieu of fecal coliforms.

If fecal coliforms or *E. coli* are present, the system must notify the Director by the end of the business day when the system is notified of the test result, unless the system is notified of the result after the Director's office is closed, in which case the system must notify the Director before the end of the next business day.

2. The Director has the discretion to allow a public water system, on a case-by-case basis, to forgo fecal coliform or *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is fecal coliform-positive or *E. coli*-positive. Accordingly, the system must notify the Director as specified in subsection (E)(1) of this section and the provisions of § 205 shall apply.

F. **RESPONSE TO VIOLATION**

1. A public water system which has exceeded the MCL for total coliforms and other microbiological contaminants in § 205 must report the violation to the Director no later than the end of the next business day after learning of the violation, and must notify the public in accordance with § 604.
2. A public water system which has failed to comply with a coliform sampling requirement, including the sanitary survey requirement, must report the sampling violation to the Director within ten days after the system discovers the violation, and must notify the public in accordance with § 604.

§ 405 SAMPLING AND ANALYTICAL REQUIREMENTS FOR INORGANIC CHEMICALS

CWSs and NTNCWSs shall conduct sampling and analyses to determine compliance with the MCLs (antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium and thallium) specified in § 203 in accordance with this section.

Each public water system shall sample at the time designated by the Director during each three-year compliance period.

A. **Sampling and analyses shall be conducted as follows:**

1. Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment and have the sample(s) analyzed. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

2. Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment and have the sample(s) analyzed. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

NOTE: For purposes of this subsection surface water systems include systems with a combination of surface and groundwater sources.

3. If a system draws water from more than one source and the sources are combined before entering the distribution system, the system must obtain a sample at an entry point to the distribution system during periods of normal operation (i.e., all the sources are in use and ample time is allowed for water from the furthest source to reach the sampling point).

B. The frequency of sampling and analyses conducted to determine compliance with the MCLs specified in § 203 for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium and thallium shall be as follows:

1. Groundwater systems shall take one sample at each sampling point once every three years. Surface water systems, combined surface/ground water systems or GWUDI shall take one sample annually at each sampling point.
2. All new systems or systems that use a new source of water and that will begin operation after January 22, 2004 must demonstrate compliance with the arsenic MCL within a period of time specified by the Director. The system must also comply with the initial sampling frequencies specified by the Director to ensure a system can demonstrate compliance with the arsenic MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

C. Composite Samples for Inorganic Chemicals:

Composite samples from a maximum of five samples is allowed, provided that the public water system notify the Director in writing and that the detection limit of the method used for analysis is less than one-fifth of the MCL. Detection limits for each analytical method and MCLs for each inorganic contaminant are listed in Appendix A, Table 400-A-2. Compositing of samples must be done in the laboratory.

1. If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be taken within 14 days at each sampling point included in the composite. These samples must be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample.

2. If the population served by the system is greater than 3,300 persons, then compositing may only be allowed by the Director at sampling points within a single system.

In systems serving less than or equal to 3,300 persons, compositing may be allowed among different systems provided that the 5-sample limit is maintained.

3. If duplicates of the original sample taken from each sampling point used in the composite are available, then the system may use the duplicates instead of resampling. The duplicates must be analyzed and the results reported to the Director within 14 days after completing analysis of the composite sample, provided the holding time of the sample is not exceeded.

D. Confirmation Samples:

1. If analytical results indicate an exceedance of the MCL for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium or thallium:

- a. The public water system must collect one sample as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.

- E. Compliance with the MCLs listed in § 203 shall be determined based on analytical result(s) obtained at each sampling point.
1. For public water systems which collect more than one sample per year, compliance with the MCLs for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium or thallium is determined by a running annual average at any sampling point.
 - a. If the average at any sampling point is greater than the MCL, then the system is out of compliance.
 - b. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately.
 - c. Any sample below the method detection limit shall be calculated as zero for the purpose of determining the annual average.
 - d. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
 2. For public water systems which are sampling annually, or less frequently, the system is out of compliance with the MCLs for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium, or thallium if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Director, the determination of compliance will be based on the average of the two samples. If a public water system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
 - a. Arsenic sampling results will be reported to the nearest 0.001 mg/L
 3. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the public water system to give public notice to only the area served by that portion of the distribution system which is out of compliance.
- F. Response to Violations of the MCL for Inorganic Chemicals
1. Compliance with the MCLs listed in § 203 shall be determined based on analytical result(s) obtained at each sampling point as required in subsection (E) of this section.
 2. The Director has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by his/her authorized representative(s).
 3. If the result of an analysis indicates that the level of arsenic listed in § 203 exceeds the MCL, then;
 - a. the public water system owner or operator shall report to the Director within seven days, and
 - b. initiate three additional analyses at the same sampling point within one month.
 4. When the average of four analyses made, pursuant to subsection (3) of this section, rounded to the same number of significant figures as the MCL for arsenic exceeds the MCL, the water system owner or operator shall:
 - a. notify the Director pursuant to § 502; and
 - b. give notice to the public pursuant to § 603.
- Sampling after public notification shall be at a frequency designated by the Director and shall continue until the MCL has not been exceeded in two successive samples or

until a sampling schedule as a condition to a variance, exemption or enforcement action shall become effective.

G. Waivers

1. The system may apply to the Director, in writing, for a waiver from the sampling frequencies specified in subsection (B)(1) of this section.
 - a. The Director may grant a public water system a waiver for sampling of "free" cyanide, provided that the Director determines that the water system is not vulnerable due to lack of any industrial source of cyanide.
2. A condition of the waiver shall require that a public water system take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one nine-year compliance cycle.
3. The Director may grant a waiver provided surface water systems have sampled annually for at least three years and groundwater systems have conducted a minimum of three rounds of sampling. Both surface and groundwater systems shall demonstrate that all previous analytical results were below the MCL.
4. Systems that use a new water source are not eligible for a waiver until three rounds of sampling from the new source have been completed.
5. In determining the appropriate reduced sampling frequency, the Director shall consider:
 - a. Reported concentrations from all previous sampling;
 - b. The degree of variation in reported concentrations; and
 - c. Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.
6. A decision by the Director to grant a waiver shall be made in writing and shall set forth the basis for the determination. The public water system shall specify the basis for its request. The Director shall review and, where appropriate, revise its determination of the appropriate sampling frequency when the system submits new sampling data or when other data relevant to the system's appropriate sampling frequency become available.
7. Systems which exceed the MCLs as calculated in subsection (E)(1) of this section shall sample quarterly beginning in the next quarter after the violation occurred.
8. The Director may decrease the quarterly sampling requirement to the frequencies specified in subsections (B)(1) and (G)(1) of this section provided that the system is reliably and consistently below the MCL. In no case can the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

§ 406 SAMPLING AND ANALYTICAL REQUIREMENTS FOR ASBESTOS

A. Sampling and analyses shall be conducted as follows:

The frequency of sampling conducted to determine compliance with the MCL for asbestos specified in § 203 shall be conducted as follows:

1. Each CWS and NTNCWS is required to sample for asbestos during the first three-year compliance period of each nine-year compliance cycle.

B. Confirmation Sampling for Asbestos

1. If the initial sample exceeds the MCL for asbestos, then the public water system must collect a confirmation sample immediately after the initial asbestos sample was taken (but not to exceed two weeks) at the same sampling point.

C. Compliance with the MCL for Asbestos

1. For public water systems which collect more than one sample per year, compliance with the MCLs for asbestos is determined by a running annual average at any sampling point.
 - a. If the average at any sampling point is greater than the MCL, then the system is out of compliance.
 - b. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately.
 - c. Any sample below the detection limit shall be calculated as zero for the purpose of determining the annual average.
 - d. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
2. For systems which are sampling annually, or less frequently, the system is out of compliance with the MCLs for asbestos if the level of the contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Director, the determination of compliance will be based on the average of the two samples. If a public water system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
3. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only the area served by that portion of the system which is out of compliance.

D. Response to Violations of the MCL for Asbestos

1. A system which exceeds the MCLs as determined in subsection (C) of this section shall sample quarterly beginning in the next quarter after the violation occurred.
2. The Director may decrease the quarterly sampling requirement to the frequency specified in subsection (A) of this section provided the Director has determined that the system is reliably and consistently below the MCL. In no case can the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four quarterly samples.
3. The Director has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by his/her authorized representative(s).

E. Waivers

1. The public water system may apply to the Director to waive the asbestos requirement based on the following conditions;
 - a. the system is not vulnerable to asbestos contamination in its source water; and/or
 - b. contamination due to corrosion of asbestos-cement pipe(s).
2. If the Director grants the waiver, then the system is not required to sample during that specified nine-year compliance cycle. A waiver remains in effect until the completion of the nine-year compliance cycle.
 - a. Systems not receiving a waiver must sample and analyze in accordance with the provisions of subsection (A) of this section.

3. A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and where asbestos contamination is most likely to occur.
4. A system vulnerable to asbestos contamination due solely to source water shall sample in accordance with the provisions of subsection (A) of this section.
5. A system vulnerable to asbestos contamination due to both its source water supply and corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and where asbestos contamination is most likely to occur.

§ 407 SAMPLING AND ANALYTICAL REQUIREMENTS FOR NITRATE

All public water systems shall collect a sample at each entry point to the distribution system after treatment to determine compliance with the MCL for nitrate in § 203.

A. Sampling and analyses shall be conducted as follows:

1. All public water systems served by groundwater systems shall sample annually. Surface water systems, combined surface and groundwater systems, or GWUDI shall take one sample quarterly.
2. For all public water systems, the repeat sampling frequency for groundwater systems shall be quarterly for at least one year following any one sample in which the concentration is greater than or equal to fifty percent ($\geq 50\%$) of the MCL. The Director may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently below the MCL.
3. For CWSs and NTNCWSs, the Director may allow a surface water system, combined surface and groundwater systems, or GWUDI to reduce the sampling frequency to annually if all analytical results from four consecutive quarters are less than fifty percent ($< 50\%$) of the MCL. A surface water system shall return to quarterly sampling if any one sample is $\geq 50\%$ of the MCL.
4. After the completed round of quarterly sampling, each CWS and NTNCWS which is sampling annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.

B. Confirmation samples for Nitrate

1. If analytical results indicate an exceedance of the MCL for Nitrate:
 - a. The public water system shall collect a confirmation sample within 24 hours upon notification of the analytical result(s).
 - b. Systems unable to comply with the 24-hour sampling requirement must:
 - i. immediately notify persons served by the public water system in accordance with §§ 603 and 604 and meet other Tier 1 public notification requirements under Part VI of these regulations; and,
 - ii. collect and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.
2. If a Director-required confirmation sample is taken for Nitrate, then the results of the initial and confirmation sample shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with subsection (C) of this section. The Director has the discretion to delete results of obvious sampling errors.

C. Compliance with the MCL for Nitrate

1. Compliance with the MCL for nitrate is determined based on one sample, if the levels are below the MCL. If the levels of nitrate exceed the MCL in the initial sample, a

confirmation sample is required and compliance shall be determined based on the average of the initial and confirmation samples.

2. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only the area served by that portion of the distribution system which is out of compliance.

D. Response to Violations of the MCL for Nitrate

1. The Director may require more frequent sampling or may require confirmation samples for results that exceed the MCL.
2. The Director has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by the Director's authorized representative(s).
3. If the result of an analysis indicates that the level of nitrate listed in § 203 exceeds the MCL, the public water system owner or operator shall:
 - a. report to the Director within seven days; and
 - b. initiate three additional analyses at the same sampling point within one month.
4. When the average of four analyses made pursuant to subsection (3) of this section, rounded to the same number of significant figures as the MCL for nitrate exceeds the MCL, the public water system owner or operator shall:
 - a. notify the Director pursuant to § 502; and
 - b. give notice to the public pursuant to § 603.

Sampling after public notification shall be at a frequency designated by the Director and shall continue until the MCL has not been exceeded in two successive samples or until a sampling schedule as a condition to a variance, exemption or enforcement action shall become effective.

5. The provisions of subsections (3) and (4) of this section notwithstanding, compliance with the MCL for nitrate shall be determined on the basis of the mean of two analyses. When a level exceeding the MCL for nitrate is found, a second analysis shall be initiated within twenty-four hours, and if the mean of the two analyses exceeds the MCL, the public water system owner or operator shall report the findings to the Director pursuant to § 502 and shall notify the public pursuant to § 603.

E. Waivers

There are no waivers of the nitrate sampling requirements.

§ 408 SAMPLING AND ANALYTICAL REQUIREMENTS FOR NITRITE

All public water systems shall sample to determine compliance with the MCL for nitrite in § 203.

A. Sampling and analyses shall be conducted as follows:

1. All public water systems served by groundwater shall sample at a frequency specified by the Director. Surface water systems, combined surface and groundwater systems, or GWUDI shall take one sample annually.
2. All public water systems shall take one sample at each entry point to the distribution system after treatment.

B. Confirmation samples for Nitrite

1. If analytical results indicate an exceedance of the MCL for Nitrite:
 - a. The public water system must collect a confirmation sample within 24 hours upon receiving the analytical result(s).
 - b. Systems unable to comply with the 24-hour sampling requirement must:
 - i. immediately notify persons served by the public water system in accordance with § 605 and 606 and meet other Tier 1 public notification requirements under Part VI of these regulations; and,
 - ii. collect and analyze a confirmation sample within two weeks of notification of the analytical results.

C. Compliance with the MCL for Nitrite

1. Compliance with the MCL for nitrite is determined based on one sample, if the levels are below the MCL. If the levels of nitrite exceed the MCL in the initial sample, a confirmation sample is required and compliance shall be determined based on the average of the initial and confirmation samples.
2. All public water systems where an analytical result for nitrite is <50 % of the MCL shall sample at the frequency specified by the Director.
3. The repeat sampling frequency for any public water system whose concentration is ≥50 % of the MCL, shall sample quarterly for at least one year. The Director may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently below the MCL.
4. Public water systems which are sampling annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.
5. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only the area served by that portion of the distribution system which is out of compliance.

D. Response to Violations of the MCL for Nitrite

1. The Director may require more frequent sampling or may require confirmation samples for results that exceed the MCL.
2. The Director has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by the Director's authorized representative(s).

E. Waivers

There shall be no waivers of the nitrite sampling requirements.

§ 409 SAMPLING AND ANALYTICAL REQUIREMENTS FOR VOLATILE ORGANIC CHEMICALS

CWSs and NTNCWSs shall conduct sampling and analyses to determine compliance with the MCLs listed in § 204, Table 200.3 (1) through (21), in accordance with this section.

Each public water system shall sample at the time designated by the Director during each three-year compliance period.

A. Sampling and analyses shall be conducted as follows:

1. Groundwater systems shall take a minimum of one sample at every entry point to the distribution system after treatment and have the samples analyzed (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions

make another sampling point more representative of each source, or treatment plant within the distribution system.

2. Surface water systems, or water systems using a combination of surface/ground or GWUDI, shall take a minimum of one sample at each entry point to the distribution system after treatment and have the samples analyzed.

Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, or treatment plant within the distribution system.

3. If a system draws water from more than one source and the sources are combined before entering the distribution system, the system must obtain a sample at an entry point to the distribution system during periods of normal operation (i.e., all the sources are in use and ample time is allowed for water from the furthest source to reach the sampling point).
4. Each CWS and NTNCWS shall take four consecutive quarterly samples for each contaminant listed in § 204, Table 200.3 (2) through (21) during each three-year compliance period.
5. If the initial sampling for contaminants listed in § 204, Table 200.3 (1) through (21) have been conducted and the systems did not detect any contaminant listed in Table 200.3 (1) through (21), then each ground and surface water system shall take one sample annually beginning with the initial three-year compliance period.
6. After a minimum of three years of annual sampling, the Director may allow groundwater systems with no previous detection of any contaminant listed in § 204, Table 200.3 to take one sample during each three-year compliance period.
7. The Director may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.
 - a. If the concentration in the composite sample is greater than or equal to 0.0005 mg/L for any contaminant listed in § 204, Table 200.3 (1) through (21) then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite, and be analyzed for that contaminant.
 - b. If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the Director within 14 days after completing analysis of the composite sample, provided the holding time of the sample is not exceeded.
 - c. If the population served by the system is > 3,300 persons, then compositing may only be permitted by the Director at sampling points within a single system. In systems serving ≤ 3,300 persons, the Director may permit compositing among different systems provided the 5-sample limit is maintained.

B. Confirmation samples for Volatile Organic Chemicals

1. The Director may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Director, the result must be averaged with the first sampling result and the average is used for the compliance determination as specified in subsection (D) of this section. The Director will delete the results of obvious sampling errors from this calculation.

C. Detection Limits for Volatile Organic Chemicals

1. If a contaminant listed in Table 200.3 (2) through (21) is detected at a level exceeding 0.0005 mg/L in any sample, then:

- a. The system must sample quarterly at each sampling point which resulted in a detection.
- b. The Director may decrease the quarterly sampling requirement specified in subsection (C)(1)(a) of this section provided it has determined that the system is reliably and consistently below the MCL. In no case shall the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.
- c. If the Director determines that the system is reliably and consistently below the MCL, the Director may allow the system to sample annually. Systems which sample annually must sample during the quarter(s) which previously yielded the highest analytical result.
- d. Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Director for a waiver as specified in subsection (F)(2) of this section.
- e. Groundwater systems which have detected one or more of the following two-carbon organic compounds:
 - i. trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene, shall sample quarterly for vinyl chloride.
 - ii. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the Director may reduce the quarterly sampling frequency of vinyl chloride sampling to one sample during each three-year compliance period.
 - iii. Surface water systems are required to sample for vinyl chloride as specified by the Director.

D. Compliance with § 204, Table 200.3 (1) through (21) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.

- 1. For public water systems which collect more than one sample per year, compliance with the MCLs listed in § 204, Table 200.3 (1) through (21) is determined by a running annual average at each sampling point.
 - a. Systems monitoring annually or less frequently whose sample result exceeds the MCL must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.
 - b. If any one sample would cause the annual average to exceed the MCL, then the system is out of compliance immediately.
 - c. If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected.
 - d. Any sample below the detection limit shall be calculated at zero for the purpose of determining the annual average.
- 2. All new systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the Director. The system must also comply with the initial sampling frequencies specified by the Director to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

E. Response to Violations of the MCL for Volatile Organic Chemicals

1. Systems which violate the requirements of § 204, Table 200.3 (1) through (21), as determined by subsection (D) of this section, must sample quarterly. After a minimum of four consecutive quarterly samples which show the system is in compliance as specified in subsection (D) of this section and the system and the Director determines that the system is reliably and consistently below the MCL, the system may sample at the frequency and times specified in subsection (C)(1)(c) of this section.
2. The Director may increase required sampling where necessary to detect variations within the system.

F. Waivers

1. Each CWS and NTNCWS groundwater system which does not detect a contaminant listed in § 204, Table 200.3 (1) through (21) may apply to the Director for a waiver from the requirements of subsections (A)(5) and (6) of this section after completing the initial sampling of each nine-year compliance cycle. (For the purposes of this section detection is defined as \geq to 0.0005 mg/L.)
 - a. A waiver shall be effective for no more than six years (two three-year compliance periods).
 - b. The Director may also issue waivers to small systems for the initial round of sampling for 1,2,4-trichlorobenzene.
2. The Director may grant a waiver after evaluating a vulnerability assessment survey which includes the following factor(s):
 - a. Knowledge of previous use (including transport, storage, or disposal) of the contaminant(s) within the watershed or zone of influence of the system. If a determination by the Director reveals no previous use of the contaminant(s) within the watershed or zone of influence, a waiver may be granted.
 - b. If previous use of the contaminant(s) is unknown or has been used previously, then the following factors shall be used to determine whether a waiver is granted.
 - i. Previous analytical results.
 - ii. The proximity of the system to a potential point or non-point source(s) of contamination. Point sources include, but are not limited to, spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.
 - iii. The environmental persistence and transport of the contaminants.
 - iv. The number of persons served by the water system and the proximity of a smaller system to a larger system.
 - v. How well the water source is protected against contamination whether it is a surface or groundwater system. Groundwater systems must consider factors such as depth of the well, the type of soil, and wellhead protection. Surface water systems must consider watershed protection.
3. As a condition of the waiver a groundwater system must:
 - a. Take one sample at each sampling point during the time the waiver is effective (i.e. one sample during two three-year compliance periods or six years); and
 - b. Update its vulnerability assessment survey every three years. If and when new potential sources of contamination have been identified to impact a drinking water source, then the vulnerability assessment survey must be updated and submitted to the Director.
 - c. Based on this vulnerability assessment the Director must reconfirm that the system is not vulnerable.

- d. If the Director does not make this reconfirmation within three years of the initial determination, then:
 - i. The waiver is invalidated; and
 - ii. The system is required to sample annually as specified in subsection (A)(5) of this section.
4. Each CWS and NTNCWS surface water system which does not detect a contaminant listed in § 204, Table 200.3 (1) through (21) may apply to the Director for a waiver from the requirements of subsection (A)(5) of this section after completing the initial sampling of each nine-year compliance cycle.
 - a. 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.
 - b. Systems meeting this criterion must be determined by the Director to be non-vulnerable based on a vulnerability assessment survey during each three-year compliance period.
 - c. Each system receiving a waiver shall sample at the frequency specified by the Director (if any).
5. The Director may allow the use of monitoring data collected during the previous "nine-year" compliance cycle for purposes of initial sampling compliance. If the data are generally consistent with the other requirements of this section, the Director may use these data (i.e., single sample rather than four quarterly samples) to satisfy the initial sampling requirement of subsection (A)(4) of this section. Systems which use grandfathered samples and did not detect any contaminant(s) listed in § 204, Table 200.3 (2) through (21) shall begin sampling annually in accordance with subsection (A)(5) of this section beginning with the initial three-year compliance period.

§ 410 SAMPLING AND ANALYTICAL REQUIREMENTS FOR SYNTHETIC ORGANIC CHEMICALS

CWSs and NTNCWSs shall conduct sampling and analyses to determine compliance with the MCLs listed in Table 200.4 (1) through (33) in § 204, in accordance with this section.

Each public water system shall conduct sampling and analyses at the time designated by the Director during each three-year compliance period.

For purposes of this section, surface water systems include systems with a combination of surface and groundwater sources.

A. Sampling and analyses shall be conducted as follows:

1. Groundwater systems shall take a minimum of one sample at every entry point to the distribution system after treatment and have the sample analyzed (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
2. Surface water systems, or water systems using a combination of surface/ground or GWUDI, shall take a minimum of one sample at each entry point to the distribution system after treatment and have the samples analyzed.

Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, or treatment plant within the distribution system.

3. If a public water system draws water from more than one source and the sources are combined before entering the distribution system, the public water system must obtain a sample at an entry point to the distribution system during periods of normal operation (i.e., all the sources are in use and ample time is allowed for water from the furthest source to reach the sampling point).

4. Sampling frequency:
 - a. Each CWS and NTNCWS shall take four consecutive quarterly samples for each contaminant listed in § 204 (A)(2), Table 200.4, during each three-year compliance period beginning with the nine-year compliance cycle.
 - b. Public water systems serving more than 3,300 persons which do not detect a contaminant in the initial three-year compliance period, of a nine-year compliance cycle, may reduce the sampling frequency to a minimum of two quarterly samples in one year during each of the three-year compliance periods.
 - c. Public water systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial three-year compliance period may reduce the sampling frequency to a minimum of one sample during each of the three-year compliance periods.
5. The Director may reduce the total number of samples a public water system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.
 - a. If the concentration in the composite sample detects one or more contaminants listed in § 204 (A)(2), then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite, and be analyzed for that contaminant.
 - b. If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the Director within 14 days after completing analysis of the composite sample, provided the holding time of the sample is not exceeded.
 - c. If the population served by the system is >3,300 persons, then compositing may only be permitted by the Director at sampling points within a single system. In systems serving ≤3,300 persons, the Director may permit compositing among different systems provided the 5-sample limit is maintained.
6. If sampling data are generally consistent with the requirements of subsection (A) of this section, then the Director may allow systems to use that data to satisfy the sampling requirement for the initial three-year compliance period.
7. The Director may increase the required sampling frequency, where necessary, to detect variations within the system (e.g. fluctuations in concentration due to seasonal use, changes in water source).

B. Confirmation samples for Synthetic Organic Chemicals

1. The Director may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Director, the result must be averaged with the first sampling result and the average used for the compliance determination as specified by subsection (D)(1) of this section. The Director has the discretion to delete results of obvious sampling errors from this calculation.

C. Detection Limits for Synthetic Organic Chemicals

1. If an organic contaminant listed in § 204 (A)(2) is detected (as defined by subsection (C)(2) of this section) in any sample, then:
 - a. Each system must sample quarterly at each sampling point which resulted in a detection.

- b. The Director may decrease the quarterly sampling requirement specified in subsection (C)(1) (a) of this section provided it has determined that the system is reliably and consistently below the MCL. In no case shall the Director make this determination unless a:
- i. groundwater system takes a minimum of two quarterly samples; or
 - ii. surface water system takes a minimum of four quarterly samples.
- c. After the Director determines the public water system is reliably and consistently below the MCL, the Director may allow the system to sample annually. Public water systems which sample annually must sample during the quarter that previously yielded the highest analytical result.
- d. Public water systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the Director for a waiver as specified in subsection (F)(2) of this section.
2. Detection, as used in this subsection, shall be defined as greater than or equal to the following concentrations for each contaminant.

TABLE 400.2 DETECTION LIMIT

CONTAMINANT	LIMIT (mg/l)
Alachlor	0.0002
Aldicarb	0.0005
Aldicarb sulfoxide	0.0005
Aldicarb sulfone	0.0008
Atrazine	0.0001
Benzo(a)pyrene	0.00002
Carbofuran	0.0009
Chlordane	0.0002
Dalapon	0.001
1,2-Dibromo-3-chloropropane (DBCP)	0.00002
Di(2-ethylhexyl) adipate	0.0006
Di(2-ethylhexyl) phthalate	0.0006
Dinoseb	0.0002
Diquat	0.0004
2,4-D	0.0001
Endothall	0.009
Endrin	0.00001

Ethylene dibromide (EDB)	0.00001
Glyphosate	0.006
Heptachlor	0.00004
Heptachlor epoxide	0.00002
Hexachlorobenzene	0.0001
Hexachlorocyclopentadiene	0.0001
Lindane	0.00002
Methoxychlor	0.0001
Oxamyl	0.002
Picloram	0.0001
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	0.0001
Pentachlorophenol	0.00004
Simazine	0.00007
Toxaphene	0.001
2,3,7,8-TCDD (Dioxin)	0.000000005
2,4,5-TP (Silvex)	0.0002

3. If PCBs (as one of seven Arochlors) are detected (as designated in this subsection) in any sample analyzed using Methods 505 or 508, the public water system shall re-analyze the sample using Method 508A to quantitate PCBs (as decachlorobiphenyl).

TABLE 400.3 DETECTION LIMIT OF PCB

AROCHLOR	DETECTION LIMIT (mg/l)
1016	0.00008
1221	0.02
1232	0.0005
1242	0.0003
1248	0.0001
1254	0.0001

1260	0.0002
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- a. Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses using Method 508A.

D. Compliance with the MCL for Synthetic Organic Chemicals

1. Compliance with § 204 (A)(2) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.
 - a. For public water systems which are conducting sampling at a frequency greater than annual, compliance with the MCL is determined by a running annual average at each sampling point.
 - i. Public water systems monitoring annually or less frequently whose sample result exceeds the regulatory detection level as defined by subsection (C)(2) of this section must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.
 - ii. If any sample result will cause the running annual average to exceed the MCL at any sampling point, the public water system is out of compliance with the MCL immediately.
 - iii. If a public water system fails to collect the required number of samples, compliance will be based on the total number of samples collected.
 - iv. If a sample result is less than the detection limit, zero will be used to calculate the annual average.
2. All new public water systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the Director. The system must also comply with the initial sampling frequencies specified by the Director to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

E. Response to Violations of the MCL for Synthetic Organic Chemicals

1. Public water systems which violate the requirements of § 204 (A)(2) as determined by subsection (D)(1) of this section must sample quarterly. After a minimum of four quarterly samples show the system is in compliance and the Director determines the public water system is reliably and consistently below the MCL, as specified in subsection (D)(1) of this section, the public water system shall sample at the frequency specified in subsection (C)(1)(c) of this section.
2. The Director has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by his/her authorized representative(s).

F. Waivers

1. Each CWS and NTNCWS may apply to the Director for a waiver from the requirement of subsection (A)(4) of this section. A public water system must reapply for a waiver for each three-year compliance period.
2. A Director may grant a waiver after evaluating the following factor(s):
 - a. Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the public water system. If a determination by the Director reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted.

- b. If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.
 - i. Previous analytical results.
 - ii. The proximity of the public water system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities. Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, home and gardens, and other land application uses.
 - iii. The environmental persistence and transport of the pesticide or PCBs.
 - iv. How well the water source is protected against contamination due to such factors as depth of the well and the type of soil and the integrity of the well casing.
 - v. Elevated nitrate levels at the water supply source.
 - vi. Use of PCBs in equipment used in the production, storage, or distribution of water (i.e., PCBs used in pumps, transformers, etc.).

§ 411 SAMPLING FREQUENCY AND COMPLIANCE REQUIREMENTS FOR RADIONUCLIDES IN COMMUNITY WATER SYSTEMS

A. Sampling, analysis, and compliance requirements for radionuclides.

Sampling and analyses for the following contaminants shall be conducted to determine compliance with § 209 (radioactivity) in accordance with the methods found in Appendix A. With the written permission of the Director, concurred in by the Administrator of the EPA, or their equivalent determined by EPA an alternate analytical technique may be employed in accordance with Appendix A § 401-A.

- 1. Community water systems (CWSs) must conduct initial monitoring to determine compliance with § 209(A) by December 31, 2007. For the purposes of monitoring for gross alpha particle activity, radium-226, radium-228, uranium, and beta particle and photon radioactivity in drinking water, "detection limit" is defined as in Appendix A § 405-A (C).
 - a. Applicability and sampling location for existing CWSs or sources. All existing CWSs using ground water, surface water or systems using both ground and surface water must sample at every entry point to the distribution system that is representative of all sources being used under normal operating conditions. The public water system must take each sample at the same sampling point unless conditions make another sampling point more representative of each source or the Director has designated a distribution system location, in accordance with subsection (A)(2)(b)(iii) of this section.
 - b. Applicability and sampling location for new CWSs or sources.
 - i. All new CWSs or CWSs that use a new source of water must begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source.
 - ii. CWSs must conduct more frequent monitoring when ordered by the Director in the event of possible contamination or when changes in the distribution system or treatment processes occur which may increase the concentration of radioactivity in finished water.
- 2. Initial monitoring: Public water systems must conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:
 - a. Public water systems without acceptable historical data, as defined below, must collect four consecutive quarterly samples at all sampling points before December 31, 2007.

- b. Grandfathering of data: The Director may allow historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, for the following situations.
 - i. To satisfy initial monitoring requirements, a CWS having only one entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.
 - ii. To satisfy initial monitoring requirements, a CWS with multiple entry points and having appropriate historical monitoring data for each entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.
 - iii. To satisfy initial monitoring requirements, a CWS with appropriate historical data for a representative point in the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003, provided that the Director finds that the historical data satisfactorily demonstrate that each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The Director must make a written finding indicating how the data conforms to these requirements.
 - c. For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the Director may waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two quarters are below the detection limit.
 - d. If the average of the initial monitoring results for a sampling point is above the MCL, the public water system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL, unless the public water system enters into another schedule as part of a formal compliance agreement with the Director.
- 3. Compositing: To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a public water system may composite up to four consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. The Director will treat analytical results from the composited as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than 2 MCL, the Director may direct the system to take additional quarterly samples before allowing the system to sample under a reduced monitoring schedule.
 - 4. A gross alpha particle activity measurement may be substituted for the required radium-226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/l. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/l. The gross alpha measurement shall have a confidence interval of 95% (1.65σ , where σ is the standard deviation of the net counting rate of the sample) for radium-226 and uranium. When a public water system uses a gross alpha particle activity measurement in lieu of a radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, 1/2 the detection limit will be used to determine compliance and the future monitoring frequency.

B. Detection Limits for Radionuclides

For the purpose of sampling radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of $\pm 100\%$ at the 95% confidence level (1.96σ , where σ is the standard deviation of the net counting rate of the sample).

1. To determine compliance with Table 200.10, (#'s 1, 2 and 4) the detection limit shall not exceed the concentrations in Table 400.4.

**Table 400.4 Detection Limits For Gross Alpha Particle Activity,
Radium 226, Radium 228 and Uranium**

Contaminant	Detection Limit
Gross alpha particle activity	3 pCi/L
Radium 226	1 pCi/L
Radium 228	1 pCi/L
Uranium	1µg/L

2. To determine compliance with § 209 (A)(1) (#3 - Beta particle and photon radioactivity), the detection limits shall not exceed the concentrations listed in Table 400.5.

TABLE 400.5 DETECTION LIMITS FOR MAN-MADE BETA PARTICLE AND PHOTON EMITTERS

RADIONUCLIDE	DETECTION LIMIT
Tritium	1,000 pCi/l
Strontium-89	10 pCi/l
Strontium-90	2 pCi/l
Iodine-131	1 pCi/l
Cesium-134	10 pCi/l
Gross Beta	4 pCi/l
Other Radionuclides	1/10 of the applicable limit

C. Compliance with the MCL for Radionuclides

1. The Director may require more frequent monitoring than specified in subsection (A) of this section, or may require confirmation samples at the Director's discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.
2. Each public water system shall monitor at the time designated by the Director during each compliance period.
3. Compliance with § 209 (A) will be determined based on the analytical result(s) obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.
 - a. For public water systems sampling 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.

- b. For public water systems sampling more than once per year, if any sample result will cause the running average to exceed the MCL at any sample point, the system is out of compliance with the MCL immediately.
 - c. Public water 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.
 - d. If a public water 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.
 - e. If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, 1/2 the detection limit will be used to calculate the annual average.
- 4. The Director shall have the discretion to delete results of obvious sampling or analytic errors.
 - 5. If the MCL for radioactivity set forth in § 209 (A) is exceeded, the operator of a CWS must give notice to the Director pursuant to § 502 and to the public as required by § 603.

D. Response to Violations of the MCL for Radionuclides

- 1. The Director has the authority to determine compliance or initiate enforcement action based upon analytical results or other information compiled by an authorized representative.
- 2. To judge compliance with the MCLs listed in § 209, averages of data shall be used and shall be rounded to the same number of significant figures as the MCL for the substance in question.

E. Reduced Monitoring

- 1. The Director may allow CWSs to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria.
 - a. If the average of the initial monitoring results for each contaminant (i.e., gross alpha particle activity, uranium, radium-226, or radium-228) is below the detection limit specified in Table 400.4, in § 411 (B)(1), the system must collect and analyze for that contaminant using at least one sample at that sampling point every nine years.
 - b. For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below 1/2 the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years.
 - c. For combined radium-226 and radium-228, the analytical results must be combined.
 - i. If the average of the combined initial monitoring results for radium-226 and radium-228 is at or above the detection limit but at or below 1/2 the MCL, the CWS must collect and analyze for that contaminant using at least one sample at that sampling point every six years.
 - d. For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above 1/2 the MCL but at or below the MCL, the public water system must collect and analyze at least one sample at that sampling point every three years.

- e. For combined radium-226 and radium-228, the analytical results must be combined.
 - i. If the average of the combined initial monitoring results for radium-226 and radium-228 is above 1/2 the MCL but at or below the MCL, the public water system must collect and analyze at least one sample at that sampling point every three years.
- f. Public water systems must use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (e.g., if a system's sampling point is on a nine year monitoring period, and the sample result is above 1/2 MCL, then the next monitoring period for that sampling point is three years).
- g. If a public water system has a monitoring result that exceeds the MCL while on reduced monitoring, the system must collect and analyze quarterly samples at that sampling 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 Director.

§ 412 MONITORING AND COMPLIANCE REQUIREMENTS FOR BETA PARTICLE AND PHOTON RADIOACTIVITY

A. To determine compliance with the maximum contaminant levels in § 209 for beta particle and photon radioactivity, a public water system must monitor at a frequency as follows:

- 1. CWSs (both surface and ground water) designated by the Director as vulnerable must sample for beta particle and photon radioactivity. Public water systems must collect quarterly samples for beta emitters and annual samples for tritium and strontium-90 at each entry point to the distribution system, beginning within one quarter after being notified by the Director. Public water systems already designated by the Director must continue to sample until the Director reviews and either reaffirms or removes the designation.
 - a. If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 50 pCi/L (screening level), the Director may reduce the frequency of monitoring at that sampling point to once every 3 years. Public water systems must collect all samples required in (A)(1) of this section during the reduced monitoring period.
 - b. For systems in the vicinity of a nuclear facility, the Director may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Director determines if such data is applicable to a particular public water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data must begin monitoring at the CWS's entry point(s) in accordance with (A)(1) of this section.
- 2. CWSs (both surface and ground water) designated by the Director as utilizing waters contaminated by effluents from nuclear facilities must sample for beta particle and photon radioactivity. Public water systems must collect quarterly samples for beta emitters and iodine-131 and annual samples for tritium and strontium-90 at each entry point to the distribution system, beginning within one quarter after being notified by the Director. Systems already designated by the Director as systems using waters contaminated by effluents from nuclear facilities must continue to sample until the Director reviews and either reaffirms or removes the designation.
 - a. Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended.
 - b. For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the Director, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water.

- c. 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. The latter procedure is recommended.
 - d. If the gross beta particle activity beta minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 15 pCi/L, the Director may reduce the frequency of monitoring at that sampling point to every 3 years. Public water systems must collect all samples required in (A)(2) of this section during the reduced monitoring period.
 - e. For systems in the vicinity of a nuclear facility, the Director may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Director determines if such data is applicable to a particular public water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data must begin monitoring at the CWS's entry point(s) in accordance with (A)(2) of this section.
3. CWSs designated by the Director to monitor for beta particle and photon radioactivity cannot apply to the Director for a waiver from the monitoring frequencies specified in (A)(1) or (A)(2) of this section.
 4. CWSs 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.
 5. 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 § 209 (A)(1)(#3, Note 2), using the formula in § 209 (A)(1)(#3, Note 3). Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.
 6. Public water systems must monitor monthly at the sampling point(s) which exceed the maximum contaminant level in § 209 (A)(1) beginning the month after the exceedance occurs. Public water systems must continue monthly monitoring until the system has established, by a rolling average of 3 monthly samples, that the MCL is being met. Public water systems who establish that the MCL is being met must return to quarterly monitoring until the systems meet the requirements set forth in (A)(1)(b) or (A)(2)(a) of this section.

§ 413 TURBIDITY SAMPLING AND ANALYTICAL REQUIREMENTS

The requirements in this section apply to unfiltered systems that the Director has determined, in writing pursuant to § 2535 of the NNSDWA, must install filtration, until June 29, 1993, or until filtration is installed, whichever is later.

- A. Samples shall be taken by public water system owners or operators for both community and non-CWSs at a representative entry point(s) to the water distribution system at least once per day, for the purpose of making turbidity measurements to determine compliance with § 206. If the Director determines that a reduced sampling frequency in a non-CWS will not pose a risk to public health, the Director can reduce the required sampling frequency. The option of reducing the turbidity frequency shall be permitted only in those public water systems that practice disinfection and which maintain an active residual disinfectant in the distribution system, and in cases where the Director has indicated in writing that no unreasonable risk to health existed under the circumstances of this option. Turbidity measurements shall be made as directed in Appendix D § 801-D (B).

- B. If the result of a turbidity analysis indicates that the maximum allowable limit has been exceeded, the sampling and measurement shall be confirmed by resampling as soon as practical and preferably within one hour. If the repeat sample confirms that the maximum allowable limit has been exceeded, the public water system owner or operator shall report to the Director within forty-eight hours. The repeat sample shall be the sample used for the purpose of calculating the monthly average. If the monthly average of the daily samples exceeds the maximum allowable limit, or if the average of two samples taken on consecutive days exceeds 5 NTU, the public water system owner or operator shall report to the Director and notify the public as required by §§ 502 and 603.
- C. Sampling for non-CWSs shall begin within two years after the effective date of this part.
- D. The requirements of this section shall apply only to public water systems which use water obtained in whole or in part from surface sources.
- E. The Director has the authority to determine compliance or initiate enforcement action based upon analytical results or other information compiled by his/her authorized representative(s).

§ 414 ALTERNATE ANALYTICAL TECHNIQUES

With the written permission of the Director, concurred in by the Administrator of the U.S. EPA, an alternate analytical technique may be employed. An alternate technique shall be accepted only if it is substantially equivalent to the prescribed test in both precision and accuracy as it relates to the determination of compliance with an MCL. The use of the alternate analytical technique shall not decrease the frequency of monitoring required by this part.