

⁶The value for arsenic is effective January 23, 2006. Unit then, the MCL is 0.05 mg/L.

⁷The MDL reported for EPA method 200.9 (Atomic Absorption; Platform—Stabilized Temperature) was determined using a 2x concentration step during sample digestion. The MDL determined for samples analyzed using direct analyses (*i.e.*, no sample digestion) will be higher. Using multiple depositions, EPA 200.9 is capable of obtaining MDL of 0.0001 mg/L.

⁸Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining a MDL of 0.0001 mg/L.

⁹Measures total cyanides when UV-digester is used, and "free" cyanides when UV-digester is bypassed.

(ii) If the population served by the system is >3,300 persons, then compositing may only be permitted by the State at sampling points within a single system. In systems serving ≤3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.

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

(5) The frequency of monitoring for asbestos shall be in accordance with paragraph (b) of this section: the frequency of monitoring for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be in accordance with paragraph (c) of this section; the frequency of monitoring for nitrate shall be in accordance with paragraph (d) of this section; and the frequency of monitoring for nitrite shall be in accordance with paragraph (e) of this section.

(b) The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in §141.62(b) shall be conducted as follows:

(1) Each community and non-transient, non-community water system is required to monitor for asbestos during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.

(2) If the system believes it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, it may apply to the State for a waiver of the monitoring requirement in paragraph (b)(1) of this section. If

the State grants the waiver, the system is not required to monitor.

(3) The State may grant a waiver based on a consideration of the following factors:

(i) Potential asbestos contamination of the water source, and

(ii) The use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

(4) A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions of paragraph (b)(1) of this section.

(5) 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 under conditions where asbestos contamination is most likely to occur.

(6) A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of paragraph (a) of this section.

(7) 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.

(8) A system which exceeds the maximum contaminant levels as determined in §141.23(i) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

(9) The State may decrease the quarterly monitoring requirement to the frequency specified in paragraph (b)(1) of this section provided the State has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a State 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.

(10) If monitoring data collected after January 1, 1990 are generally consistent with the requirements of §141.23(b), then the State may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(c) The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in §141.62 for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:

(1) Groundwater systems shall take one sample at each sampling point during each compliance period. Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point.

(2) The system may apply to the State for a waiver from the monitoring frequencies specified in paragraph (c)(1) of this section. States may grant a public water system a waiver for monitoring of cyanide, provided that the State determines that the system is not vulnerable due to lack of any industrial source of cyanide.

(3) A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle (*i.e.*, nine years).

(4) The State may grant a waiver provided surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (At least one sample shall have been taken since January 1, 1990). Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.

(5) In determining the appropriate reduced monitoring frequency, the State shall consider:

(i) Reported concentrations from all previous monitoring;

(ii) The degree of variation in reported concentrations; and

(iii) 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 State to grant a waiver shall be made in writing and shall set forth the basis for the determination. The determination may be initiated by the State or upon an application by the public water system. The public water system shall specify the basis for its request. The State shall review and, where appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available.

(7) Systems which exceed the maximum contaminant levels as calculated in §141.23(i) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

(8) The State may decrease the quarterly monitoring requirement to the frequencies specified in paragraphs (c)(1) and (c)(2) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a State 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.

(9) 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 State. The system must also comply with the initial sampling frequencies specified by the State 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.

(d) All public water systems (community; non-transient, non-community;

and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate in §141.62.

(1) Community and non-transient, non-community water systems served by groundwater systems shall monitor annually beginning January 1, 1993; systems served by surface water shall monitor quarterly beginning January 1, 1993.

(2) For community and non-transient, non-community water systems, the repeat monitoring frequency for groundwater systems shall be quarterly for at least one year following any one sample in which the concentration is ≥ 50 percent of the MCL. The State may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently less than the MCL.

(3) For community and non-transient, non-community water systems, the State may allow a surface water system to reduce the sampling frequency to annually if all analytical results from four consecutive quarters are < 50 percent of the MCL. A surface water system shall return to quarterly monitoring if any one sample is ≥ 50 percent of the MCL.

(4) Each transient non-community water system shall monitor annually beginning January 1, 1993.

(5) After the initial round of quarterly sampling is completed, each community and non-transient non-community system which is monitoring annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.

(e) All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in §141.62(b).

(1) All public water systems shall take one sample at each sampling point in the compliance period beginning January 1, 1993 and ending December 31, 1995.

(2) After the initial sample, systems where an analytical result for nitrite is < 50 percent of the MCL shall monitor at the frequency specified by the State.

(3) For community, non-transient, non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is ≥ 50 percent of the MCL. The State may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently less than the MCL.

(4) Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.

(f) Confirmation samples:

(1) Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium indicate an exceedance of the maximum contaminant level, the State may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.

(2) Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample. Systems unable to comply with the 24-hour sampling requirement must immediately notify persons served by the public water system in accordance with §141.202 and meet other Tier 1 public notification requirements under subpart Q of this part. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

(3) If a State-required confirmation sample is taken for any contaminant, 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 paragraph (i) of this section. States have the discretion to delete results of obvious sampling errors.

(g) The State may require more frequent monitoring than specified in

Environmental Protection Agency

§ 141.23

paragraphs (b), (c), (d) and (e) of this section or may require confirmation samples for positive and negative results at its discretion.

(h) Systems may apply to the State to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.

(i) Compliance with §141.11 or §141.62(b) (as appropriate) shall be determined based on the analytical result(s) obtained at each sampling point.

(1) For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium is determined by a running annual average at any sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the method detection limit shall be calculated at zero for the purpose of determining the annual average. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.

(2) For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium if the level of a contaminant is greater than the MCL. If confirmation samples are required by the State, the determination of compliance will

be based on the annual average of the initial MCL exceedance and any State-required confirmation samples. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.

(3) Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels of nitrate and/or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with paragraph (f)(2) of this section, and compliance shall be determined based on the average of the initial and confirmation samples.

(4) Arsenic sampling results will be reported to the nearest 0.001 mg/L.

(j) Each public water system shall monitor at the time designated by the State during each compliance period.

(k) Inorganic analysis:

(1) Analysis for the following contaminants shall be conducted in accordance with the methods in the following table, or the alternative methods listed in appendix A to subpart C of this part, or their equivalent as determined by EPA. Criteria for analyzing arsenic, barium, beryllium, cadmium, calcium, chromium, copper, lead, nickel, selenium, sodium, and thallium with digestion or directly without digestion, and other analytical test procedures are contained in *Technical Notes on Drinking Water Methods*, EPA-600/R-94-173, October 1994. This document is available from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242-0419 or <http://www.epa.gov/nscep/>.

Contaminant	Methodology ¹³	EPA	ASTM ³	SM ⁴ (18th, 19th ed.)	SM ⁴ (20th ed.)	SM Online ²²	Other
1. Alkalinity	Titrimetric Electrometric titration Inductively Coupled Plasma (ICP)—Mass Spectrometry	200.8 ²	D1067-92, 02 B	2320 B	2320 B	2320 B-97 I-1030-85 ⁵	
2. Antimony	Hydride-Atomic Absorption Atomic Absorption; Plat- form. Atomic Absorption; Fur- nace. ICP-Mass Spectrometry Atomic Absorption; Plat- form. Atomic Absorption; Fur- nace. Hydride Atomic Absorp- tion. Transmission Electron Microscopy	200.9 ² 200.8 ² 200.9 ² 200.8 ² 200.9 ²	D3697-92, 02. D2972-97, 03 C D1972-97, 03 B	3113 B 3113 B 3114 B		3113 B-99 3113 B-99. 3114 B-97.	
3. Arsenic ¹⁴	ICP-Mass Spectrometry Atomic Absorption; Plat- form. Atomic Absorption; Fur- nace. Hydride Atomic Absorp- tion. Transmission Electron Microscopy	200.8 ² 200.9 ²	D2972-97, 03 C D1972-97, 03 B	3113 B 3114 B		3113 B-99. 3114 B-97.	
4. Asbestos	Transmission Electron Microscopy	100.1 ⁹ 100.2 ¹⁰					
5. Barium	Inductively Coupled Plasma. ICP-Mass Spectrometry Atomic Absorption; Di- rect. Atomic Absorption; Fur- nace. Inductively Coupled Plasma. ICP-Mass Spectrometry Atomic Absorption; Plat- form. Atomic Absorption; Fur- nace. Inductively Coupled Plasma. ICP-Mass Spectrometry Atomic Absorption; Plat- form.	200.7 ² 200.8 ² 200.9 ² 200.7 ² 200.8 ² 200.9 ² 200.7 ² 200.8 ² 200.9 ²		3120 B 3111 D 3113 B 3120 B	3120 B	3120 B-99. 3111 D-99. 3113 B-99. 3120 B-99.	
6. Beryllium	Inductively Coupled Plasma. ICP-Mass Spectrometry Atomic Absorption; Plat- form. Atomic Absorption; Fur- nace. Inductively Coupled Plasma. ICP-Mass Spectrometry Atomic Absorption; Plat- form.	200.7 ² 200.8 ² 200.9 ² 200.7 ² 200.8 ² 200.9 ²	D3645-97, 03 B	3113 B		3113 B-99.	
7. Cadmium	Inductively Coupled Plasma. ICP-Mass Spectrometry Atomic Absorption; Plat- form.	200.7 ² 200.8 ² 200.9 ²					

8. Calcium	Atomic Absorption; Furnace. EDTA titrimetric				3113 B		3113 B-99.	
			D511-93, 03 A		3500-Ca D	3500-Ca B	3500-Ca B-97.	
	Atomic Absorption; Direct Aspiration. Inductively Coupled Plasma.	200.7 ²	D511-93, 03 B		3111 B		3111 B-99.	
	Ion Chromatography Inductively Coupled Plasma.	200.7 ²			3120 B	3120 B	3120 B-99.	
9. Chromium		200.8 ² 200.9 ²	D6919-03.		3120 B	3120 B	3120 B-99.	
	ICP-Mass Spectrometry Atomic Absorption; Plat- form.							
	Atomic Absorption; Furnace. Atomic Absorption; Furnace. Atomic Absorption; Direct Aspiration. Inductively Coupled Plasma.				3113 B		3113 B-99.	
	ICP-Mass spectrometry Atomic Absorption; Plat- form.	200.7 ²	D1688-95, 02 C		3113 B		3113 B-99.	
	Conductance	200.8 ² 200.9 ²	D1688-95, 02 A		3111 B		3111 B-99.	
11. Conductivity					3120 B	3120 B	3120 B-99.	
12. Cyanide	Manual Distillation followed by Spectrophotometric, Amenable. Spectro-photometric Manual. Spectro-photometric Semi-automated. Selective Electrode	335.4 ⁶	D1125-95 (Reapproved 1999) A. D2036-98 A		2510 B	2510 B	2510 B-97.	
					4500-CN - C	4500-CN - C		
			D2036-98 B		4500-CN - G	4500-CN - G	4500-CN - G-99.	
			D2036-98 A		4500-CN - E	4500-CN - E	4500-CN - E-99.	I-3300-85 ⁵
					4500-CN - F	4500-CN - F	4500-CN - F-99.	
	UV, Distillation, Spectrophotometric. Micro Distillation, Flow Injection, Spectrophotometric. Ligand Exchange and Amperometry ²¹ .		D6888-04					Kelada-01 ¹⁷ QuikChem 10-204- 00-1-X ¹⁸ OIA-1677, DW ²⁰

Contaminant	Methodology ¹³	EPA	ASTM ³	SM ⁴ (18th, 19th ed.)	SM ⁴ (20th ed.)	SM Online ²²	Other	
13. Fluoride	Ion Chromatography	300.0 ⁶ , 300.1 ¹⁹	D4327-97, 03	4110 B	4110 B	4110 B-00.		
	Manual Distill.; Color. SPADNS.			4500-F- B, D.	4500-F- B, D.	4500-F- B, D-97.		
	Manual Electrode		D1179-93, 99 B	4500-F- C	4500-F- C	4500-F- C-97.		
	Automated Electrode			4500-F- E	4500-F- E	4500-F- E-97.	380-75WE ¹¹ 129-71W ¹¹	
	Automated Alizarin						D6508, Rev. 2 ²³	
	Capillary Ion Electrophoresis.							
	Atomic Absorption; Furnace.		D3559-96, 03 D	3113 B		3113 B-99.		
	ICP-Mass spectrometry	200.8 ²						
	Atomic Absorption; Plating form.	200.9 ²						
	Differential Pulse Anodic Stripping Voltammetry.							
	Atomic Absorption							
	ICP	200.7 ²		D511-93, 03 B	3111 B 3120 B	3111 B-99. 3120 B-99.	3111 B-99. 3120 B-99.	Method 1001 ¹⁶
	Complexation Titrimetric Methods.			D511-93, 03 A	3500-Mg E	3500-Mg B	3500-Mg B-97.	
14. Lead	Ion Chromatography		D6919-03.					
	Manual, Cold Vapor	245.1 ²	D3223-97, 02	3112 B		3112 B-99.		
	Automated, Cold Vapor	245.2 ¹						
	ICP-Mass Spectrometry	200.8 ²						
	Inductively Coupled Plasma.	200.7 ²			3120 B	3120 B	3120 B-99.	
15. Magnesium	ICP-Mass Spectrometry	200.8 ²						
	Atomic Absorption; Plating form.	200.9 ²						
	Atomic Absorption; Direct.			3111 B		3111 B-99.		
	Atomic Absorption; Furnace.			3113 B		3113 B-99.		
	Ion Chromatography	300.0 ⁶ , 300.1 ¹⁹	D4327-97, 03	4110 B	4110 B	4110 B-00	B-1011 ⁸	
16. Mercury	Automated Cadmium Reduction.	353.2 ⁶	D3867-90 A	4500-NO ₃ - F	4500-NO ₃ - F	4500-NO ₃ - F-00		
	Ion Selective Electrode			4500-NO ₃ - D.	4500-NO ₃ - D.	4500-NO ₃ - D-00.	6017	

19. Nitrite	Manual Cadmium Reduction. Capillary Ion Electro-phoresis. Ion Chromatography .....	..... ..... 300.0 ⁶ , 300.1 ¹⁹ , 353.2 ⁶	D3867-90 B	4500-NO ₃ ⁻ E	4500-NO ₃ ⁻ E	4500-NO ₃ ⁻ E-00	B-1011 ⁸
	Automated Cadmium Reduction. Manual Cadmium Reduction. Spectrophotometric .....	..... ..... .....	D6508-00. D4327-97, 03	4110 B	4110 B	4110 B-00	
	Capillary Ion Electro-phoresis. Colorimetric, Automated, Ascorbic Acid. Colorimetric, ascorbic acid, single reagent. Colorimetric Phosphomolybdate; Automated-segmented flow; Automated Discrete. Ion Chromatography .....	..... 365.1 ⁶	D3867-90 A	4500-NO ₃ ⁻ F	4500-NO ₃ ⁻ F	4500-NO ₃ ⁻ F-00	
		.....	D3867-90 B	4500-NO ₃ ⁻ E	4500-NO ₃ ⁻ E	4500-NO ₃ ⁻ E-00	
		.....	D6508-00	4500-NO ₂ ⁻ B	4500-NO ₂ ⁻ B	4500-NO ₂ ⁻ B-00	
20. Ortho-phosphate ...	Colorimetric, Automated, Ascorbic Acid. Colorimetric, ascorbic acid, single reagent. Colorimetric Phosphomolybdate; Automated-segmented flow; Automated Discrete. Ion Chromatography .....	..... 365.1 ⁶	D515-88 A	4500-P F	4500-P F .....	.....	I-1601-85 ⁵ I-2601-90 ⁵ I-2598-85 ⁵
	Capillary Ion Electro-phoresis. Electrometric	300.0 ⁶ , 300.1 ¹⁹ ,	D4327-97, 03	4110 B	4110 B	4110 B-00	
21. pH	Hydride-Atomic Absorption. ICP-Mass Spectrometry Atomic Absorption; Plat-form. Atomic Absorption; Furnace. Colorimetric, Molybdate Blue. Automated-segmented Flow. Colorimetric .....	..... 200.8 ² 200.9 ²	D6508-00	4500-H+ B	4500-H+ B	4500-H+ B-00. 3114 B-97.	
22. Selenium	Colorimetric, Molybdate Blue. Automated-segmented Flow. Colorimetric .....	..... ..... .....	D3859-98, 03 A	3114 B .....	.....	.....
23. Silica	Molybdosilicate .....	.....	D3859-98, 03 B	3113 B .....	.....	3113 B-99.	I-1700-85 ⁵ I-2700-85 ⁵
		.....	D659-94, 00.	4500-Si D	4500-SiO ₂ C	4500-SiO ₂ C-97.	

Contaminant	Methodology ¹³	EPA	ASTM ³	SM ⁴ (18th, 19th ed.)	SM ⁴ (20th ed.)	SM Online ²²	Other
24. Sodium	Heteropoly blue	.....	.....	4500-Si E	4500-SiO ₂ D	4500-SiO ₂ D-97.	
	Automated for Molybdate-reactive Silica. Inductively Coupled Plasma. Inductively Coupled Plasma.	200.7 ² 200.7 ²	.....	4500-Si F 3120 B	4500-SiO ₂ E 3120 B	4500-SiO ₂ E-97. 3120 B-99.	
25. Temperature	Atomic Absorption; Direct Aspiration.	.....	.....	3111 B	.....	3111 B-99.	
	Ion Chromatography	.....	D6919-03.	.....	.....	.....
	Thermometric	.....	.....	2550	2550	2550-00.	
26. Thallium	ICP-Mass Spectrometry	200.8 ²	.....	.....	.....	.....
	Atomic Absorption; Plat-form.	200.9 ²	.....	.....	.....	.....

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1-11, 16-20, and 22-23 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and CFR part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the State Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., Room 353, Washington, DC 20460 (Telephone: 202-366-2426), or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA call 202-541-9700 or go to <http://www.archives.gov/records-retrieval>.

¹Methods for the Chemical Analysis of Water and Wastes, EPA/600/4-79/020, March 1983.

²Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-94/111, May 1994.

³Annual Book of ASTM Standards, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19380, <http://www.astm.org>; Annual Book of ASTM Standards 1994, Vols. 11.01 and 11.02.

⁴Annual Book of ASTM Standards 1996, Vols. 11.01 and 11.02; Annual Book of ASTM Standards 1999, Vols. 11.01 and 11.02; Annual Book of ASTM Standards 2003, Vols. 11.01 and 11.02.

⁵Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 800 I Street NW, Washington, DC 20001-3710; Standard Methods for the Examination of Water and Wastewater, 18th edition (1992); Standard Methods for the Examination of Water and Wastewater, 19th edition (1995); Standard Methods for the Examination of Water and Wastewater, 20th edition (1998). This following methods for this edition may be used: 3111 B, 3111 D, 3113 B, and 3114 B.

⁶U.S. Geological Survey Federal Center, Box 25286, Denver, CO 80225-0426; Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediment, Open File Report 93-125, 1993; Techniques of Water Resources Investigation of the U.S. Geological Survey, Book 5, Chapter A-1, 3rd edition, 1989.

⁷Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993. Available as Technical Report PB94-120821 at National Technical Information Service (NTIS), 5301 Shermans Road, Alexandria, VA 22312.

⁸The procedure shall be done in accordance with the Standard Method of Test for Nitrate in Drinking Water, July 1994, PN 221890-001, Analytical Technology, Inc. Copies may be obtained from AT Orion, 529 Main Street, Boston, MA 02129.

⁹Method 100.1, "Waters as Divis, for Determination of Asbestos Fibers in Water," EPA/600/4-83/043, EPA Series, February 1983. Available at NTIS, PB83-260471.

¹⁰Method 100.2, "Determination of Asbestos Structure Over 10-um in Length in Drinking Water," EPA/600/R-94/134, June 1994. Available at NTIS, PB94-201502.

¹¹Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems. Copies may be obtained from Bran & Luebbe, 1025 Busch Parkway, Buffalo Grove, IL 60089.

¹²Unfiltered, no digestion or hydrolysis.

¹³Because MDLs reported in EPA Methods 200.7 and 200.9 were determined using a 2x preconcentration step during sample digestion, MDLs determined when samples are analyzed by direct analysis (i.e. no sample digestion) will be higher. For direct analysis of cadmium and arsenic by Method 200.7, and arsenic by Method 3120 B, sample preconcentration using pneumatic nebulization may be required to achieve lower detection limits. Preconcentration may also be required for direct analysis of antimony, lead, and thallium by Method 200.9; antimony and lead by Method 3113 B; and lead by Method D3559-90D unless multiple in-furnace depositions are made.

¹⁴If ultrasonic nebulization is used in the determination of arsenic by Method 200.8, the arsenic must be in the pentavalent state to provide uniform signal response. For direct analysis of arsenic with Method 200.8 using ultrasonic nebulization, samples and standards must contain 1 mg/L of sodium hypochlorite.

¹⁵[Reserved]

- ¹⁶The description for Method Number 1001 for lead is available from Palintest, LTD, 21 Kenton Lands Road, P.O. Box 18395, Erlanger, KY 41018. Or from the Hach Company, P.O. Box 389, Loveland, CO 80539.
- ¹⁷The description for the Kelada-01 Method, "Kelada Automated Test Methods for Total Cyanide, Acid Dissociable Cyanide, and Thiocyanate," Revision 1.2, August 2001, EPA # 821-B-01-1009, is available from the National Technical Information Service (NTIS), PB 2001-108275, 5285 Port Royal Road, Springfield, VA 22161. The toll free telephone number is 800-553-6847. Note, A 450-W UV lamp may be used in this method instead of the 550-W lamp specified if it provides performance within the quality control (QC) acceptance criteria of the method in a given instrument. Similarly, modified flow cell configurations and flow conditions may be used in the method, provided that the QC acceptance criteria are met.
- ¹⁸The description for the QuikChem Method 10-204-00-1-X, "Digestion and distillation of total cyanide in drinking and wastewaters using MICRO DJST and determination of cyanide by flow injection analysis," Revision 2.1, November 30, 2000, for cyanide is available from Lachat Instruments, 6645 W. Mill Rd., Milwaukee, WI 53218. Telephone: 414-358-4200.
- ¹⁹"Methods for the Determination of Organic and Inorganic Compounds in Drinking Water," Vol. 1, EPA 815-R-00-014, August 2000. Available as Technical Report PB2000-106981 at National Technical Information Service (NTIS), 5301 Shawnee Road, Alexandria, VA 22312. <http://www.ntis.gov>.
- ²⁰Method OIA-1677, DW "Available Cyanide by Flow Injection, Ligand Exchange, and Amperometry," January 2004, EPA-821-R-04-001, Available from ALPKEM, A Division of Oil Analytical, P.O. Box 9010, College Station, TX 77842-9010.
- ²¹Sulfide levels below those detected using lead acetate paper may produce positive method interferences. Test samples using a more sensitive sulfide method to determine if a sulfide interference is present, and treat samples accordingly.
- ²²Standard Methods Online, American Public Health Association, 800 I Street NW, Washington, DC 20001, available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.