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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 141

[EPA-HQ-OW-2013-0300; FRL- 9818-2]

Expedited Approval of Alternative Test Procedures for the Analysis of Contaminants Under the Safe Drinking Water Act; Analysis and Sampling Procedures

Correction

In rule document 2013-12729, appearing on pages 32558-32574 in the issue of Friday, May 31, 2013, make the following correction:

PART 141 - [CORRECTED]

Beginning on page 32570, with the table entitled "ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.25(A)", the tables are corrected to read as set forth below:

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.25(a)				
Contaminant	Methodology	SM 21 st Edition ¹	SM 22 nd Edition ²⁸	ASTM ⁴
Naturally Occurring:				
Gross alpha and beta	Evaporation	7110 B	7110 B	
Gross alpha	Coprecipitation	7110 C	7110 C	
Radium 226	Radon emanation	7500-Ra C	7500-Ra C	D3454-05
	Radiochemical	7500-Ra B	7500-Ra B	D2460-07
Radium 228	Radiochemical	7500-Ra D	7500-Ra D	
Uranium	Radiochemical	7500-U B	7500-U B	
	ICP-MS	3125		D5673-05, 10
	Alpha spectrometry	7500-U C	7500-U C	D3972-09
	Laser Phosphorimetry			D5174-07
	Alpha Liquid Scintillation Spectrometry			D6239-09
Man-Made:				
Radioactive Cesium	Radiochemical	7500-Cs B	7500-Cs B	
	Gamma Ray Spectrometry	7120	7120	D3649-06
Radioactive Iodine	Radiochemical	7500-I B 7500-I C 7500-I D	7500-I B 7500-I C 7500-I D	D3649-06
	Gamma Ray Spectrometry	7120	7120	D4785-08
Radioactive Strontium 89, 90	Radiochemical	7500-Sr B	7500-Sr B	

Tritium	Liquid Scintillation	7500- ³ H B	7500- ³ H B	D4107-08
Gamma Emitters	Gamma Ray Spectrometry	7120 7500-Cs B 7500-I B	7120 7500-Cs B 7500-I B	D3649-06 D4785-08

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.74(a)(1)				
Organism	Methodology	SM 21 st 1 Edition	SM 22 nd 28 Edition	Other
Total Coliform	Total Coliform Fermentation Technique	9221 A, B, C	9221 A, B, C	
	Total Coliform Membrane Filter Technique	9222 A, B, C		
	ONPG-MUG Test	9223	9223 B	
Fecal Coliforms	Fecal Coliform Procedure	9221 E	9221 E	
	Fecal Coliform Filter Procedure	9222 D	9222 D	
Heterotrophic bacteria	Pour Plate Method	9215 B	9215 B	
Turbidity	Nephelometric Method	2130 B	2130 B	
	Laser Nephelometry (on-line)			Mitchell M5271 ¹⁰
	LED Nephelometry (on-line)			Mitchell M5331 ¹¹
	LED Nephelometry (on-line)			AMI Turbiwell ¹⁵
	LED Nephelometry (portable)			Orion AQ4500 ¹²

ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.74(a)(2)					
Residual	Methodology	SM 21 st 1 Edition	SM 22 nd 28 Edition	ASTM ⁴	Other

Free Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08	
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F		
	DPD Colorimetric	4500-Cl G	4500-Cl G		
	Syringaldazine (FACTS)	4500-Cl H	4500-Cl H		
	On-line Chlorine Analyzer				EPA 334.0 ¹⁶
	Amperometric Sensor				ChloroSense ¹⁷
Total Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08	
	Amperometric Titration (Low level measurement)	4500-Cl E	4500-Cl E		
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F		
	DPD Colorimetric	4500-Cl G	4500-Cl G		
	Iodometric Electrode	4500-Cl I	4500-Cl I		
	On-line Chlorine Analyzer				EPA 334.0 ¹⁶
	Amperometric Sensor				ChloroSense ¹⁷
Chlorine Dioxide	Amperometric Titration	4500-ClO ₂ C	4500-ClO ₂ C		
	Amperometric Titration	4500-ClO ₂ E	4500-ClO ₂ E		
Ozone	Indigo Method	4500-O ₃ B	4500-O ₃ B		

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.131(b)(1)					
Contaminant	Methodology	EPA Method	ASTM ⁴	SM 21 st Edition ¹	SM 22 nd Edition ²⁸
TTHM	P&T/GC/MS	524.3 ⁹ 524.4 ²⁹			
HAA5	LLE (diazomethane)/GC/ECD			6251 B	6251 B
	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)	557 ¹⁴			

Bromate	Two-Dimensional Ion Chromatography (IC)	302.0 ¹⁸			
	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)	557 ¹⁴			
	Chemically Suppressed Ion Chromatography		D 6581-08 A		
	Electrolytically Suppressed Ion Chromatography		D 6581-08 B		
Chlorite	Chemically Suppressed Ion Chromatography		D 6581-08 A		
	Electrolytically Suppressed Ion Chromatography		D 6581-08 B		
Chlorite – daily monitoring as prescribed in 40 CFR 141.132(b)(2)(i)(A)	Amperometric Titration			4500–ClO ₂ E	4500–ClO ₂ E

ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.131(c)(1)

Residual	Methodology	SM 21 st Edition ₁	SM 22 nd Edition ₂₈	ASTM ⁴	Other
Free Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08	
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F		
	DPD Colorimetric	4500-Cl G	4500-Cl G		
	Syringaldazine (FACTS)	4500-Cl H	4500-Cl H		
	Amperometric Sensor				ChloroSense ₁₇
	On-line Chlorine Analyzer				EPA 334.0 ¹⁶

Combined Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08	
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F		
	DPD Colorimetric	4500-Cl G	4500-Cl G		
Total Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08	
	Low level Amperometric Titration	4500-Cl E	4500-Cl E		
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F		
	DPD Colorimetric	4500-Cl G	4500-Cl G		
	Iodometric Electrode	4500-Cl I	4500-Cl I		
	Amperometric Sensor				ChloroSense ¹⁷
	On-line Chlorine Analyzer				EPA 334.0 ¹⁶
Chlorine Dioxide	Amperometric Method II	4500-ClO ₂ E	4500-ClO ₂ E		

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ALTERNATIVE TESTING METHODS FOR PARAMETERS LISTED AT 40 CFR 141.131(d)				
Parameter	Methodology	SM 21 st Edition ¹	SM 22 nd Edition ²⁸	EPA
Total Organic Carbon (TOC)	High Temperature Combustion	5310 B	5310 B	415.3, Rev 1.2 ¹⁹
	Persulfate-Ultraviolet or Heated Persulfate Oxidation	5310 C	5310 C	415.3, Rev 1.2 ¹⁹
	Wet Oxidation	5310 D	5310 D	415.3, Rev 1.2 ¹⁹

Specific Ultraviolet Absorbance (SUVA)	Calculation using DOC and UV ₂₅₄ data			415.3, Rev 1.2 ¹⁹
Dissolved Organic Carbon (DOC)	High Temperature Combustion	5310 B	5310 B	415.3, Rev 1.2 ¹⁹
	Persulfate-Ultraviolet or Heated Persulfate Oxidation	5310 C	5310 C	415.3, Rev 1.2 ¹⁹
	Wet Oxidation	5310 D	5310 D	415.3, Rev 1.2 ¹⁹
Ultraviolet absorption at 254 nm (UV ₂₅₄)	Spectrophotometry	5910 B	5910 B	415.3, Rev 1.2 ¹⁹

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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.402(c)(2)						
Organism	Methodology	SM 20 th Edition ⁶	SM 21 st Edition ¹	SM 22 nd Edition ²⁸	SM Online ³	Other
<i>E. coli</i>	Colilert®		9223 B	9223 B	<u>9223 B-97</u>	
	Colisure®		9223 B	9223 B	<u>9223 B-97</u>	
	Colilert-18	9223 B	9223 B	9223 B	<u>9223 B-97</u>	
	Readycult®					Readycult® ²⁰
	Colitag					Modified Colitag™ ¹³
	Chromocult®					Chromocult® ²¹
	EC-MUG			<u>9221 F</u>		
Enterococci	Multiple-Tube Technique				<u>9230 B-04</u>	
Coliphage	Two-Step Enrichment Presence-Absence Procedure					Fast Phage ³⁰

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ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.852(a)(5)			
Organism	Methodology Category	Method	SM 22 nd Edition ²⁸
Total Coliforms	Lactose Fermentation Methods	Standard Total Coliform Fermentation Technique	9221 B.1, B.2
	Enzyme Substrate Methods	Colilert®	9223 B
		Colisure®	9223 B
<i>Escherichia coli</i>	<i>Escherichia coli</i> Procedure (following Lactose Fermentation Methods)	EC-MUG medium	9221 F.1
	Enzyme Substrate Methods	Colilert®	9223 B
		Colisure®	9223 B

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 143.4(b)						
Contaminant	Methodology	EPA Method	ASTM ⁴	SM 21 st Edition ¹	SM 22 nd Edition ²⁸	SM Online ³
Aluminum	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP–AES)	200.5, Revision 4.2 ²				
	Atomic Absorption; Direct			3111 D	3111 D	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04
	Inductively Coupled Plasma			3120 B	3120 B	
Chloride	Silver Nitrate Titration		D 512-04 B	4500-Cl ⁻ B	4500-Cl ⁻ B	
	Ion Chromatography			4110 B	4110 B	
	Potentiometric Titration			4500-Cl ⁻ D	4500-Cl ⁻ D	

Color	Visual Comparison			2120 B	2120 B	
Foaming Agents	Methylene Blue Active Substances (MBAS)			5540 C	5540 C	
Iron	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP–AES)	200.5, Revision 4.2 ²				
	Atomic Absorption; Direct			3111 B	3111 B	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04
	Inductively Coupled Plasma			3120 B	3120 B	
Manganese	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP–AES)	200.5, Revision 4.2 ²				
	Atomic Absorption; Direct			3111 B	3111 B	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04
	Inductively Coupled Plasma			3120 B	3120 B	
Odor	Threshold Odor Test			2150 B	2150 B	
Silver	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP–AES)	200.5, Revision 4.2 ²				
	Atomic Absorption; Direct			3111 B	3111 B	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04
	Inductively Coupled Plasma			3120 B	3120 B	
Sulfate	Ion Chromatography			4110 B	4110 B	
	Gravimetric with ignition of residue			4500-SO ₄ ²⁻ C	4500-SO ₄ ²⁻ C	4500-SO ₄ ²⁻ C-97
	Gravimetric with drying of residue			4500-SO ₄ ²⁻ D	4500-SO ₄ ²⁻ D	4500-SO ₄ ²⁻ D-97
	Turbidimetric method		D 516-07, 11	4500-SO ₄ ²⁻ E	4500-SO ₄ ²⁻ E	4500-SO ₄ ²⁻ E-97

	Automated methylthymol blue method			4500-SO ₄ ²⁻ F	4500-SO ₄ ²⁻ F	4500-SO ₄ ²⁻ F-97
Total Dissolved Solids	Total Dissolved Solids Dried at 180 deg C			2540 C	2540 C	
Zinc	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP–AES)	200.5, Revision 4.2 ²				
	Atomic Absorption; Direct Aspiration			3111 B	3111 B	
	Inductively Coupled Plasma			3120 B	3120 B	

¹ Standard Methods for the Examination of Water and Wastewater, 21st edition (2005). Available from American Public Health Association, 800 I Street, NW, Washington, DC 20001-3710.

² EPA Method 200.5, Revision 4.2. “Determination of Trace Elements in Drinking Water by Axially Viewed Inductively Coupled Plasma-Atomic Emission Spectrometry.” 2003. EPA/600/R-06/115. (Available at <http://www.epa.gov/nerlcwww/ordmeth.htm>.)

³ Standard Methods Online are 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.

⁴ Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or <http://astm.org>. The methods listed are the only alternative versions that may be used.

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⁶ Standard Methods for the Examination of Water and Wastewater, 20th edition (1998). Available from American Public Health Association, 800 I Street, NW, Washington, DC 20001-3710.

⁷ Method ME355.01, Revision 1.0. "Determination of Cyanide in Drinking Water by GC/MS Headspace," May 26, 2009. Available at <https://www.nemi.gov> or from James Eaton, H & E Testing Laboratory, 221 State Street, Augusta, ME 04333. (207) 287-2727.

⁸ Systea Easy (1-Reagent). "Systea Easy (1-Reagent) Nitrate Method," February 4, 2009. Available at <https://www.nemi.gov> or from Systea Scientific, LLC., 900 Jorie Blvd., Suite 35, Oak Brook, IL 60523.

⁹ EPA Method 524.3, Version 1.0. "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry," June 2009. EPA 815-B-09-009. Available at <http://water.epa.gov/drink/>.

¹⁰ Mitchell Method M5271, Revision 1.1. "Determination of Turbidity by Laser Nephelometry," March 5, 2009. Available at <https://www.nemi.gov> or from Leck Mitchell, Ph.D., PE, 656 Independence Valley Dr., Grand Junction, CO 81507.

¹¹ Mitchell Method M5331, Revision 1.1. "Determination of Turbidity by LED Nephelometry," March 5, 2009. Available at <https://www.nemi.gov> or from Leck Mitchell, Ph.D., PE, 656 Independence Valley Dr., Grand Junction, CO 81507.

¹² Orion Method AQ4500, Revision 1.0. "Determination of Turbidity by LED Nephelometry," May 8, 2009. Available at <https://www.nemi.gov> or from Thermo Scientific, 166 Cummings Center, Beverly, MA 01915, <http://www.thermo.com>.

¹³ Modified Colitag™ Method. "Modified Colitag™ Test Method for the Simultaneous Detection of *E. coli* and other Total Coliforms in Water (ATP D05-0035)," August 28, 2009. Available at <https://www.nemi.gov> or from CPI International, 5580 Skylane Boulevard, Santa Rosa, CA 95403.

¹⁴ EPA Method 557. "Determination of Haloacetic Acids, Bromate, and Dalapon in Drinking Water by Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)," September 2009. EPA 815-B-09-012. Available at <http://water.epa.gov/drink/>.

¹⁵ AMI Turbiwell, "Continuous Measurement of Turbidity Using a SWAN AMI Turbiwell Turbidimeter," August 2009. Available at <https://www.nemi.gov> or from Markus Bernasconi, SWAN Analytische Instrumente AG, Studbachstrasse 13, CH-8340 Hinwil, Switzerland.

¹⁶ EPA Method 334.0. "Determination of Residual Chlorine in Drinking Water Using an On-line Chlorine Analyzer," September 2009. EPA 815-B-09-013. Available at <http://water.epa.gov/drink/>.

- ¹⁷ ChloroSense. "Measurement of Free and Total Chlorine in Drinking Water by Palintest ChloroSense," August 2009. Available at <https://www.nemi.gov> or from Palintest Ltd, 21 Kenton Lands Road, PO Box 18395, Erlanger, KY 41018.
- ¹⁸ EPA Method 302.0. "Determination of Bromate in Drinking Water using Two-Dimensional Ion Chromatography with Suppressed Conductivity Detection," September 2009. EPA 815-B-09-014. Available at <http://water.epa.gov/drink/>.
- ¹⁹ EPA 415.3, Revision 1.2. "Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water," September 2009. EPA/600/R-09/122. Available at <http://www.epa.gov/nerlcwww/ordmeth.htm>.
- ²⁰ Readycult® Method, "Readycult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," January, 2007. Version 1.1. Available from EMD Millipore (division of Merck KGaA, Darmstadt, Germany), 290 Concord Road, Billerica, MA 01821.
- ²¹ Chromocult® Method, "Chromocult® Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," November, 2000. Version 1.0. EMD Millipore (division of Merck KGaA, Darmstadt, Germany), 290 Concord Road, Billerica, MA 01821.
- ²² Hach Company. "Hach Company SPADNS 2 (Arsenite-Free) Fluoride Method 10225 – Spectrophotometric Measurement of Fluoride in Water and Wastewater," January 2011. 5600 Lindbergh Drive, P.O. Box 389, Loveland, Colorado 80539. (Available at <http://www.hach.com>.)
- ²³ Hach Company. "Hach Company TNTplus™ 835/836 Nitrate Method 10206 – Measurement of Nitrate in Water and Wastewater," January 2011. 5600 Lindbergh Drive, P.O. Box 389, Loveland, Colorado. (Available at <http://www.hach.com>.)
- ²⁴ EPA Method 525.3. "Determination of Semivolatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS)," February 2012. EPA/600/R-12/010. Available at <http://www.epa.gov/nerlcwww/ordmeth.htm>.
- ²⁵ EPA Method 536. "Determination of Triazine Pesticides and their Degradates in Drinking Water by Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS)," October 2007. EPA 815-B-07-002. Available at <http://water.epa.gov/drink>.

²⁶ EPA Method 523. "Determination of Triazine Pesticides and their Degradates in Drinking Water by Gas Chromatography/Mass Spectrometry (GC/MS)," February 2011. EPA 815-R-11-002. Available at <http://water.epa.gov/drink>.

²⁷ EPA Method 1623.1. "*Cryptosporidium* and *Giardia* in Water by Filtration/IMS/FA," 2012. EPA-816-R-12-001. (Available at <http://water.epa.gov/drink>.)

²⁸ Standard Methods for the Examination of Water and Wastewater, 22nd edition (2012). Available from American Public Health Association, 800 I Street, NW, Washington, DC 20001-3710.

²⁹ EPA Method 524.4, Version 1.0. "Measurement of Purgeable Organic Compounds in Water by Gas Chromatography/Mass Spectrometry using Nitrogen Purge Gas," May 2013. EPA 815-R-13-002. Available at <http://water.epa.gov/drink>.

³⁰ Charm Sciences Inc. "Fast Phage Test Procedure. Presence/Absence for Coliphage in Ground Water with Same Day Positive Prediction". Version 009. November 2012. 659 Andover Street, Lawrence, MA 01843. Available at www.charmsciences.com.

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