

§ 141.25

paragraph (h)(18) 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.

(iii) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

(iv) If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected.

(v) If a sample result is less than the detection limit, zero will be used to calculate the annual average.

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(20) All new systems or systems that use a new source of water that begin operation

40 CFR Ch. I (7-1-02 Edition)

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.

§ 141.25 Analytical methods for radioactivity.

(a) Analysis for the following contaminants shall be conducted to determine compliance with §§141.15 and 141.16 (radioactivity) in accordance with the methods in the following table, or their equivalent determined by EPA in accordance with §141.27.

Contaminant	Methodology	Reference (method or page number)								
		EPA ¹	EPA ²	EPA ³	EPA ⁴	SM ⁵	ASTM ⁶	USGS ⁷	DOE ⁸	Other
Naturally occurring:										
Gross alpha ¹¹ and beta.	Evaporation	900.0	p 1	00-01	p 1	302, 7110 B		R-1120-76		
Gross alpha ¹¹	Co-precipitation			00-02		7110 C				
Radium 226	Radon emanation,	903.1	p 16	Ra-04	p 19	7500-Ra C	D 3454-91	R-1141-76	Ra-05	N.Y. ⁹
	Radio chemical	903.0	p 13	Ra-03		304, 305,	D 2460-90	R-1140-76		
						7500-Ra B				
Radium 228	Radio chemical	904.0	p 24	Ra-05	p 19	304, 7500-Ra D		R-1142-76		N.Y. ⁹ N.J. ¹⁰
Uranium ¹²	Radio chemical	908.0				7500-U B				
	Fluorometric	908.1				7500-U C (17th Ed.)	D2907-91	R-1180-76 R-1181-76	U-04	
	Alpha spectro metry ..			00-07	p33	7500-U C (18th or 19th Ed.)	D 3972-90	R-1182-76	U-02	
	Laser Phospho rimetry	D 5174-91			
Man-made:										
Radioactive cesium.	Radio chemical	901.0	p 4			7500-Cs B	D 2459-72	R-1111-76		
	Gamma ray spectrometry.	901.1			p 92	7120 (19th Ed.)	D 3649-91	R-1110-76	4.5.2.3	
Radioactive iodine	Radio chemical	902.0	p 6 p 9			7500-I B	D3649-91			
						7500-I C				
						7500-I D				
	Gamma ray spectrometry.	901.1			p 92	7120 (19th Ed.)	D 4785-88		4.5.2.3	
Radioactive Strontium 89, 90.	Radio chemical	905.0	p 29	Sr-04	p. 65	303, 7500-Sr B		R-1160-76	Sr-01 Sr-02	
Tritium	Liquid scintillation	906.0	p 34	H-02	p. 87 p92	306, 7500-3H B	D 4107-91	R-1171-76		
Gamma emitters	Gamma ray	901.1				7120 (19th Ed.)	D 3649-91	R-1110-76	4.5.2.3	
	Spectrometry	902.0				7500-Cs B	D 4785-88			
	901.0				7500-I B				

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of documents 1 through 10 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 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 Safe Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, 401 M St., SW., Washington, DC 20460 (Telephone: 202-260-3027); or at the Office of Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.

¹"Prescribed Procedures for Measurement of Radioactivity in Drinking Water", EPA 600/4-80-032, August 1980. Available at U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161 (Telephone 800-553-6847), PB 80-224744.

²"Interim Radiochemical Methodology for Drinking Water", EPA 600/4-75-008(revised), March 1976. Available at NTIS, *ibid.* PB 253258.

³"Radiochemistry Procedures Manual", EPA 520/5-84-006, December 1987. Available at NTIS, *ibid.* PB 84-215581.

⁴"Radiochemical Analytical Procedures for Analysis of Environmental Samples", March 1979. Available at NTIS, *ibid.* EMSL LV 053917.

⁵"Standard Methods for the Examination of Water and Wastewater", 13th, 17th, 18th, 19th Editions, 1971, 1989, 1992, 1995. Available at American Public Health Association, 1015 Fifteenth Street N.W., Washington, D.C. 20005. All methods are in the 17th, 18th and 19th editions except 7500-U C Fluorometric Uranium was discontinued after the 17th Edition, 7120 Gamma Emitters is only in the 19th Edition, and 302, 303, 304, 305 and 306 are only in the 13th Edition.

⁶Annual Book of ASTM Standards, Vol. 11.02, 1994. Available at American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

⁷"Methods for Determination of Radioactive Substances in Water and Fluvial Sediments", Chapter A5 in Book 5 of *Techniques of Water-Resources Investigations of the United States Geological Survey*, 1977. Available at U.S. Geological Survey (USGS) Information Services, Box 25286, Federal Center, Denver, CO 80225-0425.

⁸"EML Procedures Manual", 27th Edition, Volume 1, 1990. Available at the Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, NY 10014-3621.

⁹"Determination of Ra-226 and Ra-228 (Ra-02)", January 1980, Revised June 1982. Available at Radiological Sciences Institute Center for Laboratories and Research, New York State Department of Health, Empire State Plaza, Albany, NY 12201.

¹⁰"Determination of Radium 228 in Drinking Water", August 1980. Available at State of New Jersey, Department of Environmental Protection, Division of Environmental Quality, Bureau of Radiation and Inorganic Analytical Services, 9 Ewing Street, Trenton, NJ 08625.

¹¹Natural uranium and thorium-230 are approved as gross alpha calibration standards for gross alpha with co-precipitation and evaporation methods; americium-241 is approved with co-precipitation methods.

¹²If uranium (U) is determined by mass, a 0.67 pCi/μg of uranium conversion factor must be used. This conservative factor is based on the 1:1 activity ratio of U-234 to U-238 that is characteristic of naturally occurring uranium.

(b) When the identification and measurement of radionuclides other than those listed in paragraph (a) of this section is required, the following references are to be used, except in cases where alternative methods have been approved in accordance with §141.27.

(1) *Procedures for Radiochemical Analysis of Nuclear Reactor Aqueous Solutions*, H. L. Krieger and S. Gold, EPA-R4-73-014. USEPA, Cincinnati, Ohio, May 1973.

(2) *HASL Procedure Manual*, Edited by John H. Harley. HASL 300, ERDA Health and Safety Laboratory, New York, NY., 1973.

(c) For the purpose of monitoring 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 plus or minus 100 percent at the 95 percent confidence level (1.96σ where σ is the standard deviation of the net counting rate of the sample).

(1) To determine compliance with §141.15(a) the detection limit shall not exceed 1 pCi/l. To determine compliance with §141.15(b) the detection limit shall not exceed 3 pCi/l.

(2) To determine compliance with §141.16 the detection limits shall not exceed the concentrations listed in Table B.

TABLE B.—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.

(d) To judge compliance with the maximum contaminant levels listed in §§141.15 and 141.16, averages of data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

(e) The State has the authority to determine compliance or initiate enforcement action based upon analytical results or other information compiled by

their sanctioned representatives and agencies.

[41 FR 28404, July 9, 1976, as amended at 45 FR 57345, Aug. 27, 1980; 62 FR 10173, Mar. 5, 1997]

EFFECTIVE DATE NOTE: At 65 FR 76745, Dec. 7, 2000, § 141.25 was amended by revising paragraphs (a) introductory text, (c)(1), (c)(2) introductory text, and (d), and by redesignating Table B in paragraph (c)(2) as Table C, effective Dec. 8, 2003. For the convenience of the user, the revised text is set forth as follows:

§ 141.25 Analytical methods for radioactivity.

(a) Analysis for the following contaminants shall be conducted to determine compliance with §141.66 (radioactivity) in accordance with the methods in the following table, or their equivalent determined by EPA in accordance with §141.27.

* * * * *

(c) * * *

(1) To determine compliance with §141.66(b), (c), and (e) the detection limit shall not exceed the concentrations in Table B to this paragraph.

TABLE B.—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	Reserve

(2) To determine compliance with §141.66(d) the detection limits shall not exceed the concentrations listed in Table C to this paragraph.

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(d) To judge compliance with the maximum contaminant levels listed in §141.66, averages of data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

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§ 141.26 Monitoring frequency for radioactivity in community water systems.

(a) Monitoring requirements for gross alpha particle activity, radium-226 and radium-228.