

**§ 141.25**

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Contaminant	Detection limit (mg/l)
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	.0001
Pentachlorophenol	.00004
Simazine	.00007
Toxaphene	.001
2,3,7,8-TCDD (Dioxin)	.000000005
2,4,5-TP (Silvex)	.0002

(19) Analysis under this section shall only be conducted by laboratories that have received certification by EPA or the State and have met the following conditions:

(i) To receive certification to conduct analyses for the contaminants in § 141.61(c) the laboratory must:

(A) Analyze Performance Evaluation (PE) samples provided by EPA, the State, or by a third party (with the approval of the State or EPA) at least once a year by each method for which the laboratory desires certification.

(B) For each contaminant that has been included in the PE sample achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	Acceptance limits (percent)
DBCP	±40
EDB	±40
Aalachlor	±45
Atrazine	±45
Benz[a]pyrene	2 standard deviations.
Carbofuran	±45
Chlordane	±45
Dalapon	2 standard deviations.
Di(2-ethylhexyl)adipate	2 standard deviations.
Di(2-ethylhexyl)phthalate	2 standard deviations.
Dinoseb	2 standard deviations.
Diquat	2 standard deviations.
Endothall	2 standard deviations.
Endrin	±30
Glyphosate	2 standard deviations.
Heptachlor	±45
Heptachlor epoxide	±45
Hexachlorobenzene	2 standard deviations.
Hexachloro-cyclopentadiene	2 standard deviations.
Lindane	±45
Methoxychlor	±45
Oxamyl	2 standard deviations.
PCBs (as Decachlorobiphenyl)	0-200

Contaminant	Acceptance limits (percent)
Picloram	2 standard deviations.
Simazine	2 standard deviations.
Toxaphene	±45
Aldicarb	2 standard deviations.
Aldicarb sulfoxide	2 standard deviations.
Aldicarb sulfone	2 standard deviations.
Pentachlorophenol	±50
2,3,7,8-TCDD (Dioxin)	2 standard deviations.
2,4-D	±50
2,4,5-TP (Silvex)	±50

(ii) [Reserved]

(20) 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.

(Approved by the Office of Management and Budget under control number 2040-0090)

[40 FR 59570, Dec. 24, 1975, as amended at 44 FR 68641, Nov. 29, 1979; 45 FR 57345, Aug. 27, 1980; 47 FR 10998, Mar. 12, 1982; 52 FR 25712, July 8, 1987; 53 FR 5147, Feb. 19, 1988; 53 FR 25110, July 1, 1988; 56 FR 3583, Jan. 30, 1991; 56 FR 30277, July 1, 1991; 57 FR 22178, May 27, 1992; 57 FR 31841, July 17, 1992; 59 FR 34323, July 1, 1994; 59 FR 62468, Dec. 5, 1994; 60 FR 34085, June 29, 1995; 64 FR 67464, Dec. 1, 1999; 65 FR 26022, May 4, 2000; 66 FR 7063, Jan. 22, 2001; 67 FR 65250, Oct. 23, 2002; 67 FR 65898, Oct. 29, 2002]

**§ 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.

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Contaminant	Methodology	Reference (method or page number)								
		EPA <sup>1</sup>	EPA <sup>2</sup>	EPA <sup>3</sup>	EPA <sup>4</sup>	SM <sup>5</sup>	ASTM <sup>6</sup>	USGS <sup>7</sup>	DOE <sup>8</sup>	Other
Naturally occurring:										
Gross alpha, <sup>9</sup> and beta.	Evaporation .....	900.0 .....	p 1 .....	00-01 .....	p 1 .....	302, 7110 B .....	.....	R-1120-76 .....		
Gross alpha <sup>11</sup> ..	Co-precipitation .....	903.1 .....	p 16 .....	00-02 .....	p 19 .....	7110 C .....	D 3454-97 .....	R-1141-76 .....		
Radium 226 .....	Radium emanation .....	903.0 .....	p 13 .....	Ra-04 .....	Ra-03 .....	305,7500-Ra C .....	D 2460-97 .....	R-1140-76 .....		
Radium 228 .....	Radiochemi- cal .....	904.0 .....	p 24 .....	Ra-05 .....	p 19 .....	304,7500-Ra B .....	.....	R-1142-76 .....		
Uranium <sup>12</sup> .....	Radiochemi- cal .....	908.0 .....	.....	.....	.....	7500-Ra D .....	.....	.....		
	Fluorometric .....	908.1 .....	.....	.....	.....	7500-U B .....	.....	.....		
	Alpha spectrometry .....	.....	.....	00-07 .....	p 33 .....	7500-U C (17th Ed.) .....	D 2907-97 .....	R-1180-76, R-1181-76, U-04		
	Laser Phosphorimetry.	.....	.....	.....	.....	7500-U C (18th, 19th or 20th Ed.),	D 3972-97 .....	R-1182-76 .....	U-02	
Man-made:						.....	.....	.....		
Radioact- ive cesium .....	Radiochemi- cal .....	901.0 .....	p 4 .....	.....	.....	7500-CsB .....	D 5174-97 .....	.....		
	Gamma ray spec- tomety .....	901.1 .....	.....	.....	p 92 .....	7120 .....	D 2459-72 .....	R-1111-76 .....		
	Radiochemi- cal .....	902.0 .....	p 6, p 9 .....	.....	.....	7500-1 B, 7500-1 C, 7500-1 D,	D 3649-91 .....	R-1110-76 .....	4.5,2.3 .....	
	Gamma ray spec- tomety .....	901.1 .....	.....	.....	p 92 .....	7120 .....	D 4785-93 .....	.....	4.5,2.3 .....	
	Radiochemi- cal .....	905.0 .....	p 29 .....	Si-04 .....	p 65 .....	303, 7500-Sr B .....	.....	R-1160-76 .....	Si-01, Si-02	
	Liquid scintillation .....	906.0 .....	p 34 .....	H-02 .....	p 87 .....	306, 7500-3H B .....	D 4107-91 .....	R-1171-76 .....		
	Gamma ray .....	901.1 .....	.....	.....	p 92 .....	7120 .....	D 3649-91 .....	R-1110-76 .....		
	Scintometry .....	902.0 .....	.....	.....	.....	7500-Cs B, 7500-1 B .....	D 4785-93 .....	.....		
	Gamma emitters .....	901.0 .....	.....	.....	.....	.....	.....	.....	Ga-01-R	

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; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations.html](http://www.archives.gov/federal_register/code_of_federal_regulations.html).

<sup>1</sup>"Prescribed Procedures for the Measurement of Radionuclides in Drinking Water," EPA 6004-80-032, August 1980. Available at the U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22216 (Telephone 800-553-6847), PB 80-224744.

2

"Interim Radiochemical Methodology for Drinking Water," EPA 6004-75-008(revised), March 1976. Available NTIS, ibid. PB 84-215581.

3

"Radiochemical Procedures for Analysis of Environmental Samples," March 1979. Available at NTIS, ibid.

4 "Radiochemical Analytical Procedures for the Examination of Water and Wastewater," 13th, 17th, 18th, 19th Editions, or 20th edition, 1971, 1989, 1992, 1995, 1998. Available at American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005. Methods 7110B, 7500-Ra B, 7500-Ra C, 7500-Ra D, 7500-U B, 7500-Cs B, 7500-1 B, 7500-Sr B, 7500-3H B are in the 17th, 18th, 19th and 20th editions. Method 7110 C is in the 18th, 19th and 20th editions. Method 7120 is only in the 19th and 20th editions.

5 "Standard Methods for the Examination of Water and Wastewater," 13th, 17th, 18th, 19th, 20th editions. Methods 302, 303, 304, 305 and 306 are only in the 17th, 18th, 19th and 20th editions. Method 7110 C is in the 18th, 19th and 20th editions. Method 7120 is only in the 19th and 20th editions.

6 Annual Book of ASTM Standards, Vol. 11.01 and 11.02, 1989; ASTM International any year containing the cited version of the method may be used. Copies may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

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<sup>7</sup>"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.

<sup>8</sup>"EMIL Procedures Manual", 28th (1957) or 27th (1990) Editions, Volumes 1 and 2; either edition may be used. In the 27th Edition Method Ra-04 is listed as Ra-05 and Method Ga-01-R is listed as Sect. 4.5.2.3. Available at the Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, NY 10014-3621.

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

<sup>10</sup>"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.

<sup>11</sup>Natural 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.

<sup>12</sup>In uranium ( $U$ ) is determined by mass, a 0.67 pCi/ $\mu$ g of uranium conversion factor must be used. This conversion factor is based on the 1:1 activity ratio of  $U$ -234 and  $U$ -238 that is characteristic of naturally occurring uranium.

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(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 ( $1.96\sigma$  where  $\sigma$  is the standard deviation of the net counting rate of the sample).

(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.

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

Radionuclide	Detection limit
Tritium .....	1,000 pCi/l.
Srontium-89 .....	10 pCi/l.
Srontium-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 § 141.66, 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.

(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; 65 FR 76745, Dec. 7, 2000; 67 FR 65250, Oct. 23, 2002]

EFFECTIVE DATE NOTE 1: At 69 FR 31012, June 2, 2004, § 141.25 was amended in the table in paragraph (a) by revising the entry for uranium, revising footnotes 1, 2, 3, 5, 6, 8, and 12, and adding footnote 13, effective Aug. 31, 2004. For the convenience of the user, the revised and added text is set forth as follows:

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(a) \* \* \*

**§ 141.25, Note**

Contaminant	Methodology	Reference (method or page number)						
		EPA <sup>1</sup>	EPA <sup>2</sup>	EPA <sup>3</sup>	EPA <sup>4</sup>	SM <sup>5</sup>	ASTM <sup>6</sup>	USGS <sup>7</sup>
Uranium <sup>12</sup>	Radiochemical	*	*	*	*	*	*	*
	Fluorometric	90B0	.....	.....	.....	7500-U B	D 2907-97	R-1180-76, R-1181-76
	ICP-MS	90B.1	.....	.....	.....	7500-U C (17th Ed.)	D 2907-97	U-04
	Alpha spectrometry	13200.8	.....	.....	00-07	3125	D5673-03	
	Laser Phosphorimetry	.....	.....	.....	p-33	7500-U C (18th, 19th or 20th Ed.)	D3972-97	R-1182-76
							D5174-97	
		*	*	*	*	*	*	*

\* The procedures shall be done in accordance with the documents listed below. The incorporation by reference of documents 1 through 10 and 13 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 800-428-4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue NW, Room B135, Washington, DC (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register\\_code\\_of\\_federal\\_regulations/locational.html](http://www.archives.gov/federal_register_code_of_federal_regulations/locational.html).

<sup>1</sup>\*Prescribed Procedures for the Measurement of Radioactivity in Drinking Water, EPA 600/4-80-032, August 1980. Available at the U.S. Department of Commerce, National Technical Information Service (NTIS), 5225 Port Royal Road, Springfield, VA 22161 (Telephone 800-553-6847), PB 80-224744, except Method 200.8, "Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry," Revision 5.4, which is published in "Methods for the Determination of Metals in Environmental Samples—Supplement I,"

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

<sup>3</sup>\*Radiochemical Analytical Procedures for Analysis of Environmental Samples, March 1979. Available at NTIS, ibid. EML LV 053917.

<sup>4</sup>\*Standard Methods for the Examination of Water and Wastewater, 13th, 17th, 18th, 19th, 20th editions, 1977, 1989, 1992, 1995, 1998. Available at American Public Health Association, 1015 Fifteenth Street NW., Washington, DC 20005. Methods 302, 303, 304, 305 and 306 are only in the 13th edition. Methods 7110B, 7500-Ra C, 7500-Ra D, 7500-U B, 7500-Cs B, 7500-I B, 7500-Sr B, 7500-3H B are in the 17th, 18th, 19th and 20th editions. Method 7110 C is in the 18th, 19th and 20th editions. Method 7120 is only in the 18th and 20th editions. Method 7120 is only in the 18th, 19th and 20th editions. Method 7120 is only in the 18th and 20th editions. Method 7120 is only in the 18th, 19th and 20th editions. Method 7120 is only in the 18th and 20th editions.

<sup>5</sup>\*Annual Book of ASTM Standards, Vol. 11.01 and 11.02, 1999; ASTM International, any year containing the cited version of the method may be used. Copies of these two volumes and the 2003 version of D 5673-03 may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428-2959.

<sup>6</sup>\*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, Federer Center, Denver, CO 80225-0425.

<sup>7</sup>\*EML Procedures Manual, 28th (1987) or 27th (1990) Editions, Volumes 1 and 2; either edition may be used. In the 27th Edition Method Ra-04 is listed as Ra-05, and Method Ga-01-R is listed as Sect. 4.5.2.3. Available at the Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, NY 10014-3621.

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

<sup>13</sup>\*Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry, Revision 5.4, which is published in "Methods for the Determination of Metals in Environmental Samples—Supplement I," EPA 600-R-94-111, May 1994. Available at NTIS, PB 95-125472.

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EFFECTIVE DATE NOTE 2: At 69 FR 38855, June 29, 2004, §141.25 was amended in paragraph (c)(1) in the entry for uranium in the second column of Table B by removing the word "reserve" and adding in its place "1 µg/L", effective July 29, 2004.

### **§ 141.26 Monitoring frequency and compliance requirements for radionuclides in community water systems.**

(a) *Monitoring and compliance requirements for gross alpha particle activity, radium-226, radium-228, and uranium.* (1) Community water systems (CWSs) must conduct initial monitoring to determine compliance with § 141.66(b), (c), and (e) 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 § 141.25(c).

(i) *Applicability and sampling location for existing community water systems or sources.* All existing CWSs using ground water, surface water or systems using both ground and surface water (for the purpose of this section hereafter referred to as systems) must sample at every entry point to the distribution system that is representative of all sources being used (hereafter called a sampling point) under normal operating conditions. The system must take each sample at the same sampling point unless conditions make another sampling point more representative of each source or the State has designated a distribution system location, in accordance with paragraph (a)(2)(ii)(C) of this section.

(ii) *Applicability and sampling location for new community water systems or sources.* 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. CWSs must conduct more frequent monitoring when ordered by the State 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:* Systems must conduct initial monitoring for gross

alpha particle activity, radium-226, radium-228, and uranium as follows:

(i) Systems without acceptable historical data, as defined below, must collect four consecutive quarterly samples at all sampling points before December 31, 2007.

(ii) *Grandfathering of data:* States may allow historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, for the following situations.

(A) To satisfy initial monitoring requirements, a community water system 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.

(B) To satisfy initial monitoring requirements, a community water system 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.

(C) To satisfy initial monitoring requirements, a community water system 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 State 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 State must make a written finding indicating how the data conforms to these requirements.

(iii) For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the State 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.

(iv) If the average of the initial monitoring results for a sampling point is above the MCL, the system must collect and analyze quarterly samples at