CA

64442 MCLs and Monitoring - Gross Alpha Particle Activity, Radium-226, Radium-228, and Uranium

(a)

Each community and nontransient-noncommunity water system (system) shall comply with the primary MCLs in Table 64442 in the drinking water supplied to the public and use the DLRs for reporting monitoring results: Table 64442 Radionuclide Maximum Containment Levels (MCLs) and Detection Levels for Purposes of Reporting (DLRs) Radionuclide MCL DLR Radium-226 1 pCi/L Radium-228 5 pCi/L (combined radium-226 & -228) 1 pCi/L Gross Alpha particle activity (excluding radon and uranium) 15 pCi/L 3 pCi/L Uranium 20 pCi/L 1 pCi/L

(b)

Each system shall monitor to determine compliance with the MCLs in table 64442, as follows: (1) Monitor at each water source, or every entry point to the distribution system that is representative of all sources being used under normal operating conditions; conduct all monitoring at the same sample site(s) unless a change is approved by the State Board, based on a review of the system and its historical water quality data; (2) For quarterly monitoring, monitor during the same month (first, second or third) of each quarter during each quarter monitored; (3) By December 31, 2007, complete initial monitoring that consists of four consecutive quarterly samples at each sampling site for each radionuclide in table 64442, except that nontransient-noncommunity water systems shall not be

required to monitor radium-228 as a separate analyte, but shall monitor for compliance with the combined radium MCL using the analytical method described in Prescribed Procedures for Measurement of Radioactivity in Drinking Water, Section 6, Alpha-Emitting Radium Isotopes in Drinking Water, method 903.0 (EPA/600/4-80-032, August, 1980): (A) Data collected for a sampling site between January 1, 2001, and December 31, 2004, may be used to satisfy the initial monitoring requirement, subject to the State Board's approval based on whether the analytical methods, DLRs, sampling sites, and the frequency of monitoring used were consistent with this article. (B) For gross alpha particle activity, uranium, radium-226 and radium-228, the State Board may waive the final two quarters of initial monitoring at a sampling site if the results from the previous two quarters are below the DLR(s) and the sources are not known to be vulnerable to contamination.

(1)

Monitor at each water source, or every entry point to the distribution system that is representative of all sources being used under normal operating conditions; conduct all monitoring at the same sample site(s) unless a change is approved by the State Board, based on a review of the system and its historical water quality data;

(2)

For quarterly monitoring, monitor during the same month (first, second or third) of each quarter during each quarter monitored;

(3)

By December 31, 2007, complete initial monitoring that consists of four consecutive quarterly samples at each sampling site for each radionuclide in table 64442, except that nontransient-noncommunity water systems shall not be required to monitor radium-228 as a separate analyte, but shall monitor for compliance with the combined

radium MCL using the analytical method described in Prescribed Procedures for Measurement of Radioactivity in Drinking Water, Section 6, Alpha-Emitting Radium Isotopes in Drinking Water, method 903.0 (EPA/600/4-80-032, August, 1980): (A) Data collected for a sampling site between January 1, 2001, and December 31, 2004, may be used to satisfy the initial monitoring requirement, subject to the State Board's approval based on whether the analytical methods, DLRs, sampling sites, and the frequency of monitoring used were consistent with this article. (B) For gross alpha particle activity, uranium, radium-226 and radium-228, the State Board may waive the final two quarters of initial monitoring at a sampling site if the results from the previous two quarters are below the DLR(s) and the sources are not known to be vulnerable to contamination.

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Data collected for a sampling site between January 1, 2001, and December 31, 2004, may be used to satisfy the initial monitoring requirement, subject to the State Board's approval based on whether the analytical methods, DLRs, sampling sites, and the frequency of monitoring used were consistent with this article.

(B)

For gross alpha particle activity, uranium, radium-226 and radium-228, the State Board may waive the final two quarters of initial monitoring at a sampling site if the results from the previous two quarters are below the DLR(s) and the sources are not known to be vulnerable to contamination.

(c)

Any new system or new source for an existing system shall begin monitoring pursuant to Subsection (b) within the first quarter after initiating water service to the public.

(d)

After initial monitoring, each system shall monitor for each radionuclide at each sampling site at a frequency determined by the monitoring result(s) [single sample result or average of sample results if more than one sample collected] from the most recent compliance period as follows: (1) For nontransient-noncommunity water systems, the results for the total radium analyses shall be averaged. (2) For community water systems, the results of radium-226 and radium-228 analyses shall be added and the average calculated. (3) The values used for the radionuclide MCLs and DLRs shall be as specified in Table 64442. (4) If the single sample result or average is: A. Below the DLR, the system shall collect and analyze at least one sample every nine years (3 compliance periods). B. At or above the DLR, but at or below 1/2 the MCL, the system shall collect and analyze at least one sample every six years. C. Above 1/2 the MCL, but not above the MCL, the system shall collect and analyze at least one sample every three years.

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For community water systems, the results of radium-226 and radium-228 analyses shall be added and the average calculated.

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The values used for the radionuclide MCLs and DLRs shall be as specified in Table 64442.

(4)

If the single sample result or average is: A. Below the DLR, the system shall collect and analyze at least one sample every nine years (3 compliance periods). B. At or

above the DLR, but at or below 1/2 the MCL, the system shall collect and analyze at least one sample every six years. C. Above 1/2 the MCL, but not above the MCL, the system shall collect and analyze at least one sample every three years.

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Below the DLR, the system shall collect and analyze at least one sample every nine years (3 compliance periods).

B.

At or above the DLR, but at or below 1/2 the MCL, the system shall collect and analyze at least one sample every six years.

C.

Above 1/2 the MCL, but not above the MCL, the system shall collect and analyze at least one sample every three years.

(e)

A system that monitors quarterly may composite up to four consecutive samples from a single sampling site if analysis is done within a year of the first sample's collection. If the result of the composited sample is greater than 1/2 the MCL, at least one additional quarterly sample shall be analyzed to evaluate the range and trend of results over time before allowing the system to reduce the monitoring frequency.

(f)

A gross alpha particle activity measurement may be substituted for other measurements by adding the 95% confidence interval (1.65[SIGMA], where [SIGMA] is the standard deviation of the net counting rate of the sample) to it; and if, (1) For uranium and radium measurements (after initial radium-228 monitoring has been completed), the gross alpha measurement does not exceed 5 pCi/L; or (2) For radium measurements (after initial radium-228 monitoring has

been completed), the result obtained from subtracting the uranium measurement from the gross alpha measurement does not exceed 5 pCi/L.

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For uranium and radium measurements (after initial radium-228 monitoring has been completed), the gross alpha measurement does not exceed 5 pCi/L; or

(2)

For radium measurements (after initial radium-228 monitoring has been completed), the result obtained from subtracting the uranium measurement from the gross alpha measurement does not exceed 5 pCi/L.

(g)

If any sample result is greater than an MCL: (1) For a system monitoring less than quarterly, quarterly samples shall be collected and analyzed to determine compliance, pursuant to subsection (h); (2) For a system that already has four consecutive quarterly results, compliance shall be determined pursuant to subsection (h). (3) The system shall monitor quarterly until the results of four consecutive quarterly sample results do not exceed the MCL.

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For a system monitoring less than quarterly, quarterly samples shall be collected and analyzed to determine compliance, pursuant to subsection (h);

(2)

For a system that already has four consecutive quarterly results, compliance shall be determined pursuant to subsection (h).

(3)

The system shall monitor quarterly until the results of four consecutive quarterly sample results do not exceed the MCL.

(h)

A system with one or more sample results greater than an MCL shall determine compliance with the MCL as follows: (1) At each sampling site, based on the analytical results for that site. Any confirmation sample result shall be averaged with the initial result. (2) Using all monitoring results collected under this section during the previous 12 months, even if more than the minimum required number of samples was collected. (3) By a running annual average of four consecutive quarters of sampling results. Averages shall be rounded to the same number of significant figures as the MCL for which compliance is being determined.(A) If any sample result will cause the annual average at any sample site to exceed the MCL, the system shall be out of compliance immediately upon receiving the result; (B) If a system has not analyzed the required number of samples, compliance shall be determined by the average of the samples collected at the site during the most recent 12 months; and (C) If a sample result is less than the DLR in table 64442, zero shall be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226, total radium, and/or uranium. In that case, if the gross alpha particle activity result is less than the DLR, 1/2 the DLR shall be used to calculate the annual average. (4) If compositing is allowed at a sampling site, by the results of a composite of four consecutive quarterly samples. (5) If the system can provide documentation that a sample was subject to sampling or analytical errors, the State Board may invalidate the result based on its review of the documentation, the sampling result, and the historical sampling data. (6) Each system shall ensure that the laboratory analyzing its samples collected for compliance with this article calculates and reports the sample-specific Minimum Detectable Activity at the 95% confidence level (MDA95) along with the sample results. The MDA95 shall not exceed the DLR and shall be calculated as described in ANSI N42.23 Measurement and Associated

Instrumentation Quality Assurance for Radiobioassay Laboratories, Appendix A.7.6 (September 10, 1995).

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At each sampling site, based on the analytical results for that site. Any confirmation sample result shall be averaged with the initial result.

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Using all monitoring results collected under this section during the previous 12 months, even if more than the minimum required number of samples was collected.

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By a running annual average of four consecutive quarters of sampling results. Averages shall be rounded to the same number of significant figures as the MCL for which compliance is being determined.(A) If any sample result will cause the annual average at any sample site to exceed the MCL, the system shall be out of compliance immediately upon receiving the result; (B) If a system has not analyzed the required number of samples, compliance shall be determined by the average of the samples collected at the site during the most recent 12 months; and (C) If a sample result is less than the DLR in table 64442, zero shall be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226, total radium, and/or uranium. In that case, if the gross alpha particle activity result is less than the DLR, 1/2 the DLR shall be used to calculate the annual average.

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If any sample result will cause the annual average at any sample site to exceed the MCL, the system shall be out of compliance immediately upon receiving the result;

(B)

If a system has not analyzed the required number of samples, compliance shall be determined by the average of the samples collected at the site during the most recent 12

months; and

(C)

If a sample result is less than the DLR in table 64442, zero shall be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226, total radium, and/or uranium. In that case, if the gross alpha particle activity result is less than the DLR, 1/2 the DLR shall be used to calculate the annual average.

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If compositing is allowed at a sampling site, by the results of a composite of four consecutive quarterly samples.

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Each system shall ensure that the laboratory analyzing its samples collected for compliance with this article calculates and reports the sample-specific Minimum Detectable Activity at the 95% confidence level (MDA95) along with the sample results. The MDA95 shall not exceed the DLR and shall be calculated as described in ANSI N42.23 Measurement and Associated Instrumentation Quality Assurance for Radiobioassay Laboratories, Appendix A.7.6 (September 10, 1995).