3745-81-26 Radionuclide monitoring requirements.

Monitoring requirements for radionuclide contaminants of drinking water are stated in this rule. Analytical procedures which are acceptable for monitoring of radionuclide contaminants in drinking water are listed in rule 3745-81-27 of the Administrative Code. Community public water systems shall monitor for radionuclide contaminants according to a schedule provided by the director.

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

(1) Community public water systems shall complete initial monitoring to determine compliance with the maximum contaminant levels listed in rule 3745-81-15 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 paragraph (D) of this rule.

(2) All existing community public water systems shall sample at every sampling point that is representative of all sources being used under normal operating conditions for that sampling point. The system shall take each sample at the same sampling point unless the director determines that conditions make another sampling location more representative of each source.

(3) All new community public water systems or community public water systems that use a new source of water shall begin initial monitoring within the first quarter after initiating use of the source.

(4) Initial monitoring. Systems shall conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:

(a) Systems without acceptable grandfathered data, as described below, shall collect four consecutive quarterly samples at all sampling points before December 31, 2007.

(b) Grandfathering of data. Under the following circumstances the director may use data from compliance monitoring conducted between June 1, 2000 and December 8, 2003 to determine that a system has satisfied part or all of the initial monitoring requirements.

(i) Monitoring during that time period was conducted for each entry point to the distribution system and the director finds that other available historical data provide

sufficient indication that each entry point to the distribution system is expected to be in compliance. The director shall consider trends and variability in the historical data and other relevant information to determine the suitability of the data from compliance monitoring conducted between June 1, 2000 and December 8, 2003 to satisfy part or all of the initial monitoring requirements. If acceptable, the grandfathered monitoring data shall be used to determine the future monitoring frequency as specified in paragraph (A)(6) of this rule.

(ii) Monitoring during that time period was conducted for a representative point or points in the distribution system and the director finds that other available historical data provide sufficient indication that each entry point to the distribution system is expected to be in compliance. The director shall consider trends and variability in the historical data and other relevant information to determine the suitability of the data from compliance monitoring conducted between June 1, 2000 and December 8, 2003 to satisfy part or all of the initial monitoring requirements. The director shall make a written finding indicating how the monitoring data conforms to the above requirements. If acceptable, the grandfathered monitoring data shall be used to determine the future monitoring frequency as specified in paragraph (A)(6) of this rule.

(iii) Monitoring for gross alpha particle activity may be substituted for the required radium-226 and uranium monitoring data as specified by paragraph (A)(7) of this rule.

(iv) All monitoring data for entry point samples collected during these times will be used to determine future monitoring frequency, as specified in paragraph (A)(6) of this rule, using the highest annual average or annual result if only one sample was monitored in a year.

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

(5) If the average of the initial monitoring results for a sampling point is above the maximum contaminant level (MCL), the community public water system shall collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL.

(6) Reduced monitoring. The director may allow community public water systems to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria:

(a) If the average of the initial monitoring results for each contaminant (i.e., gross alpha particle activity, uranium, radium-226, or radium-228) is below the detection limit specified in paragraph (D) of this rule, the community public system shall collect and analyze for that contaminant using at least one sample at that sampling point every nine years.

(b) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below fifty per cent of the MCL, the community public water system shall collect and analyze for that contaminant using at least one sample at that sampling point every six years. For combined radium-226 and radium-228, the analytical results shall be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is at or above the detection limit but at or below fifty per cent of the MCL, the community public water system shall collect and analyze for the contaminant(s) using at least one sample at that sample point every six years.

(c) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above fifty per cent of the MCL but at or below the MCL, the community public water system shall collect and analyze at least one sample at that sampling point every three years. For combined radium-226 and radium-228, the analytical results shall be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is above fifty per cent of the MCL but at or below the MCL, the community public water

system shall collect and analyze at least one sample at that sampling point every three years.

(d) Community public water systems shall use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (e.g., if a system's sampling point is on a nine year monitoring period, and the sample result is above fifty per cent of MCL but at or below the MCL, then the next monitoring period for that sampling point is at least one sample every three years.)

(e) If a community public water system has a monitoring result that exceeds the MCL while on reduced monitoring, the system shall collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL.

(7) A gross alpha particle activity measurement may be substituted for the required radium-226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/L. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/L. The gross alpha measurement shall have a confidence interval of ninety-five per cent (1.96 sigma where sigma is the standard deviation of the net counting rate of the sample) for radium-226 and uranium. When a community public water system uses a gross alpha particle activity measurement in lieu of radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, fifty per cent of the detection limit will be used to determine compliance and the future monitoring frequency.

(B) Monitoring requirements for beta particle and photon radioactivity.

(1) The director may designate a community public water system as vulnerable to beta particle and photon radioactivity contamination based on identified potential radioactive sources which may influence source waters via air deposition, groundwater migration, or surface water releases. Those community public water systems within a one mile radius of potential radioactive sources will be considered vulnerable to beta particle and photon radioactivity contamination unless information is provided on mitigating factors showing that this

designation is not appropriate. Community public water systems designated by the director as vulnerable shall sample for beta particle and photon radioactivity to determine compliance with the maximum contaminant levels listed in rule 3745-81-15 as follows:

(a) Community public water systems shall collect quarterly samples for beta emitters and annual samples for tritium and strotium-90 at each sampling point, beginning within one quarter after being notified by the director. Systems designated as vulnerable shall continue to sample until the director removes the designation.

(b) If the gross beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 50 pCi/L (screening level) and the combined monitoring results for all measured contaminants (i.e. tritium. strontium-90, and any other contaminants for beta particle and photon radioactivity as specified by rule 3745-81-15 of the Administrative Code) are at or below the MCL, the director may reduce the frequency of monitoring at that sampling point to once every three years. Systems shall collect all samples required in paragraph (B)(1)(a) of this rule during the reduced monitoring period.

(2) Community public water systems designated by the director as utilizing waters contaminated by effluents from nuclear facilities shall sample for beta particle and photon radioactivity to determine compliance with the MCLs listed in rule 3745-81-15 of the Administrative Code as follows:

(a) Community public water systems shall collect monthly samples for gross beta particle activity and quarterly samples for iodine-131, tritium, and strontium-90 at each sampling point, beginning within one quarter after being notified in writing by the director. For iodine-131, five consecutive daily samples shall be analyzed once each quarter. As ordered by the director, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water. Systems designated by the director as using waters contaminated by effluents from nuclear facilities shall continue to sample until the director removes the designation.

(b) If the gross beta particle activity at a sampling point has a running average (computed quarterly) less than or equal to 15 pCi/L (screening level) and the combined monitoring results are at or below the MCL for all measured contaminants (i.e., iodine-

131, tritium, strontium-90, etc.), the director may reduce the frequency of monitoring at that sampling point to every three years. Community public water systems shall collect all samples required in paragraph (B)(2)(a) of this rule during the reduced monitoring period.

(3) A waiver from the monitoring frequencies specified in paragraph (B)(1) or (B)(2) of this rule shall not be granted to community public water systems designated by the director as vulnerable to beta particle and photon radioactivity contamination.

(4) Community public water systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for gross beta particle activity analysis. Systems may subtract the potassium-40 beta particle activity value from the total gross beta activity. The potassium-40 beta particle activity shall be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82 picocuries of potassium-40 per milligram of potassium.

(5) If the gross beta particle activity (minus the naturally occurring potassium-40 beta particle activity) exceeds the appropriate screening level, an analysis of the sample shall be performed to identify the major applicable radioactive constituents present in the sample and the appropriate doses shall be calculated and summed to determine compliance with the MCLs listed in rule 3745-81-15. Doses shall also be calculated and combined for measured levels of tritium and strontium to determine compliance.

(6) Community public water systems shall monitor monthly at the sampling point(s) which exceed the MCLs as determined in rule 3745-81-15 beginning the month after the exceedance occurs. Systems shall continue monthly monitoring until the system has established, by a running average of three monthly samples, that the MCL is being met. Systems who establish that the MCL is being met shall return to quarterly monitoring until they meet the requirements set forth in paragraph (B)(1)(b) or (B)(2)(b) of this rule.

(7) For community public water systems in the vicinity of a nuclear facility or other facility that is a radioactive source, the director may allow the systems to utilize environmental surveillance data collected by the nuclear facility (i.e., raw water data for locations within the vicinity of the systems) in lieu of monitoring at the system's sampling point(s), where the director determines that data is applicable to a particular water system. In the event that there is a release from a nuclear

facility, community public water systems which are using surveillance data shall begin monitoring at the system's sampling point(s) in accordance with paragraph (B)(1) or (B)(2) of this rule.

(C) General monitoring and compliance requirements for radionuclides.

(1) The director may require more frequent monitoring than specified in paragraphs (A) and (B) of this rule, or may require confirmation samples. The results of the initial and confirmation samples will be averaged for use in compliance determinations.

(2) To determine compliance with the MCLs listed in rule 3745-81-15 of the Administrative Code, 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.

(3) Compliance with the MCLs listed in rule 3745-81-15 of the Administrative Code will be determined based on the analytical result(s) obtained at each sampling point. If the average of any sampling point is greater than the MCL, then the community public water system is in violation of the MCL.

(a) For community public water systems monitoring more than once per year, compliance with the MCL is determined quarterly by a running annual average at each sampling point. If the average of any sampling point is greater than the MCL, then the system is in violation of the MCL.

(b) For community public water systems monitoring more than once per year, if any sample result will cause the running annual average to exceed to MCL at any sampling point, the system is out of compliance with the MCL immediately.

(c) Community public water systems shall include all samples taken and analyzed under the provisions of this rule in determining compliance, even if that number is greater than the minimum required.

(d) If a community public water system does not collect all required samples when compliance is based on a running annual average, compliance will be based on the running average of the total number of samples collected.

(e) If a sample result is less than the detection limit, zero will be used to calculate the running annual average, unless a gross alpha particle activity result is being used in lieu of radium-226 or uranium. If the gross alpha particle activity result is less than detection, fifty per cent of the detection limit will be used to calculate the running annual average for radium-226 and/or uranium.

(4) The director has the discretion to delete results of obvious sampling or analytical errors.

(5) If a MCL set forth in rule 3745-81-15 of the Administrative Code is exceeded, the owner or operator of a community water system shall give notice to the director pursuant to rule 3745-81-31 of the Administrative Code and to the public as required by rule 3745-81-32 of the Administrative Code.

(D) For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit.

(1) The detection limit shall be that concentration which can be counted with a precision of plus or minus one hundred per cent at the ninety-five percent confidence level (1.96 sigma where sigma is the standard deviation of the net counting rate of the sample).

(2) To determine compliance with rule 3745-81-15 of the Administrative Code, the detection limits shall not exceed the concentrations listed in the following table:

Radionuclide	Detection limit
Cesium-134	10 pCi/L
Iodine-131	1 pCi/L
Gross alpha	3 pCi/L
Gross beta	4 pCi/L
Radium-226	1 pCi/L
Radium-228	1 pCi/L
Strontium-89	10 pCi/L
Strontium-90	2 pCi/L
Tritium	1,000 pCi/L

Uranium	1 µg/L
Other beta/photon emitters	1/10 of the MCL (dose equivalent in pCi/L)

Effective: 04/15/2005

R.C. 119.032 review dates: 09/15/2009

Promulgated Under: 119.03
Statutory Authority: RC Section 6109.04
Rule Amplifies: RC Section 6109.04
Prior Effective Dates: 12/27/78, 05/22/89, 09/15/04