



Ohio Administrative Code

Rule 3745-525-920 Groundwater sampling and analysis requirements, 40 C.F.R. 257.93.

Effective: October 1, 2026

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- (A) The groundwater monitoring program shall include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and downgradient wells required by rule 3745-525-910 of the Administrative Code. The owner or operator of the CCR unit shall develop a sampling and analysis program that includes procedures and techniques for the following:
- (1) Sample collection.
 - (2) Sample preservation and shipment.
 - (3) Analytical procedures.
 - (4) Chain of custody control.
 - (5) Quality assurance and quality control.
- (B) The groundwater monitoring program shall include sampling and analytical methods that are appropriate for groundwater sampling and that accurately measure hazardous constituents and other monitoring parameters in groundwater samples. For purposes of rules 3745-525-900 to 3745-525-970 of the Administrative Code, the term constituent refers to both hazardous constituents and other monitoring parameters listed in either appendix A or appendix B to rule 3745-525-900 of the Administrative Code.
- (C) Groundwater elevations shall be measured in each well immediately prior to purging, each time groundwater is sampled. The owner or operator of the CCR unit shall determine the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same CCR management area shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction.
- (D) The owner or operator of the CCR unit shall establish background groundwater quality in a hydraulically upgradient or background well for each of the constituents required in the particular groundwater monitoring program that applies to the CCR unit as determined under paragraph (A) of rule 3745-525-930 or paragraph (A) of rule 3745-525-940 of the Administrative Code. Background groundwater quality may be established at wells that are not located hydraulically upgradient from the CCR unit if it meets the requirements of paragraph (A)(1) of rule 3745-525-910 of the Administrative Code.



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- (E) The number of samples collected when conducting detection monitoring and assessment monitoring (for both downgradient and background wells) shall be consistent with the statistical procedures chosen under paragraph (F) of this rule and the performance standards under paragraph (G) of this rule. The sampling procedures shall be those specified under paragraphs (B) to (D) of rule 3745-525-930 of the Administrative Code for detection monitoring, paragraphs (B) to (D) of rule 3745-525-940 of the Administrative Code for assessment monitoring, and paragraph (B) of rule 3745-525-950 of the Administrative Code for corrective action.
- (F) The owner or operator of the CCR unit shall select one of the statistical methods specified in paragraphs (F)(1) to (F)(5) of this rule to be used in evaluating groundwater monitoring data for each specified constituent. The statistical test chosen shall be conducted separately for each constituent in each monitoring well.
- (1) A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method shall include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.
 - (2) An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method shall include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.
 - (3) A tolerance or prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.
 - (4) A control chart approach that gives control limits for each constituent.
 - (5) Another statistical test method that meets the performance standards of paragraph (G) of this rule.
 - (6) The owner or operator of the CCR unit shall obtain a certification from a qualified professional engineer stating that the selected statistical method is appropriate for evaluating the groundwater monitoring data for the CCR management area. The certification shall include a narrative description of the statistical method selected to evaluate the groundwater monitoring data.



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(G) Any statistical method chosen under paragraph (F) of this rule shall comply with the following performance standards, as appropriate, based on the statistical test method used:

- (1) The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of constituents. Normal distributions of data values shall use parametric methods. Non-normal distributions shall use non-parametric methods. If the distribution of the constituents is shown by the owner or operator of the CCR unit to be inappropriate for a normal theory test, then the data shall be transformed or a distribution-free (non-parametric) theory test shall be used. If the distributions for the constituents differ, more than one statistical method may be needed.
- (2) If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a type I error level no less than 0.01 for each testing period. If a multiple comparison procedure is used, the type I experiment wise error rate for each testing period shall be no less than 0.05; however, the type I error of no less than 0.01 for individual well comparisons shall be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.
- (3) If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be such that this approach is at least as effective as any other approach in this rule for evaluating groundwater data. The parameter values shall be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern.
- (4) If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval shall contain, shall be such that this approach is at least as effective as any other approach in this rule for evaluating groundwater data. These parameters shall be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern.
- (5) The statistical method shall account for data below the limit of detection with one or more statistical procedures that shall at least as effective as any other approach in this rule for evaluating groundwater data. Any practical quantitation



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limit that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.

- (6) If necessary, the statistical method shall include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.
- (H) The owner or operator of the CCR unit shall determine whether or not there is a statistically significant increase over background values for each constituent required in the particular groundwater monitoring program that applies to the CCR unit, as determined under paragraph (A) of rule 3745-525-930 of the Administrative Code or paragraph (A) of rule 3745-525-940 of the Administrative Code.
- (1) In determining whether a statistically significant increase has occurred, the owner or operator shall compare the groundwater quality of each constituent at each monitoring well designated pursuant to paragraph (A)(2) or (D)(1) of rule 3745-525-910 of the Administrative Code to the background value of that constituent, according to the statistical procedures and performance standards specified under paragraphs (F) and (G) of this rule.
- (2) Within ninety days after completing sampling and analysis, the owner or operator shall determine whether there has been a statistically significant increase over background for any constituent at each monitoring well.
- (I) The owner or operator shall measure "total recoverable metals" concentrations in measuring groundwater quality. Measurement of total recoverable metals captures both the particulate fraction and dissolved fraction of metals in natural waters. Groundwater samples shall not be field-filtered prior to analysis.
- (J) The owner or operator of the CCR unit shall comply with the recordkeeping requirements specified in paragraph (H) of rule 3745-525-50 of the Administrative Code, the notification requirements specified in paragraph (H) of rule 3745-525-60 of the Administrative Code, and the internet requirements specified in paragraph (H) of rule 3745-525-70 of the Administrative Code.