

6.1.5.1 Monitoring Conditions / Other Considerations / Analytical Detection Levels-Definitions

Applicability:

Definitions are provided of the various types of analytical detection levels that permit writers may encounter when reviewing approved analytical procedures.

Content:

Instrument detection limit (IDL) – The lowest number the instrument can accurately measure in an ideal setting. This is not a reportable number.

Method detection limit (MDL) – The minimum concentration of a substance that can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero.

Many of the approved analytical methods listed in section 6.1.4 include a MDL. MDLs are generally not considered reportable levels and EPA does not recommend their use as compliance levels in permits.

Practical quantification limit (PQL) – A correction factor used to account for uncertainty in MDL measurement precision; the exact factor used varies among laboratories based on demonstrated analysis capabilities. According to Standard Methods, this number is a practical and routinely achievable detection level with good certainty that the reported value is reliable. However, EPA does not recommend the use of PQLs as compliance levels in permits because the multiplier is set at an arbitrary number and therefore it has no one definition.

Minimum Level (ML) – The level at which the entire analytical system gives recognizable mass spectra and acceptable calibration points. This level corresponds to the lowest point at which the calibration curve is determined based on analyses for the pollutant of concern in reagent water.

EPA recommends the use of the ML for the compliance level in permits where the permit limit is below detection. Many EPA analytical methods include a ML. When a promulgated ML is not available, EPA recommends the use of an interim ML that is calculated by using a factor of 3.18 times the MDL.

Legal References:

Code of State Regulations:

[10 CSR 20-7.015\(9\)\(A\)2 and \(A\)3](#) Effluent Regulations - General Conditions - Monitoring, Analysis and Reporting

Code of Federal Regulations:

[40 CFR part 136, appendix B](#) Part 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants - Appendix B—Definition and Procedure for the Determination of the Method Detection Limit—Revision 1.11

Other Links:

“Technical Support Document for Water-Quality Based Toxics Control” (EPA/505/2-90-001), section 5.7.3;

[“Determining Compliance With Water Quality Based Effluent Limits Below Quantitation in the Absence of Promulgated Minimum Levels\(MLs\)”](#), Federal Register: May 25, 1995 (Volume 60, Number 101)

Standard Methods for the Examination of Waters and Wastewater, 19th edition, Section 1030 C., published by the Water Environment Federation, 601 Wythe Street, Alexandria, VA 22314.

Key Words:

Instrument detection limit, Method detection limit, Practical quantification limit, Minimum Level, Detection level, MDL, ML

Page ID: 6.1.5.1 Analytical Detection Levels-Definitions

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Modification Date: 11/29/2004 JFP 2/2/05