

The Method Update Rule 2017: Revisions to the Method Detection Limit (MDL) Procedure

The EPA published updates to the methods and related procedures that are required by the regulations under the Clean Water Act. The update became final on September 27, 2017.

Understanding the Revised MDL Procedure

What is the MDL? The method detection limit (MDL) is basically the lowest detected result from an analytical method that is reliably distinguishable from method blank results and can be reported with 99% confidence that the analyte concentration is greater than zero.

- Simply stated, it is the value that represents the smallest measured amount where we are confident that the analyte is truly present in the sample and not an artifact of instrument noise or background.
- Determinations for MDL are from the analysis of a spiked blank in a given matrix containing the analyte.

Why was the MDL procedure revised?

- The previous procedure did not account for **method blank** performance. Historically, blank results were assumed to be distributed and centered around zero.
- Changes in technology and greater sensitivity in instrumentation has resulted in a higher likelihood of false detection at the “zero” value. Where this is not monitored it can go unnoticed, and skew results at the low end of the reportable range.
- Certain types of instrumentation and associated procedures are more susceptible to background noise related to reagents, instrumentation, and other environmental interferences.

What is different about the new MDL?

- The new procedure requires that all method blanks are evaluated over a specified period of time for detectable values, which allows for evaluation of normal fluctuations in the technique and in the instrumentation. The values are then used to determine the average detectable amounts in day to day batch analysis.
- The collected method blank values are used to calculate an MDL for blanks, represented as MDL_b.
- The MDL for spiked blanks is represented as MDL_s. The previous procedure allowed MDL spiked blank samples to be processed in one day. The new procedure requires that the spiked blanks are both processed and analyzed in a minimum of three batches over multiple days and across all instruments used for the method being evaluated. This allows for consideration of normal operations, where the previous procedure may have been biased to instrument/process performance on a single day.
- The new procedure requires that the MDL_b and the MDL_s are compared, and the higher of the two is used for the final MDL. The values are still calculated similarly to the previous procedure, but the calculation requirements will vary based on the number of replicates.
- Two independently prepared MDL blank spiked samples are analyzed quarterly on each instrument and the results are used to verify the existing MDL on an annual basis. Recalculation is only required if the annual verification fails the specified criteria.
- Labs have the option to pool data from multiple instruments to calculate one representative MDL.

How does the new MDL procedure affect data?

- The new procedure will provide a higher level of confidence that bias, due to typical instrument and method performance, has been considered and accounted for in the final data.
- For certain types of instruments that produce background noise or have susceptibility to environmental interferences, the MDL and corresponding Reporting Limit (RL) may be higher than previous data. It is possible that any method and technology combination could exhibit higher than previous MDL and RL results, but the following analyses are at a higher risk for impact: Metals by ICP & ICPMS, Anions by IC, Organics by GC, Inorganic analytes (UV VIS, FIA, Discrete Analyzers).

Resources: Go to the [EPA MDL Procedure](#) and the [EPA MDL FAQ](#). Review the [EPA Method Update Rule](#).

Questions? Contact Corporate Quality at quality@pacelabs.com.