

NPDES/SDS total residual chlorine MDL/RL guidance

Background

National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) permits require establishment of a method detection limit (MDL) and reporting limit (RL) for total residual chlorine (TRC). In August 2017, the U.S. Environmental Protection Agency updated the procedure to determine MDL's. This update applies to determining an MDL utilizing colorimetric and spectrophotometric equipment to measure for TRC. The new procedure requires initial assessment of a laboratory control standard (LCS) and method blanks over a period of days. It also requires ongoing verification of routine method blanks and two laboratory control standards per quarter. Adhering to the following procedures will satisfy the MDL/RL requirements of permits from a compliance standpoint until the Minnesota Pollution Control Agency (MPCA) publishes formal guidance.

Compliance

Permittees must ensure that they analyze and document at least eight method blanks and laboratory control samples at or below the permit required RL throughout each year. For seasonal (e.g. April-October) or monthly monitoring, it is recommended that permittees analyze and document, a method blank and laboratory control standard at or below the permit required reporting limit (this may be different from your effluent limit), once per month during the permit required monitoring period for a total of eight or more laboratory control standards and method blanks during the year. Calculating a MDL is not required at this point in time but documentation of method blanks and laboratory control samples must be retained for at least five years.

Procedure	Description	Acceptance
Method blank	Analyte free water i.e. distilled water, analyzed just like a sample	Less than ½ the laboratory control sample concentration
Laboratory control sample at or below permit required RL	Known concentration of TRC diluted in analyte free water i.e. distilled water, analyzed just like a sample	40% recovery of true value (obtained value/true value*100 = %Recovery)

Data reporting

The laboratory control sample concentration will serve as the reporting limit. If a laboratory control sample with a true concentration of 0.04 milligrams per Liter (mg/L) is analyzed and meets the 40% acceptance criteria then sample values measured below 0.04 mg/L would be reported as <0.04mg/L. For example, if a laboratory control sample of 0.04 mg/L is analyzed and recovered between the range of 0.02 and 0.06 mg/L (+/- 40%), report sample values measured below 0.04 as <0.04 mg/L. See *Troubleshooting* for guidance if unacceptable values are obtained.

Common equipment

The most common equipment used to monitor for TRC in the field includes portable colorimeters and bench top spectrophotometers, similar to those pictured below, utilizing Standard Methods 4500Cl-G.



Resources

Below is a list of a few vendors that supply standards to prepare the laboratory control sample. Please note that there may be preference over one standard depending on the individual application. If you need assistance in preparing a known concentration contact your equipment vendor, lab chemical supply company, or assigned MPCA compliance and enforcement staff.

- **NSI Lab Solutions** 800-234-7837 (Snips 1.0 mg/L and 2.5 mg/L)
- **North Central Laboratory (NCL)** 800-648-7836 (Potassium Permanganate equivalent to 1000 mg/L TRC in DPD)
- **Hach** 800-227-4224 (Ampule 25-30 mg/L) each lot has a different concentration, which may be difficult in preparing the same known concentration from lot to lot

Troubleshooting

If the laboratory control standard percent recovery is outside of 40% or the blank value is greater than half the laboratory control sample, take action to identify why. Assess analytical steps including laboratory control standard preparation, contamination, and equipment problems. If failure continues and a result must be reported, include a note with submission of data in eDMR report with a description of issue encountered, while continuing to troubleshoot and correct. See *resources* if assistance is needed.

Disclaimer

Reference of company or products names does not constitute endorsement by the MPCA or its staff.

References

U.S. Environmental Protection Agency. *Definition and Procedure for the Determination of the Method Detection Limit-Revision 2*; Appendix B to Title 40 Code of Federal Regulations (CFR) Part 136.