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## NATIONAL WATER QUALITY LABORATORY TECHNICAL MEMORANDUM 2001.03

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To: Distribution E

From: Gregory B. Mohrman, Chief  
National Water Quality Laboratory

Subject: Change in the Long-Term Method Detection Level and the Laboratory Report Level for Total Recoverable Phenol Analyses, Because of Excessive Variability

Effective Date  
of Change: October 6, 2000

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### Purpose

The National Water Quality Laboratory (NWQL) analyzes water samples for Total Recoverable Phenols, parameter code 32730, lab code 2322. Quality-assurance programs at the NWQL indicate that the blanks for this method are subject to extensive variability, which occasionally produce apparent positive bias. The purpose of this memo is to describe the variability, discuss NWQL actions to compensate for the blank variability, and to report the possible effects on the data base.

### Background

NWQL Technical Memorandum 99.03 (Brenton, 1998) announced that beginning October 15, 1998, the NWQL would analyze water samples for Total Recoverable Phenols by using method 5530 (American Public Health Association, 1998). Memorandum 99.03 stated that the method was only applicable to samples that contained more than 4 ug/L (micrograms per liter) of phenol because of excessive bias and variability at concentrations less than 4 ug/L. The Minimum Reporting Level (MRL) was set at 4 ug/L.

The Organic Blind Sample Project, operated by the Branch of Quality Systems, produced results suggesting that the bias of the analytical results, for samples spiked near 4 ug/L, was unacceptable. During the same period, the Long-Term Method Detection Level (LT-MDL) Project, administered by the NWQL Quality Assurance Section (QAS), determined that the LT-MDL for this method is 8 ug/L and the Laboratory Reporting Level (LRL) is 16 ug/L (Childress, 1999). The NWQL QAS Blind Blank Project data indicate that reported phenol concentrations, greater than the original MRL, were possible for blank-water samples. All of the information from these quality-assurance programs suggested that the bias of the method is unacceptable for samples that contain phenol concentrations at or near 4 ug/L.

## Scope

Since October 6, 2000, data from the determination of Total Recoverable Phenol have been qualified (based on the LT-MDL process), as follows:

1. For determinations reporting that the Total Recoverable Phenol concentration is less than the 8-ug/L LT-MDL, the results have been reported as less than the LRL of 16 ug/L;
2. For concentrations measured between 8 and 16 ug/L, the result has been reported and qualified with an "E" to indicate estimation caused by variability.

Effects on the data base: Between October 15, 1998, and October 6, 2000, all Total Recoverable Phenol data greater than 4 ug/L have been reported without qualifiers. During that period, the NWQL analyzed 650 samples for Total Recoverable Phenol. Sixty-six percent of these samples had concentrations less than 4 ug/L, 87 percent had concentrations less than 8 ug/L, and 97 percent had concentrations less than 16 ug/L. Total Recoverable Phenol concentrations less than 8 ug/L should be considered questionable because of the strong possibility of a false positive determination. Concentrations between 8 and 16 ug/L should be considered as estimated concentrations because of the variability at low concentrations. No effort will be made to qualify concentration data already in the National Water Information System data base. The NWQL advises each district to review the Total Recoverable Phenol data that were analyzed during the period from Oct. 15, 1998, to Oct. 6, 2000, and decide whether to qualify the reported concentrations. The laboratory identification numbers for these samples range between 19982800001 and 20002800001.

## References

American Public Health Association, 1998, Standard methods for the examination of water and wastewater (20<sup>th</sup> ed.): Washington D.C., American Public Health Association, Inc., p. 5-40.

Brenton, R.W., 1998, Analysis of total phenols: National Water Quality [Technical Memorandum 99.03](http://www.nwql.cr.usgs.gov/Public/nwql_memo.html), [http://www.nwql.cr.usgs.gov/Public/nwql\\_memo.html](http://www.nwql.cr.usgs.gov/Public/nwql_memo.html).

Childress, C.J.O., Foreman, W.T., Connor, B.F., and Maloney, T.J., 1999: New reporting procedures based on long-term method detection levels and some considerations for interpretations of water-quality data provided by the U.S. Geological Survey National Water Quality Laboratory: U.S. Geological Survey Open-File Report 99-193.

**Supersedes:** National Water Quality Laboratory Technical Memorandum 99.03

**Key Words:** Phenols, Analysis, Blank