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NATIONAL WATER QUALITY LABORATORY TECHNICAL MEMORANDUM 1998.01

November 10, 1997

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From: Robert S. Williams, Jr., Chief
National Water Quality Laboratory
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Subject: Change in Ammonia plus Organic Nitrogen Minimum Reporting Level

Effective
date of
changes: November 10, 1997

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Revision: None

Supplemental: None

SCOPE

This technical memorandum pertains to changes in the minimum reporting level (MRL) for ammonia plus organic nitrogen in chilled and chilled-acidified filtered and whole-water samples, effective November 10, 1997. Specifically it announces that MRLs for these tests will be lowered from 0.2 milligrams of nitrogen per liter (mg-N/L) to 0.1 mg-N/L (Table 1). The changes are the result of a systematic evaluation of reporting levels for National Water Quality Laboratory (NWQL) methods. Reporting level changes are based on an assessment of analytical data for low-concentration samples.

Table 1. Reporting level changes for ammonia plus organic nitrogen methods

[WATSTORE, Water Data Storage & Retrieval System; N, nitrogen; ASF, automated segmented-flow spectrophotometry; FIL, 0.45 um filtered; and WWR, whole water recoverable]

Constituent	Parameter (WATSTORE) code*	NWQL lab code	Minimum Reporting Level (milligrams-N/liter)	
			Current	Effective Nov. 10, 1997
Ammonia + organic nitrogen as N, micro-Kjeldahl digestion, colorimetry, ASF, FIL	00623D	1985	0.2	0.1
Ammonia + organic nitrogen as N, micro-Kjeldahl digestion, colorimetry, ASF, WWR	00625D	1986	0.2	0.1
Ammonia + organic nitrogen as N, micro-Kjeldahl digestion, colorimetry, ASF, FIL, acidified	00623E	1994	0.2	0.1
Ammonia + organic nitrogen as N, micro-Kjeldahl digestion, colorimetry, ASF, WWR, acidified	00625E	1995	0.2	0.1

*Letter following 5 digits represents method code.

BACKGROUND

From 1986 until October 1, 1991, the NWQL determined ammonia plus organic nitrogen (Kjeldahl nitrogen) using a semi-automated, block digester method (Fishman and Friedman, 1989) similar to U.S. Environmental Protection Agency (USEPA) method 351.2 (U.S. Environmental Protection Agency, 1993). In 1991, projected increases in demand for Kjeldahl nitrogen determinations brought on by the National Water Quality Assessment Program (NAWQA) Program spurred efforts at the NWQL to improve data quality and production capacity for this test. To this end, changes in both the digestion procedure and colorimetric method used to determine ammonia in sample digests were developed, validated, and implemented. Modifications to the block digestion procedure involved halving sample and digestion reagent volumes as described by Jirka and others (1976) and using a pair of block digesters as described by Bowman and Delfino (1982)--one set at the desolvation temperature, the other set at the digestion temperature--rather than a single block digester that

ramped between the two temperatures during the 4-hour course of the digestion. The Jirka/Bowman modifications to the block digestion procedure, along with an improved cleaning procedure for digestion tubes, resulted in significant decreases in the time required to digest samples and in reagent blank concentrations. Complete details of the modified digestion procedure have been reported previously (Patton and Truitt, 1992). An automated colorimetric method to determine ammonia in sample digests also was developed and validated. In this automated procedure, a microporous polypropylene membrane allows ammonia to pass into the analytical stream but excludes particulate and ionic components in sample-digest matrices that would otherwise interfere in the analysis. The salutary effects of these modifications, which have been in place at the NWQL since October 1, 1991, are apparent in yearly average NWQL blind blank (reagent water) Kjeldahl nitrogen concentrations (Table 2).

Table 2. Yearly concentration averages and standard deviations for NWQL Kjeldahl nitrogen blind blank samples. Note method change in the 1992 water year.

[mg-N/L, milligrams of nitrogen per liter; n, number of points]

Year	Kjeldahl nitrogen concentration (mg-N/L)			
	Dissolved	n	Whole-water	n
1990	0.11 +/- 0.17	59	0.13 +/- 0.27	60
1991	0.10 +/- 0.11	49	0.11 +/- 0.13	46
1992	-0.04 +/- 0.05	47	-0.04 +/- 0.06	51
1993	0.01 +/- 0.06	53	0.00 +/- 0.06	51
1994	0.00 +/- 0.04	52	0.00 +/- 0.05	52
1995	-0.01 +/- 0.06	135	0.02 +/- 0.07	139
1996	0.00 +/- 0.06	67	0.01 +/- 0.06	68

EFFECT ON DATA BASE

The minimum reporting level change will cause a shift in the nondetection (less than) concentration in the data base. Historical reporting levels are not being changed in the data base.

REFERENCES

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U.S. Environmental Protection Agency, 1993, Methods for the determination of inorganic substances in environmental samples: Cincinnati, Ohio, Environmental Monitoring and Support Laboratory, EPA/600/R-93/100, August 1993, 79 p.

Supersedes: None

Key Words: Ammonia + organic nitrogen, Kjeldahl nitrogen, minimum-reporting level, MRL

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