In Reply Refer To:
Mail Stop 412

September 13, 2011

To: GS-W-ALL

From: Terry L. Schertz
Assistant Chief, Office of Water Quality

Subject: Approval of new USGS Methods I-2547-11 and I-2548-11 for Standard- and Low-level Colorimetric Determination of Nitrate Plus Nitrite in Water by Enzymatic Reduction, Automated Discrete Analyzer Methods

The Office of Water Quality (OWQ) has approved new standard- and low-level analytical methods, I-2547-11 and I-2548-11, respectively—NWQL lab codes 3156 (3222 for filtered acidified samples) and 3157, respectively—developed by chemists at the National Water Quality Laboratory for the determination of nitrate plus nitrite in filtered water.

The U.S. Geological Survey (USGS) developed these methods to replace its cadmium-reduction, automated continuous-flow analyzer methods I-2545-90 (lab code 1975—1990 for filtered acidified samples) and I-2546-91 (lab code 1979). Despite their long predominance as reducing agents of choice for colorimetric nitrate determinations in water, flow-through cadmium reactors are difficult to prepare and activate, pose health risks to analysts and waste stream processors, increase waste-stream disposal costs, and are incompatible with discrete analyzers. In the new discrete analyzer methods, nitrate is reduced enzymatically to nitrite with nontoxic, soluble nitrate reductase instead of toxic, granular, copperized cadmium used in the methods that they replace. Colorimetric reagents used to determine the resulting nitrite in the new methods are identical to those used in cadmium-reduction methods.

Estimated method detection levels range from 0.02 mg N/L for the standard-level method and 0.002 mg N/L for the low-level method, which are comparable to the 2010 long-term detection levels of the continuous flow analyzer cadmium-reduction methods they replace. Interim reporting levels will be set slightly higher at 0.04 mg N/L for the standard level method and 0.01 mg N/L for the low-level method.

This method approval process follows the technical procedures specified in OWQ Technical Memorandum 04.01 and the method is described in a USGS Techniques and Methods Report:

> Patton, C. J., and Kryskalla, J. R., 2011, Colorimetric determination of nitrate plus nitrite in water by enzymatic reduction, automated discrete analyzer methods: U.S. Geological Survey Techniques and Methods, book 5, chap. B8.

The report will be made available through the USGS Publications Warehouse.

If you have any questions about the new analytical method, or would like a copy of the report, when it is available, please contact Charles Patton (cjpatton@usgs.gov, 303-236-3956) or Jeff McCoy (jefmccoy@usgs.gov, 303-236-3940).

If you have questions about the method approval process, please contact Terry Schertz (tschertz@usgs.gov, 703-648-6864).