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NATIONAL WATER QUALITY LABORATORY TECHNICAL MEMORANDUM 1993.01

October 5, 1992

To: Assistant Chief Hydrologist, PC&TS
Regional Hydrologists
Chief, Office of Water Quality
Assistant Chief, Office of Water Quality
Deputy ACH for PC&TS for NAWQA
Area Assistant Regional Hydrologists
District Chiefs
Regional Water-Quality Specialists
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Chiefs, NAWQA Study-Units
Chief, Ocala Project Office
Chief, Yucca Mtn. QA Group
Employees, National Water Quality Laboratory

From: Chief, National Water Quality Laboratory

Subject: Identification of Low Levels of Sodium Contamination in Nitric Acid Samples

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Revision: No

For several years the nitric acid ampules have been tested using the regular level ICP or AA methods and previously approved nitric acid ampules as control materials. The quality acceptance of nitric acid ampules was based on consistency of preparation. The contract with the current ampule supplier requires sodium contamination to be no more than 0.5 mg/L. The ampules have routinely and easily met the contract specification, and the detection limits of the AA and ICP methods of 0.1 and 0.2 mg/L, respectively. For review, the NWQL determines sodium in water samples supplied in white polyethylene bottles by the following methods:

Watstore Code (Lab code)	Method	Detection Level
930A (LC 834)	Atomic Absorption (AA)	0.01 mg/L
930B (LC 59)	AA	0.1 mg/L
930C (LC 675)	Inductively-coupled Plasma (ICP)	0.2 mg/L
930D (LC 1276)	ICP	0.2 mg/L

After recent re-examination of procedures for testing ampules for contamination, we found that the ampules needed to be checked for sodium by the low level AA method, which has a detection limit of 0.01 mg/L. Upon checking at this level, we have determined a possible sodium contamination arising from the nitric acid ampules at the 0.03 to 0.05 mg/L level.

Upon reviewing sodium analysis requests for the 1991 fiscal year, we found that greater than 95% of the sodium determinations were by methods 930B, 930C, and 930D. The remainder of the determinations were by method 930A. All the customers of the 930A sodium method have been informed of the sodium contamination and have discussed alternative sample preservation techniques with the Lab.

By consensus, the following statements and recommendations were made based upon the customers' project needs and requirements:

1. Customers who routinely specify sodium determinations by 930B, 930C, and 930D methods are not affected by the low levels of sodium contamination found in the NWQL supplied nitric acid ampules because of the higher detection levels of those methods.
2. The customers whose project data quality requirements entail determinations of sodium by method 930A (with a 0.01 mg/L detection level) should obtain and quality assure their own nitric acid.
3. The nitric acid selected must be the highest purity available and packaged in a teflon bottle. The teflon bottle is the key identifier of high purity nitric acid sources. A certificate of analysis should also be supplied with the nitric acid. Although this is not an endorsement of a brand, the following is an example which can be obtained through VWR Scientific. Baker Chemical Co. produces high purity nitric acid in 500-ml teflon containers under the Ultrex II brand name. A certificate of analysis is provided with every bottle purchased. The price is approximately \$150 per bottle. Although this may be perceived expensive, this product has been assured by the manufacturer and properly packaged in a teflon container to minimize sodium contamination. DO NOT purchase nitric acid that is packaged in glass containers or plastic coated glass bottles. Nitric acid supplied in glass bottles will not meet the requirements for sodium determination by method 930A.
4. The NWQL cannot guarantee the purity of nitric acid purchased by the user. After opening the nitric acid, the user must assure that the nitric acid continues to meet the purity requirements with regular quality assurance checks. This can be achieved by submitting samples to the NWQL for analysis. If there are questions about techniques for quality assuring the nitric acid, please contact Jerry Hoffman (303 467-8082).
5. NWQL sodium methods are capable of routinely determining sodium at the above specified detection levels using the above recommendations for preserving samples.

The NWQL is preparing a new contract which will contain appropriate specifications for maximum allowable contamination. Generally, the specification will require the supplier to assure that the levels of contamination will not exceed 10% of the current laboratory method detection limits for our current production methods. This will provide a safety margin.

Any customers who anticipate future projects that may require the low level sodium method (0.01 mg/L detection level) should notify the laboratory before the project begins. The effective date of this technical memorandum will be October 1, 1992.

If there are any questions or concerns, please call Nancy Driver (303 467-8041) or Jeff Pritt (303 467-8045).

/signed/

Peter F. Rogerson

Key Words: Sodium, contamination, nitric acid, ampules, low level.

Distribution: See above plus QWTALK