United States Department of the Interior

U.S. GEOLOGICAL SURVEY
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Denver, Colorado 80225

IN REPLY REFER TO:

NATIONAL WATER QUALITY LABORATORY TECHNICAL MEMORANDUM 1994.04

December 30, 1993

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 Hydrologists
District Chiefs
Regional Water-Quality Specialists
Assistant Regional Hydrologists for NAWQA
District Water-Quality Specialists
Chiefs, NAWQA Study-Units
Chief, Ocala Project Office
Chief, Yucca Mtn. QE Group
Chief, Branch of Quality Assurance
Employees, National Water Quality Laboratory

From: Peter F. Rogerson, Chief
National Water Quality Laboratory
Branch of Analytical Services

Subject: Graphite Furnace Atomic Absorption Spectrophotometry to replace Direct-Current Plasma Atomic Emission Spectrometry for the determination of chromium in water

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Revision: None

SCOPE: Effective January 1, 1994, the National Water Quality Laboratory (NWQL) will be replacing the Direct-Current Plasma Atomic Emmission Spectrometry (DCP-AES) method for the determination of chromium in water with a Graphite Furnace Atomic Absorption Spectrophotometry (GF-AAS) method. All chromium data released by the NWQL after January 1, 1994, will be analyzed by the GF-AAS method documented in U.S. Geological Survey Open-file Report 93-449, "Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of Chromium in Water by Graphite Furnace Atomic Absorption Spectrophotometry." The reporting limit for chromium by graphite furnace will be 1 µg/l. The lab code for dissolved, chromium determinations will be changed from 727 Chromium, Dis DCP,to 1936 Chromium, Dis

GFAA. The lab code for whole- water recoverable chromium determinations will be changed from 726 Chromium, Total DCP to 1937 Chromium, Total GFAA. The NWQL will update all schedules with the new lab codes.

As part of the review process for the new GF-AAS chromium method, the four Regional Water-Quality Specialists requested that the NWQL perform a larger additional sample comparison study. The NWQL analyzed an additional 350 chromium samples on both methods and obtained the following results based upon pair-wise t-tests of the data: For 223 dissolved Cr samples, the mean difference was 0.5 µg/L: (GF-AAS > DCP-AES) with a 95 percent confidence interval around the mean of +/- 0.3 µg/L. For 127 whole-water recoverable Cr samples, the mean difference was 0.7 µg/L (GF-AAS > DCP-AES) with a 95 percent confidence interval around the mean of +/0.2 µg/L. This indicates that we measured differences between the two methods that were less than the detection limit of 1 µg/L--but greater than zero--for both dissolved and whole-water methods. This data package is available at your request from the NWQL.

Supersedes: None

Keywords: Chromium, determination, atomic absorption, trace metal

Distribution: See above plus QWTALK & LABNEWS