April 5, 1999

To: 'E'

From: Janice R. Ward, Acting Chief,
Office of Water Quality

Subject: Approval of a Water Quality Analytical Method for the determination of Elements in Whole Water Digests using Inductively Coupled Plasma-Optical Emission Spectrometry and Inductively Coupled Plasma-Mass Spectrometry

The Office of Water Quality has approved a new water-quality analytical method by the National Water Quality laboratory (NWQL) for the determination of elements in whole-water digests using inductively coupled plasma/optical emission spectrometry (ICP/OES) and inductively coupled plasma/mass spectrometry (ICP/MS). This water-quality analytical methods approval follows the technical procedure specified in OWQ Tech Memo 98.05. The Open File Report (OFR) is entitled:

> "Methods of Analysis by the U.S. Geological Survey National Water Quality laboratory—Determination of Elements in whole-water digests using inductively coupled plasma/optical emission spectrometry and inductively coupled plasma/mass spectrometry" by John R. Garbarino and Tedmund S. Struzeski. U.S. Geological Survey Open File Report (OFR) 98-165.

The NWQL is replacing obsolete, single-element flame atomic absorption and direct current plasma-atomic emission spectrometry methods with this new, whole-water multi-element plasma method. More details on the implementation of this change will be available in a Technical Memorandum from the NWQL shortly.

The OFR contains data on spike recoveries from both whole water digests and digested standard reference water samples. Average spike recoveries for whole water digests were 100 percent + or - 10 percent and results from standard reference water samples were generally within 1 standard deviation of the most probable values. Statistical analysis of the results from whole water digests indicated there was no statistical difference among ICP/OES, ICP/MS, and former official methods of analysis for 24 of the 26 elements evaluated. For most elements, ICP/MS is the method of choice whenever concentrations are less than 100 ug/L, and ICP/OES performs better at concentrations greater than 1000 ug/L.

Data users are cautioned to note that long-term time trends may appear to be affected when a new method, with lower detection limits, is substituted for an older method with higher detection limits. In most instances, lower detection limits will result in more detections of analytes, along with more accurate and precise determinations of analyte concentrations near the previous, higher, detection limit. For help with data interpretation issues, please contact the OFR authors at the NWQL.