A Department of Ecology Report

Technical Guidance for Laboratories Accredited for EPA Method 200.7

Purpose of This Document

This document provides technical clarification to laboratories performing trace metals analysis by EPA Method 200.7. Some of the critical detail in this method is difficult to interpret.

This document provides guidance to help laboratories implement the necessary steps in the correct order, to ensure the method is followed as intended.

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1. Select suitable wavelengths for analytes of interest. Make sure at least one suitable wavelength has been selected for each analyte of interest. Analyzing two wavelengths is recommended, where possible. The two wavelengths should show similar results. If there is great disparity between wavelengths for the same analyte, this indicates interferences may be affecting the results. Investigate prior to reporting data. It is OK to report from an alternate wavelength as long as supporting Quality Assurance (QA) information is available such as Linear Dynamic Range (LDR), method detection limit, and quality control.

2. Optimize instrument and set background points (Method 200.7 section 4.1.1 and Method 200.5 section 4.1). Background points should be set prior to determining LDR and Interelement Corrections (IECs). Avoid locating background points within regions that are impacted by spectral interferences.

3. Identify interferents, and ensure that they are accounted for in the IEC correction routine.

4. Perform LDR study. LDR must be within 10% of the true value. LDRs are part of the Initial Demonstration of Performance (IDP), which is mandatory (Method 200.7 and Method 200.5 section 9.2.2).

5. Establish Spectral Interference Correction (SIC) Routine (Method 200.7 section 10.4 and Method 200.5 section 4.1 note). Run single-element solutions which must be within the LDR. Typically 50 to 100 ppm (Method 200.7 section 4.1.4). Single element solutions should be analyzed for all analytes of interest and all interferents at the selected wavelengths.

6. Analysis of the single element solutions will generate apparent false positive or false negative peaks. These will be used to calculate K factors which will be stored in the instrument software. Divide the apparent concentration by the measured concentration of the interferent to calculate the k value. Some software is programmed to perform these calculations and store the data.

7. Once established, the IEC routine must be verified. A daily SIC solution should be analyzed including all major cations present in the samples. Typically Al, Mg, Ca, and Fe for most ambient, drinking waters and ground waters. In some samples such as influents and waste samples, other interferents may need to be included in the SIC solution. Daily SIC solutions should include high concentrations such as 50 to 100 ppm.

8. Acceptance criteria for daily SIC may be set at +/- LLOQ/PQL.

9. The complete IEC correction routine should be verified annually.

10. Perform Quality Control Sample (QCS) study (Method 200.7 section 9.2.3 and Method 200.5 section 9.2.4). Second source standard +/- 5% of true value.

11. Perform MDL studies annually (Method 200.7 section 9.2.4 and Method 200.5 section 9.2.5). MDL studies should be wavelength specific and be taken through the entire preparation and analysis.

12. Ensure calibration standards are prepared as described in Table 3 of Method 200.7. When all elements are added to one standard, spectral interference error may occur in the calibration curve, since the correction routine is not applied until after calibration.

The use of internal standards is recommended for axial view, especially for water samples that are not particularly clean, or soils.