METHOD STATEMENT

Determinand:
Dissolved and Total Mercury

Matrix:
Sample Type: Final effluent, Trade Discharge and Crude Sewage and associated waste waters.

Principle of Method:
The basis of the method is the measurement of ions produced by an Inductively Coupled Plasma and detected using a mass spectrometer. A dynamic reaction cell using oxygen as a reaction gas is used to reduce interference by interrupting the sequence of reactions that would otherwise create interference.
Acidified samples are nebulised and the aerosol that is produced is transported to the plasma torch where excitation of the metal atoms occur. Excitation is due to the high temperatures (up to 6,000K) produced by the radio frequency inductively coupled plasma. The metal ions thus produced pass through an interface region into the mass spectrometer. There the ions are separated by a quadropole and fall on to the mass detector. The dual mode detector then detects these ions and the resulting electrical signals are processed into digital information that is used to indicate ion intensity and subsequently elemental concentration.

Interferences:
Due to the large mass of the mercury isotopes, there are few interferences that could cause interferences. The oxygen DRC gas is used to remove potential Tungsten interferences; however these are not likely to be present in many waste water samples.

Performance of Method:
Range of Application:

LOD – 2.5 ug/l
Normal reporting limit 0.05µg/l

Limit of Detection:

0.0384µg/l

Performance Summary

	Standards		Final Effluent		Final Effluent Filtered		Trade Discharge		Crude Sewage	
	Low Std	High Std	Low Spike	High Spike	Low Spike	High Spike	Low Spike	High Spike	Low Spike	High Spike
%Recovery	102.07	100.52	100.11	99.08	99.51	99.70	99.16	97.30	99.06	98.45
%RSD	2.22	1.32	3.47	1.62	3.51	2.08	3.13	2.15	4.85	2.32

References:
In house method based on SCA bluebook 163 Inductively Coupled Plasma Spectrometry 1996 and DWI Guidance note Sample Preservation and Preparation for Metals Analysis of Drinking Water.
Perkin Elmer Elan DRC-e series Hardware Guide manual