



## HPLC Application Note 2.78

### Ultra Low Detection Limits for Inorganic Anions and Cations in Power Station Boiler Water Analysis

#### Most Basic Recommended Cecil Instrument:-

- IonQuest Ion Chromatography System 2, including CE 4020 two channel on-line degasser, CE 4601C column heater and PowerStream software.
- CE 4715 continuous anion regenerant suppressor and 4720 01 01 column overpressure valve.

#### Introduction:-

Boilers used in power stations hold ultra pure water, the purity of that water needs to be determined by highly sensitive techniques. Ion Chromatography is a technique which offers high sensitivity. In this case study, Cecil Instruments demonstrate the use of their IonQuest Ion Chromatography systems in the detection of ultra low ppb levels of common inorganic ions

#### Typical Method:-

Chloride, Bromide, Sulphate and Nitrate ions were detected under the following analytical conditions:-

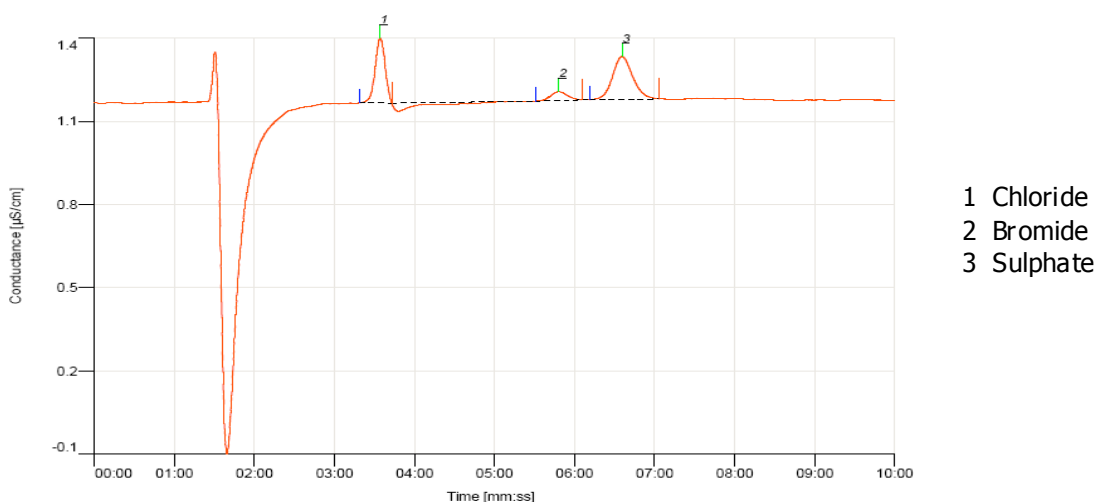
Analytical Column:-	Allsep Anion column, 7 $\mu$ m, 150 x 4.6 mm
Mobile Phase:-	Sodium carbonate/sodium bicarbonate buffer pH 10.5
Mobile Phase flow rate:-	1.3 mL/min
Column Temperature:-	35 °C
Detector Temperature:-	35 °C
Injection volume	100 $\mu$ L of untreated sample
Offset	18 $\mu$ S/cm
Range	20 $\mu$ S/cm
Run time	10 minutes



Sodium, Ammonium, Potassium, Calcium and Magnesium ions were detected under the following analytical conditions:-

Analytical Column:-	Universal cation column, 7 $\mu\text{m}$ , 100 x 4.6 mm
Mobile Phase:-	5 mM methane sulphonic acid, pH 4.0
Mobile Phase flow rate:-	1.0 mL/min
Column Temperature:-	35 $^{\circ}\text{C}$
Detector Temperature:-	35 $^{\circ}\text{C}$
Injection volume	100 $\mu\text{L}$ of untreated sample
Offset	2,100 $\mu\text{S/cm}$
Range	10 $\mu\text{S/cm}$
Run time	7.5 minutes

### Typical Chromatograms:-



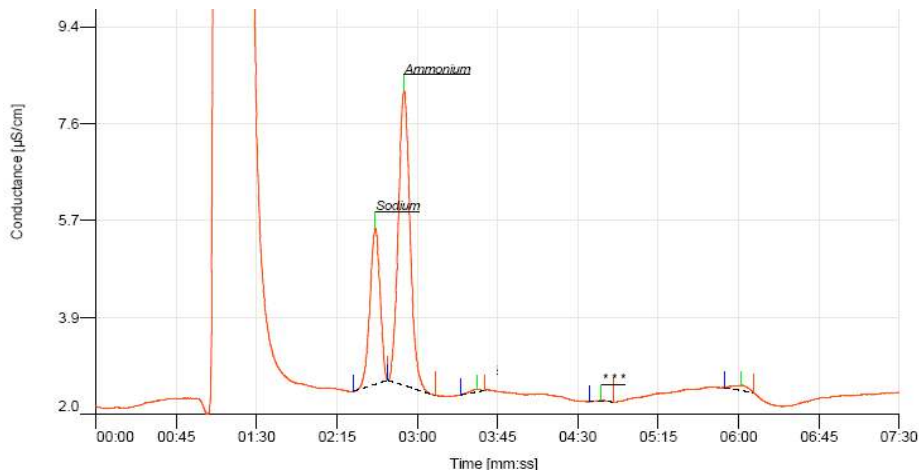
Chromatogram 1 Inorganic anions in boiler feed water

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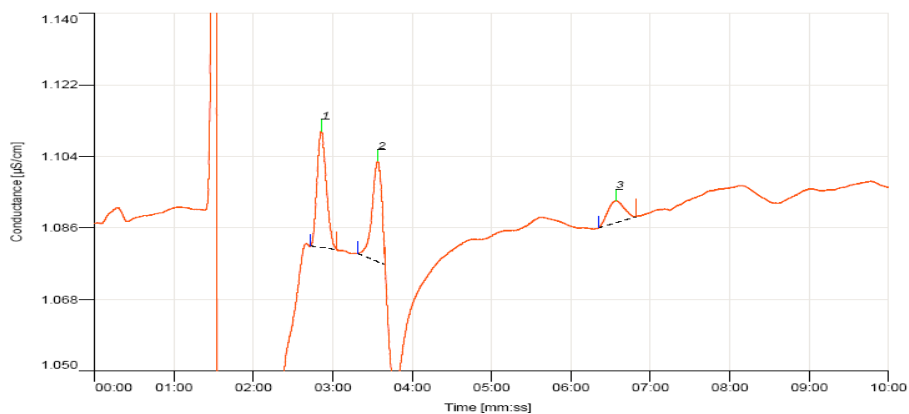
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Chromatogram 2 Inorganic cations in boiler feed water



Chromatogram 3 Inorganic anions in steam condensate

This note acts purely as a guide to the method. Cecil Instruments Ltd take no responsibility for the outcome of any analysis.  
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