

### **Annexure C3: Report on mercury determination from coal samples**

Three coal samples were analyzed for the determination of total mercury concentrations. The mercury analysis was performed using an ICP-MS instrument (SPECTRO 2000).

Coal samples, including a reference material (SARM20) certified at 250 ng g<sup>-1</sup> (Range: 180 - 270 ng g<sup>-1</sup>) for Hg, were digested prior to analysis using a microwave extraction technique (Multiwave 3000, Anton Paar). The following program was used for the digestion:

Sample mass: ±200 mg Reagents: HNO<sub>3</sub> (10ml); HF (2ml); HCl (1ml)

Step Power (W) Ramp (min) Hold (min) Fan

1 400 15 25 1

2 0 5 5 3

The concentrated HF was later on neutralized with H<sub>3</sub>BO<sub>3</sub> and all the samples were diluted to 50 ml with de-ionized water (Millipore). A blank was also prepared using the same methodology as for coal samples.

Digested samples were then taken to the ICP-MS for Hg<sub>TOT</sub> determination.

The method LD was 0.32 ng g<sup>-1</sup>. The total Hg concentration obtained for the reference material was 233.3 ± 34.2 ng g<sup>-1</sup>. Mercury concentrations of coal samples are presented on the table below.

We also reported the average concentration of the 3 samples since the difference between individual concentrations was quite important. This, we think, could be due to a problem of sample representativity.

Table1. Hg<sub>TOT</sub> in coals

Coal sample	Hg (ng g <sup>-1</sup> ) ± SD
Coal 1	51.4 ± 5.6
Coal 2	93.7 ± 4.9
Coal 3	35.0 ± 0.4
Average	60.0 ± 30.3

**Report Author/Submitted by:**

**Ewa M Cukrowska, Environmental Analytical Chemistry, Wits University, Johannesburg  
(27/05/2011)**