OP 1.1

Monitoring of chromium species and eleven selected metals in emission and immission of airborne environment

Petra Krystek[1,2] and Rob Ritsema[1]

[1]National Institute for Public Health and the Environment (RIVM), P.O. Box 1, 3720 BA Bilthoven/The Netherlands, [2]formerly at RIVM

Special aspects of direct emission of a foundry and immission to very closed living areas are studied. Beside the determination of ten heavy metals, Cr speciation was carried out in order to determine the Cr(VI) concentration. With respect to toxicity Cr(VI) species are playing an important role. Human studies have clearly established that inhaled Cr(VI) is a human carcinogen, resulting in an increased risk of lung cancer.

Sampling took place on different days during a period of six weeks. In this period the foundry was busy with the activities of welding and founding in two different halls. It was guaranteed that normal working activities took place in the foundry during all sampling periods. The samples were taken as industrial exhaust directly by the outlet and as airborne sample in the environment with distances between some hundred meters and 2 km from the industrial factory.

Two methods of sampling, sample pre-treatment and mass spectrometric measurement were developed and applied in this study.

- Cr(VI) sampling took place in special impinger systems by absorbing air particles in a buffer of Na_2CO_3 / $NaHCO_3$. A procedure of selective complexation and extraction was developed. The extracts were measured by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS).
- Airborne particulate matter was sampled on quartz-filters After digestion with aqua regia several elements (Al, Ca, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, Sb, and Zn) were analysed as total-element concentration by quadrupole (Q-) ICPMS.

The obtained analytical data are the basis of an indirect exposure study with respect to people who are living in the next surrounding of the foundry.