Exercise

Master's degree in environmental science and engineering

Occupational and environmental health

4.2 physico-chemical - measurements

1) Metrology quiz

The limit of quantification for arsenic by atomic absorption is 100 ng. Calculate whether it is possible to verify , with this sensitivity and with a personal filter sample at a flow rate of 2 l/min, if the "ceiling" limit value set at 2μ g/m3 over 15 min is respected or not. Comment on your answer.

2) Trouble at the workshop

A company active in the field of metal construction wishes to evaluate the exposure of its employees in one of its workshops (fictitious case). The high dust level in the hall (deposits on the surfaces, presence of a quasi-permanent cloud) has indeed generated complaints and concerns among the personnel (about twenty people in the hall). The workshop in question is dedicated to the work on aluminum frames. Most of the work consists in assembling the frames, though welding and flame cutting are also carried out in the hall.
Which measurement strategy (and for what reason) would you prioritize to assess the situation?

2) Surprise spray

During the winter of 2002-2003, the toxzentrum (reference toxicology center) in Zurich noted an upsurge in hospitalizations (about 200 cases) related to acute respiratory problems following the use of waterproofing sprays. A quick investigation showed that all the incriminated products (several brands) had in common the same waterproofing agent (a fluorinated resin) and that the German company which put it on the market had just changed its composition.

The producing company supplied many wholesalers in Europe with the mother product. They added it to preparations and repackaged it for different uses (waterproofing spray for leather, for textile...)

Although the product is widely distributed, the "epidemic" of respiratory problems has affected only a fraction of the countries concerned. Can you hypothesize why this is so?