

## **1 Development of a Structured Chemical Measurement System**

Laboratory networking and infrastructure development are required at the European and national levels. This work will provide the basic enabling mechanism for the development of a structured system and facilitate co-operation and harmonisation of analytical practices. Tasks include:

- a) Provision of a focus for European level activities concerned with analytical quality matters. The work will include the organisation of networking meetings and the exchange of information on quality matters. EARACHEM is well placed to help provide such strategic support.
- b) Establishment of an improved internationally recognised conceptual basis and associated terminology to underpin chemical measurement.
- c) Provision of studies needed to inform and develop guides and norms describing best analytical practice, including the organisation of workshops.

## **2 Provision of a Common Means of Calibration and the Equivalence of National Standards**

At best, most chemical measurements are traceable only to the multiplicity of reference materials (RMs) currently on the market and the validity of methods by which that traceability is established is itself not proven in most areas. The equivalence of national and regional standards needs to be demonstrated through key inter-laboratory comparisons. The objectives are to facilitate both horizontal comparability (country to country) and vertical (primary reference to working level) traceability. Primary references will provide traceability through secondary materials and methods to the working level. We need to establish the level of uncertainty required for top-level measurements to provide a sound basis for acceptable uncertainty at the working level. Tasks include the following:

- a) Development of primary techniques for sample preparation, pre-treatment and separation.
- b) Development of primary methods such as the further development of isotope dilution mass spectrometry (IDMS) capability as a primary method for both elemental and (organic) molecular analysis.
- c) Provision of reference substances for primary methods such as isotopically enriched pure substances for IDMS measurements.

- d) Development of primary pure substance reference materials covering; elements (eg Ag, Si); inorganic compounds (eg Na<sub>2</sub>CO<sub>3</sub>, CuSO<sub>4</sub>); organic compounds (eg nicotine, benzoic acid, a pesticide, acetanilide, phenacetin)
- e) Development of primary matrix reference materials covering:
  - i) a range of matrix types (materials, consumer products, food, agricultural products, environmental materials, toxic substances in the work place, gas mixtures);
  - ii) materials for trace level analytes in selected matrices (toxic elements in food, pesticides, vegetation, dioxins/PCBs in soil);
  - iii) materials for validating sample preparation techniques;
  - iv) materials for validation of methods and instrumentation such as GLC, HPLC, organic MS, NMR, IR, UV/VIS, ICP-OES, ETA, AAS, ICP-MS, XRF, XRD, XPS, SIMS
- f) Development of secondary CRMs for specific measurement problems concerned EC regulations, directives, standards and other aspects of the Single Market
- g) Provision of information on reference materials and methods including: further develop the COMAR directory of available CRMs; a directory of CRMs in course of preparation and under consideration; and a directory of EC/EFTA CRM requirements
- h) Establishment of a systems for the certification of CRM producers
- i) Contribute to broader international programmes operated by ISO and CIPM.

### **3 Development of International Norms and Guides**

Studies including laboratory investigations are required to develop the know-how required to harmonise and define best analytical practice in the following areas:

- specification of analytical requirements
- sampling
- measurement uncertainty
- proficiency testing
- method validation
- automation of chemical measurements
- information technology in chemical measurement
- quality systems.

### **4 Development of Improved Methods for Chemical Measurement**

Improved and fully validated methods are required for:

- a) Health, safety and the environment;
- b) Customs, tariff and trade;
- c) New industrial needs;
- d) New measurement techniques;
- e) Test kits and spot check procedures;

- f) Identification of chemical substances;
- g) Measurements made outside the laboratory.

## **5 Transfer of Technology and Education and Training**

Raising awareness of analytical quality issues, the exchange of information and the diffusion of the results of projects are central tasks.

Tasks include:

- a) Raising awareness of the importance of quality issues amongst chemical measurement scientists, and their customers;
- b) Organising training workshops, courses and exchange of researchers for chemical measurement scientists and their teachers;
- c) Preparation and publication of training material in the form of books, videos and computer material;
- d) Organising proficiency testing schemes at the European level and providing information about existing schemes and future requirements.