

## I. PREFACE TO THE REPORT AND PUBLICATION

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Water can be considered as one of the basic elements supporting life and the natural environment, a primary component for industry, a consumer item from human and animals and a vector for domestic and industrial pollution. Various European Directives already provide for a framework for the control of aquatic substances, the quality of bathing, surface and drinking waters and effluent control.

Such regulatory measures are closely related to analytical measurements. However, in order to comply with these regulations on a permanent basis, treatment plants and distribution companies, as well as water users and polluters, need to implement automated measuring techniques, such as sensors and other analytical tools in continuous or sequential mode to obtain suitable alarm systems and facilitate the management of water resources and decision making processes.

This approach is in continuous evolution within the European Union. In view of the consequences of wrong measurements, it is vital that reliable quality control systems be achieved and maintained. At present, however, only a small range of analytical parameters can be measured automatically, satisfying the required quality and sensitivity criteria within an acceptable cost. It is therefore necessary to develop and validate new methods to extend the list of parameters. In addition, straightforward extrapolation of laboratory measurements is insufficient to meet the requirements of continuous monitoring. Finally, the development of new methodologies requires that the most recent knowledge in fields such as optics, electrochemistry, biochemistry, chemometrics and others be shared by experts.

In order to identify possible actions to be undertaken in the field of standards, measurements and testing for monitoring water quality, the Standards Measurements and Testing (SMT) Programme of the European Union organised a European workshop that was held in Nancy on 29-31 May 1997. This Workshop brought together researchers and industrial users with the aim of making an overview of the present state of the art, of considering possible improvements in existing techniques and the need and possibilities of developing new advanced technologies.

A Steering Committee prepared the programme and, in close consultation with the European Commission's SMT Programme, identified experts in the above mentioned fields who were invited to submit written contributions to the programme. This intensive 2-day event in Nancy, was organised and steered by the International Water Centre, NANC.I.E.

The following themes constituted the framework of the seminar :

- Diagnosis :
  - End users views
  - Identification and prioritisation of research needs

## *Preface*

- Advanced technologies for classical parameters: improvement of existing methods or development of alternative techniques
- Advanced technologies for new parameters and measurement concepts
- Needs and possibilities for the development of advanced technologies: establishing priorities.

The Workshop programme was organised in such a way as to examine technologies adapted to different water categories :

- natural surface and underground waters;
- drinking water;
- water for industrial use and process water;
- domestic and industrial waste waters; and
- sludge arising from water treatment processes.

Also, it was structured to match the needs and the opportunities arising from quickly evolving basic sciences and measurement technologies :

- optical technologies
- electrochemical sensors
- biochemical sensors (whole cells: bacteria, micro-algae...)
- microelectronics and computer sciences for on-line signal acquisition and treatment
- chemometrics for the interpretation of data treatment ( numerical, neuronal, fuzzy techniques)

It became evident in the preparation of the meeting and professional contacts established, that due to the spatial and time dependent variability of water characteristics, on-line monitoring is needed. Yet, it became evident that corresponding techniques are rather limited in terms of the parameters covered and sensitivities available compared to existing laboratory techniques. At the outset of the Workshop, the participants agreed that a continued research effort was necessary to improve on-line monitoring performance and to encourage wider acceptance and promote their use.

Words of appreciation have to be expressed to the experts whose papers are reproduced in this publication and Jacek Zapasnik, European and Multilateral Affairs Manager of the NANC.I.E. staff who organised the seminar and acted as facilitator during the plenary and round-table sessions.

The proceedings of this Workshop are not only published to reflect the issues raised during this event, or to merely identify priorities for the development of advanced technologies in water quality monitoring. The Workshop gave a privileged opportunity to exchange experiences and develop certain guidelines, but more importantly to establish a framework for cooperation on the European level between professionals involved actively in this field.