

A benchmarking study on information management systems for water laboratories in South Africa

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Abstract

The increasing demand for the chemical monitoring of water qualities emphasises the importance of an efficient and workable laboratory management system to remain profitable and competitive in a fast growing industry. The management of information is therefore becoming increasingly important as the effectiveness and profitability of the water laboratory is largely measured against its management systems and continual improvement programmes. Effective information management forms an important part of laboratory management to ensure that data are updated and remain current. One way of proving its effectiveness, the laboratory must provide proof of a controlled and procedurised documentation system and the availability of updated data and information. The effective control of data and information in the water laboratory by using some kind of information management system is therefore essential. Laboratory managers are becoming aware of the need for an effective, computerised laboratory data and information management system as the entry of data and results into a manual system has several disadvantages. The laboratory manager is increasingly seeking for ways to improve the efficiency of his laboratory and more time must therefore be spent on managing the laboratory, rather than to facilitate the distribution and control of information.

Introduction

The modern water chemistry laboratory in developing countries is equipped with state-of-the-art equipment and suitably qualified and skilled personnel to ensure that laboratory test results are reported timeously and accurately. Critical analytical equipment is linked to the Laboratory Information management System (LIMS) and data entry is automated. Laboratory documentation forms an important, integral part of the laboratory and it is essential that documents are effectively controlled. All the documents which are kept in the laboratory are recorded on a master list and clear distinction is made between original copies and revised copies. Only authorised personnel are permitted to instruct any amendments, alterations or revisions to laboratory documents. Documents are numbered and located and periodically revised by management. Obsolete documents are removed from the system (SABS ISO/IEC17025: 2000).

Current status of information management in water chemistry laboratories in South Africa

Generally, South African water laboratories compare favorably with their international counterparts with regard to laboratory information management systems. It is common knowledge that LIMS is designed primarily for the collection, processing, storage and retrieval of laboratory data and results. Information is stored in electronic format with rapid manipulation of laboratory data and the printing of documents and test reports. Smaller water laboratories without LIMS normally rely on the manual operation of the following activities:

- log-in of sample details and planning and scheduling of workloads;
- labelling of samples and entering of data and test results;
- equipment availability and performance;
- final quality control of test results;
- tracking of samples and sample results through the laboratory;
- construction and presentation of graphs and trends; and
- reporting of results to customers.

Manual systems subsequently have no definite and guaranteed control over the scheduling of water samples and sample turn-around times. Larger laboratories on the other hand are mostly equipped with some type of LIMS for the registering of samples and the reporting of results. LIMS is an effective tool for automation of the water chemistry laboratory. These systems are designed using the correct and appropriate criteria in order to meet the current and future needs of the water laboratory and its customers and stakeholders.

Requirements for international competition

In order for laboratories to remain internationally competitive, effective measures must be implemented to ensure that information and data management systems incorporate, *inter alia*, the following core functions (Gillespie, 1995; Paszko, 2001; Miller, 1997; Oelker, 1997, and Kolva, 1995):

- sample scheduling, archiving and tracking;
- access to validated methods and standard operating procedures;
- interfacing to a wide spectrum of laboratory instrumentation and providing the status of equipment;
- traceability and status of test samples and test results;
- flagging and/or rejection of out-of-specification results and acceptance of approved and verified results;
- graphical presentations of analytical data, equipment performance and personnel productivity;

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