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IMPLEMENTATION OF QUALITY ASSURANCE AND QUALITY CONTROL IN THE NUCLEAR ANALYTICAL LABORATORY OF THE ESTONIAN RADIATION PROTECTION CENTRE

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Abstract

The analytical laboratory of the Estonian Radiation Protection Centre is in the process of implementing the system of Quality Assurance (QA) and Quality Control (QC) in the framework of the IAEA TC Project RER/2/004/ "QA/QC of Nuclear Analytical Techniques". The draft Quality Manual with annexes has been prepared accordingly to the ISO 17025 Guide, documents and other printed material delivered on the seminars of the project. The laboratory supply has been supplemented with necessary equipment for guaranteeing of quality. Proficiency testing included to the project has been performed successfully.

1. INTRODUCTION

The environmental research laboratory of the regulatory authority, the Estonian Radiation Protection Centre (ERPC) is equipped with gamma-spectrometer, alpha-spectrometer and with liquid scintillation counter. The laboratory was originally established by the Estonian Meteorological and Hydrological Institute in 1994, and was joined to the ERPC in 1996. In 1997 the laboratory was equipped with necessary supplies for preparing of samples. Personal of the laboratory has consisted of 3 specialists included the head of laboratory since 1996.

ERPC has responsibility for environmental radiation monitoring according to the Radiation Act [1]. The number and origin of samples analysed by the laboratory has increased during last years remarkably. Beside the environmental samples radioactive waste, foodstuffs, building materials, some raw materials etc. are analysed in the laboratory at present.

Though the problems of quality assurance rose in 1997, the accreditation of the laboratory become actual in 1999 after approval of the Environmental Monitoring Act [2] which fixed requirement of accreditation of laboratories responsible for environmental monitoring. Gamma-spectrometry is the main method for analysing of radioisotopes in environmental samples as well as in foodstuffs and building materials. This is why the laboratory of the ERPC planned to prepare the use of this method for accreditation.

Up to 1999 the requirements of the ISO 17025 [3] were not introduced and there was no correspondingly trained personnel in ERPC. Experience for preparing of the Quality Manual (QM) was missing as well.

The laboratory of the ERPC was included to the IAEA TC Project "QA/QC of Nuclear Analytical Techniques" in June 1999. Two specialist from ERPC have been trained correspondingly in the framework of the above mentioned project

2. PROGRESS OF THE ERPC LABORATORY IN CONNECTION WITH THE IAEA PROJECT RER 2/004/ (during the period from June 1999 to September 2001)

Systematic establishment of a Quality Assurance System (QAS) in accordance to the requirements of ISO 17025 was started practically from the zero point after the first seminar organized in framework of the project. ISO 17025 Guide, documents and other material delivered on the seminars became to the main guidelines.

For introduction of QAS and accreditation of the laboratory was planned to:

1. concentrate to QA of the gamma-spectrometric method and to the process of accreditation
2. prepare the documentation relevant for QA and necessary for accreditation
 - o relatively small QM approximately 40 pages
 - o annexes to the QM
 - personnel
 - information concerning equipment
 - methods used
 - information about calibration of equipment
 - procedures, instructions
 - archives, registers
 - different forms
 - customers
 - complaints
 - corrective measures;
3. correct the laboratory activity if needed
4. supplement of the laboratory equipment in accordance to requirements of QA

The draft QM for the laboratory of ERPC is practically ready. The draft QM is based on the requirements of ISO 17025 and remarks and recommendations of the IAEA experts were considered.

The draft QM for ERPC laboratory consist of the following items:

- o quality politics
- o structure of the quality system
- o structure and management
- o system of the document control
- o complaints and their management
- o audits
- o management of reviews
- o corrective action
- o purchasing of services and supplies
- o review of requests, contracts
- o sub-contracting
- o personnel
- o accommodation and environmental conditions
- o methods: gamma-spectrometry
- o equipment
- o calibration of equipment
- o measurement traceability
- o handling of samples
- o archives and registers
- o reviews and certificates

Organisational position, subordination and order for signing of documents are fixed.

Introduced are:

- o system for receiving, identification and storage of samples
- o order of registering and storage of measurement results
- o register of certificates issued
- o archive of clients
- o register of complaints
- o order of equipment calibration
- o plan of internal audit and audit personnel
- o plan of corrective actions
- o data base for personnel and for education and training
- o data base for equipment and there calibration

The final version of the QM is planned to bring to refer to the Estonian Accreditation Centre before the end of 2001.

It was foreseen in the project to carry out audits of participating laboratories by the experts of IAEA in addition to the seminars and proficiency testing.

The first audit of the IAEA experts took place in February 2000. The main deficiencies, recommendations and consequences were noted in the final report of audit [4]. The second audit was organised in July 2001. Both audits were important while indicated to the insufficient items in QAS.

Internal audit has an important role in guaranteeing the QA of the laboratory. The seminar on Internal Audit was organised according to the Project RER 2/004 in May 2001. Two persons from ERPC participated in the mentioned seminar and they are able to carry out internal audit of the laboratory in the accepted way.

In connection to the preparation of ERPC laboratory for the accreditation two problems, which can be appear in some other small countries, were identified as follows:

1. it may be difficult to staff competent personnel for accreditation of the specific sphere as the nuclear analytical techniques is;
2. the lack of specialists able to provide the service for maintenance and repair of nuclear analytical techniques may occur.

In conclusion we would like to emphasize, that our participation in the IAEA TC Project RER/2/004 gave an important impulse to the development of the Quality Assurance System and for starting the accreditation process of the ERPC laboratory. It has allowed us to obtain the necessary knowledge for establishment of QA/QC system in the laboratory.

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REFERENCES

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- [4] VERMAERCKE, P., RER/2/004/EST/ Inspection Report 1, (2000) 25 pp.