

IAEA/RCA Meeting for Senior Managers on “Optimization of Industrial Processes using Prompt Gamma Neutron Activation Analysis (PGNAA)”,
Beijing, China, 1-3 November 2004.

Draft Meeting Report

The meeting was held at Green Brook Hot Spring hotel in Fangshan District, Beijing from 01-03 November. The meeting venue was changed from Yanjing hotel to this modern hotel (3 star category) to obtain a higher quality accommodation and better meeting environment for a lower price. 21 delegates participated the meeting including 13 foreign participants from RCA MSs, 2 local participants, 2 IAEA experts from Australia, 2 local resource lecturers, 1 Chinese observer and the organiser. Dr. Zhang Peixin of China Institute of Atomic Energy was the meeting organiser (see Appendix I (List of Participants)). During the meeting, the following aspects have been identified and agreed on.

Industrial PGNAA technology and its applications

1. There are increasing needs for faster and more accurate technologies for on-line characterization of materials in minerals and processing industries of RCA MSs. Routinely, sampling and laboratory assaying are applied to monitor the quality of materials. However, samples may not be truly representative of the bulk of the material, and therefore the PGNAA gauges that are able to measure most of the process flow are preferred. Alternatively, an off-belt PGNAA bulk analyzer measuring large volume/mass of the material can be a cost-effective option. During exploration, mine planning and mine development stages of the mining cycle, *in-situ* monitoring of properties of a mineral resource provides necessary information about a mined product. During the processing of ore, also, it is desirable to monitor the bulk qualities of the mined minerals, such as elemental composition or ash content. Because of the high costs in mining, processing and disposal of waste material, there are considerable economic and environmental benefits to be gained by placing close tolerances on the properties of the raw material being mined and processed. Applications of neutron gamma techniques using 14Mev generators were presented and created a better awareness among the meeting participants of the advantages and disadvantages of these techniques.
2. A Regional Training and Demonstration Centre has been established in Beijing, China, as a part of planned activities under RCA project RAS/8/094. For this centre, attention is focused on introduction of the two instruments; PGNAA off-belt analyzer and

PGNAA borehole logging tool. Two meetings were held in Beijing in October/November 2004, namely the Regional Training Course on “Optimization of Industrial Processes through Improved Off-belt and On-line Bulk Analysis of Materials by using PGNAA” (25-29 October, 2004) and the Regional Meeting for Senior Managers on “Optimization of Industrial Processes using PGNAA” (01-03 November, 2004).

3. The main objective of the two events was to demonstrate and inform participants on the practical and economic benefits of the use of off-belt and on-line bulk analysis PGNAA gauges for the optimisation and quality assurance of materials in processing, and of the use of borehole PGNAA tool for optimization of exploration and exploitation mining stages.
4. The above objective was satisfactorily met. The demonstrations of the nucleonic control systems acquired for the Centre created better awareness of available technology among the meeting participants.
5. The major achievements of the RAS/8/094, as brought up by the representatives of the participating Member States, were:
 - a) The creation of two regional centres (in Beijing and Hanoi),
 - b) Substantial acquisition of advanced nucleonic instrumentation by both Regional Centres,
 - c) Availability of this instrumentation to all Member States for national demonstrations and/or training courses,
 - d) Substantial training component, through a large number of fellowships and scientific visits, and
 - e) Provision of expert’s assistance to Member States.

Current status of industrial PGNAA technology in RCA MSs (as to Appendix II. Country Report)

Recommendations for future activities under RAS/8/099 RCA project

The participants strongly recommended that the activities presently carried out in project RAS/8/094 should be sustained and further developed over the next two years at least. The participants strongly believe that the future project RAS/8/099 should be well-balanced and should equally support the components RAS/8/091 and RAS/8/094 for a better benefit to the member states.

In particular, the participants recommended the following actions:

a) that the IAEA continue to support and sustain the PGNAA bulk analysis centre already established at the China Institute of Atomic Energy (CIAE) in Beijing, and the borehole logging centre already established at the Vietnam Atomic Energy Commission (VAEC) in Hanoi.

b) That this support comprise at least one regional activity in each centre over the next two year period under the RAS/8/099 project. Suitable regional activities include training courses, workshops and seminars with an emphasis on industrial applications (with the participation of IAEA experts).

c) That the bulk analyzer in the CIAE centre to be upgraded by the addition of a compact and portable 14 MeV neutron generator. Neutron generators have significant safety and technical advantages for on-line analysis in industry; in particular neutron generators can be switched off and they can be pulsed. The use of neutron generators will lead to a significant advancement of on-line analysis applications in the region with strong economic benefits.

d) That a wider use of available resources will be achieved by national training courses/seminars on PGNAA techniques and industrial applications in both on-line analysis and borehole logging. These national training courses or on-site demonstration could involve leased equipment from either of the regional centres. The Agency should set-up a “modus operandi” on how to get easier access to the equipment from the regional centres. IAEA experts from the region should also be involved.

e) Fellowship programme or on-the-job training at regional centres or at manufacturer laboratories for fellows from the regional member states should be provided in future. This is important to have hands-on experience and transfer of practical knowledge to the member states.

f) In order to better support the existing regional centres in Beijing and Hanoi and to decide on the focus and work program of these centres, an advisory group comprising of selected specialists or experts from member states should be established for each centre.