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REPORT TO THE GOVERNMENT OF  
THE DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

URANIUM PROSPECTING  
DRK/3/003-04  
LABORATORY GAMMA-RAY SPECTROMETRY

by  
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LEVEL 1  
M 277

## 1. SUMMARY

At the request of the Government of the Democratic People's Republic of Korea (DPRK) the IAEA expert undertook a three month mission (from 7 May 1990 to 31 July 1990) to the Maebongsan Geoprospecting Expedition within the framework of the IAEA project DRK/3/003 "Uranium Prospecting". The objective of the mission was to introduce the laboratory gamma-ray spectrometry analysis of rocks with the modern equipment provided by the IAEA.

The Maebongsan Geoprospecting Expedition (MGE), Pyongwon County, South Pyongan Province, an organization of the Ministry of Atomic Energy, carries out activities in uranium prospecting in the DPRK. Laboratory radiometric analyses of rocks with obsolete low sensitive equipment have been used at the MGE in the past time. A group of six persons (nuclear engineers, electronic engineer, geologist, technician) from the staff of the MGE was assigned to participate and collaborate in the introduction of rock analyses with the computer based multichannel analyzer.

In the course of the mission the expert realized the following activities:

- a) Lectures on laboratory gamma-ray spectrometry of geological materials, theory, results and examples of practical application. Consultations on practical topics. (36 hours of lectures).
- b) Installation of the detector and multichannel analyzer in the MGE laboratory, assistance in adaption of laboratory technical facilities, notes on radiation safety.
- c) Basic technical instructions and rules for the use of the personal computer based multichannel analyzer, equipment setup and practical training of the MGE personnel in equipment operation.
- d) Preparation of laboratory standards (geological reference materials) for equipment calibration and the determination of their technical parameters. Comparison with expert's pure uranium reference material.
- e) Tests of the equipment (Bicron scintillation detector, Aptec PCMCA/WIN multichannel analyzer, Aptec/Epson LQ-510 printer). Tests included: selection of detector operational high voltage, determination of equipment gamma-ray energy resolution, equipment energy calibration, determination of the equipment noise level and equipment spectrum shift.

- f) Instruction and practical training in the use of the programme "ANAL3" (Charles University, Czechoslovakia) for the equipment calibration and rock analyses computer data processing.
- g) Written instructions, recommendations, numerical data, drawings and explanations to the theory and application of laboratory gamma-ray spectrometry of geological materials with the Aptec PCMCA/WIN multi-channel analyzer (32 pages of text and drawings)
- h) Evaluation of technical conditions, needs and possibilities for the development of the laboratory gamma-ray spectrometry and the broader programme of uranium prospecting at the MGE.

The equipment fault disabled its normal operation and rock analyses in the second half of the expert's stay in the DPRK. The procedures of equipment calibration, analyses of rock samples and evaluation of their results were not realized.