

Ge-Li SPECTROMETRY OF LOW ACTIVITIES IN THE PREOPERATIONAL
STUDIES NEAR THE NUCLEAR POWER PLANT KRŠKO

D. Brajnik

J. Stefan Institute, Faculty of Electrotechnics, E. Kardelj
University of Ljubljana, Yugoslavia

Low-level gamma-ray spectrometer consisting of a high volume (116 ccm) Ge(Li) detector and a shield, constructed of 15 cm thick old iron was used for the preoperational environmental studies in the vicinity of the nuclear power plant Krško in Slovenia. The present very low activities of natural and artificial origin in the condensed samples of water sediments, biological samples and in air filters could be identified. The lower detection limit lays between 7 - 20 mBq for most fission products and 30 - 100 mBq for natural gamma-ray emitters (counting time 1 - 2 days, 50 % statistical precision).

A Ge(Li) detector of a large volume (116 ccm with a relative efficiency of 23 % for ^{60}Co and a high peak to Compton ratio was placed into a shield, made of 15 cm thick old iron. The inner diameter of the shield is 38 cm. The construction of the shield allows easy changing of the samples. Spectrometer is situated in a room far away from other nuclear facilities and is connected to a WD 6600 processor.

Natural background without sample was reduced to less than 1 c/s in the energy region above 30 keV.

The precision in the determination of the present low activities of rivers and underground waters was improved by sequential stripping of different components of natural radiation. Typical results are presented.