**Monitoring of 226Ra and uranium isotopes concentrations in underground water samples released from a phosphogypsum disposal area**

**K. Kehagia\*, D.C. Xarchoulakos and C. Potiriadis**

Department of Environmental Radioactivity, Greek Atomic Energy Commission

P.O. Box 60092, 15310, Agia Paraskevi, Greece

\* *e-mail: konstantina.kehagia@eeae.gr*

Radionuclides of natural origin of the uranium and thorium series are present in most materials. These materials are commonly referred to as Naturally Occurring Radioactive Materials (NORMs). In Greece, industrial activities involving NORMs are relatively limited. Among them are three fertilizer industries, of which only one remains operational. This particular facility, located in northern Greece, has been in continuous operation since 1965.

Phosphogypsum, a by-product of the fertilizer production process, which contains elevated levels of radionuclides such as 226Ra and uranium isotopes, is deposited continuously near the industry, by the sea side, in an open land disposal area of about 500000 m2. The total estimated mass of deposited phosphogypsum is around 13 million tons.

Groundwater quality monitoring is critical in this context due to the potential leaching of radionuclides from the phosphogypsum into the subsurface environment. To evaluate this risk, water samples are collected systematically from a network of 20 boreholes strategically positioned around the disposal area. Concentrations of 226Ra and uranium isotopes in these samples are determined through alpha spectrometry, a sensitive and accurate method suitable for low-level radioactivity measurements.

Following the implementation of a drainage channel around the perimeter of the disposal site, recommended by the Greek Atomic Energy Commission, the monitoring programme also includes an evaluation of this intervention’s effectiveness in mitigating radionuclide migration.

The aim of this work is to present the monitoring programme implemented since 2003 by the Environmental Radioactivity Department of the Greek Atomic Energy Commission (EEAE), which is the national competent authority for the control, regulation and supervision in the fields of nuclear energy, nuclear technology, radiological and nuclear safety and radiation protection.