

NATURAL RADIONUCLIDES IN BAUXITIC TAILINGS (RED-MUD) IN THE GULF OF CORINTH, GREECE.

PAPATHEODOROU¹G., PAPAETHYMIU²H., MARATOU¹A, & FERENTINOS¹G.

¹Laboratory of Marine Geology and Physical Oceanography, Dept. of Geology, University of Patras, Patras 265 00, Greece. E-mail: George.Papatheodorou@upatras.gr

²Division of Physical, Inorganic and Nuclear Chemistry, Dept. of Chemistry, University of Patras, Patras 265 00, Greece. E-mail: epap@chemistry.upatras.gr

A detailed environmental survey was carried out in the central Gulf of Corinth in order to determine radionuclides in the bauxite “red-mud” tailings which have been discharged on the seafloor by a Bauxite Processing Plant (Aluminio Ellados A.E). The discharge of bauxitic tailings via two pipelines at a water depth of 100m, in Antikyra Bay (Northern Gulf of Corinth), has resulted in the formation of two red-mud mound-like deposits. The red-mud deposits at the mouth of the outfalls, are not stable and very often red-mud masses are detached from the two main deposits and are transported to the Corinth central basin, by turbidity currents, at a water depth of 850m and about 17km away from the main deposits. Thus, at the Antikyra bay, the red-mud has formed a surficial veneer (0.5-2.0cm) on the seafloor. On the Corinth central basin floor the red-mud has formed successive red-mud layers which are interrupted by layers of natural mud. Fifteen gravity cores have been selected from the studied area and a number of bauxite samples have been collected from mines that supply the bauxite processing plant. Red-mud, natural mud and bauxite samples were analyzed for ²³⁸U, ²²⁶Ra, ²³²Th, ⁴⁰K, and ¹³⁷Cs by direct gamma spectrometry. The study of radionuclides concentrations has shown that: (a) the enrichment factor of radionuclides in the red-mud in the main deposit at the mouth of the outfalls, in relation to bauxite samples, is about 2.0, (b) the enrichment factor of ²³⁸U, ²²⁶Ra and ²³²Th in the red-mud in the main deposit and the central basin, in relation to natural sediments below, is visibly higher than 1.0 (2.0-19.0) whilst ⁴⁰K exhibits the opposite trend, and (c) the enrichment/dilution factor of radionuclides in the red-mud surficial veneer at the Antikyra Bay, in relation to the natural sediments below, is ranging between 0.4 and 3.5.