



“Gheorghe Asachi” Technical University of Iasi, Romania



GEOCHEMISTRY AND QUALITY ASSESSMENT OF SURFACE WATER IN AN ACTIVE COAL WASHING PLANT OF NORTHERN IRAN

Majid Shahhosseini^{1,2}, Faramarz Doulati Ardejani^{1,2*}, Sied Ziaedin Shafaei^{1,2}

¹School of Mining, College of Engineering, University of Tehran, Tehran, Iran

²Faculty of Mining, Petroleum and Geophysics, Shahrood University of Technology, Shahrood, Iran

Abstract

Drainage water and tailings impoundments water geochemistry (pH, EC, alkalinity, trace element concentrations, major ions) were studied at the Anjir Tangeh coal washing plant. The drainage water with neutral to alkaline pH values, high SO_4^{2-} concentration and low metal content represented typical neutral alkaline mine drainage (NAMD). According to the Stiff and Piper diagrams, the majority of water samples classified into Ca-Mg- HCO_3^- type except drainage and processing water which were placed in Ca-Mg- SO_4^{2-} type. Manganese was found to exceed the maximum guideline value recommended for the drinking water by World Health Organization. The heavy metal pollution index (HPI) of surface water (20.6) is well below the index limit of 100, which suggests that neither is generally contaminated with respect to Mn, Fe, Cu, Zn, Ni and Pb. PHREEQC speciation and solubility modeling proposed super saturation of the drainage water with respect to ferric oxyhydroxides, manganese carbonates, calcium carbonates and manganese oxides. Surface water can be used for irrigation except processing water with very high salinity are doubtful to unsuitable for agriculture uses.

Key words: Alborz Markazi coalfield, heavy metal pollution index, neutral alkaline mine drainage (NAMD), SAR, water type

Received: February, 2012; Revised final: March, 2013; Accepted: March, 2013

* Author to whom all correspondence should be addressed: e-mail: fdoulati@ut.ac.ir