

Investigation of environmental impacts of acid mine drainage (AMD) on coal tailing in Zirab coal cleaning factory, Mazandran Province.

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Abstract This study mostly investigated the environmental impact of acid mine drainage (AMD) on the tailing of coal cleaning factory in Mazandaran province. This factory is one of the largest and the oldest in the coal concentration in Central Alborze Coal Basin. So, annually huge amounts of coal tailing will be left. The sampling of coal, coal tailing, drainage water from coal tailing, factory's waste water, secondary surface minerals and river water have been carried out in summer in 2005. On the basis of geochemistry and mineralogy results indicate that the amount of Fe_2O_3 , SO_3 and heavy metal have decreased strongly in coal tailing of Zirab coal cleaning factory compare to homogenate coals. This is an indication of oxidation of pyrite and acidic environment formation. This acid reacts with calcite and dolomite and increase the value of pH. The process also decreases the amount of CaO, MgO and MnO in coal tailing. Hydrogeochemical studies demonstrate that drainage and seepaged water from tail dumps are of (Na-Ca-Mg)- SO_4 type. In arid seasons, due to evaporation of hydro-sulfates solution, blodite and secondary minerals are formed on the tailing dump surfaces. This drainage water from tailing and Zirab coal cleaning factory into adjacent river has caused the precipitation of hematite, calcite, amorphous iron oxide. Hydrogeochemical modeling proved that hematite goethite and iron hydroxides along with carbonate minerals (calcite, dolomite and aragonite) are forming. According to Gibbs diagram, indicates that lithology is the most important factor in increasing the ionic concentration in drained and seepage water from tailing and river water. The rate of SO_4 , PO_4 , Ca, Sr, Sb, and Bi in seepage water from tailing and coal cleaning factory are more than the standard value, which can cause the surfaces and groundwater pollution in this region. By keeping the coal waste material in vicinity of the river, so for prevention of pollution, it is necessary to collect and transform the tailing to a place with a sufficient drainage and treatment systems.

Keywords: Acid mine drainage, Coal tailing, Coal cleaning factory, Mazandran Province.