RESEARCH PAPER:

Geochemistry of coal washery effluents in Zarand region, Kerman province, South-east of Iran

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SUMMARY

The present study deals with the water pollution produced by coal washery effluents accumulated in tailing tank, Zarand region, Kerman province, Southeast of Iran. Sampling has been done from waters discharged to the tailing tank. Water/effluent samples were analysed for measurement of parameters namely, colour, total suspended solids (TSS); chemical oxygen demand (COD); total dissolved solids (TDS), acidity or alkanity (pH), temperature, oil and grease and heavy metal contaminants. The coal processing results essentially in production of huge quantities of suspended material, which is beyond the stipulated limit of 100 mg/l as specified in the standard. Formation of a thin film of oil and grease on the water discharged from coal washing plant, oil and grease, turbidity (NTU), TSS, COD and TDS were increased in water discharged to the tailing tank. The concentration of Mg was exceeding the permissible limit. Heavy metals such as copper, nickel, zinc, lead, chromium, cadmium, arsenic, mercury and iron were very less in the effluents indicating that coal washing processing was not effective on increasing heavy metals.

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Key words : Coal washery, Tailing tank, Effluents, Heavy metals

Coal, a fossil fuel, is the largest source of energy for the generation of electricity worldwide. Coal is inherently a "dirty" source of energy. Row coal contains non-coal minerals that will be released as polluting discharge during washing. Coal washeries have been implicated as one of the major sources of surface and groundwater pollution (Gurdeep Singh, 1986, Bandopadhyay, 1987; Gupta and Singh, 1995).

One of the main objectives of coal preparation is to reduce the quantity of pollutants in coal that is burnt. Washing principle of coal is mainly based on the different in specific gravity between coal and its impurities, the difference processing techniques depend on the washibility characteristics of particular coal. Preparation of coal by physico-chemical methods is known washing/beneficiation. Extracted coal from Pabedana coal mine is transported by trucks to Zarand, coal washing plant, which is 65 km south of Pabedana coal mine (Fig. 1). At Zarand coal processing was commenced in 1978 with a capacity of 2 million tons of raw coal with 61% production efficiency. Zarand coal washing plant is one of the biggests processing plants in southwest of Asia.

The effluents from coal washing processes contain large amounts of suspended and dissolved solids, dirty materials and impuries associated with raw coal and they create serious problems of deterioration of water quality of groundwater into which they are discharged (Ghose, 1999). Effluent from coal mine contains high load of TDS, calcium, carbonate and heavy metals hence contaminates the aquatic regime (Dhar *et al.*, 1986). Heavy metals are one of the most detrimental fractions of mining effluent, being persistent accumulates in water, soil, sediment and living organisms (Miretzky *et al.*, 2004). The present study has been carried out on the geochemical characterization of washery effluents from coal washery which accumulated in tailing pond. Finally, assessment of pollution was conducted by coal washery in surrounding area.

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