## Characteristics of Groundwater Occurrence & the Recharge Potential of Coal Mining Project – A Case Study

G.Kumar<sup>1</sup>, S.K.Singh<sup>2</sup> and B.K.Sinha<sup>3</sup>

<sup>1</sup>Professor & Head, Geology, BIT Sindri, Dhanbad – 828 123, Jharkhand, INDIA

<sup>2</sup> Director, BIT Sindri, Dhanbad – 828 123, Jharkhand, INDIA <sup>3</sup>GM, SAIL - ISP, Chasnalla, Dhanbad – 828 135, Jharkhand, INDIA

Tasra Coal Block (Chasnalla, Dhanbad) owned by SAIL has been selected as the study area for the present work. The water resources in the study area are mainly river, ponds and groundwater. Damodar River controls the main drainage of the area. The common sources for domestic and irrigation in the core zone villages include shallow dug wells, river and ponds. The other system is tapping deep aquifers in some of the villages by deep tube wells i.e. hand pumps. These wells have been an average depth of 30-40 meters. The water table in the dug wells ranges in between 6-12 m in pre-monsoon and 2-8 meter in post-monsoon periods except in few cases when the water table is somewhat deeper. By and large, deep aquifers are neglected in most of the area. With proper technique, the ground water can be successfully tapped to meet the water demand both for domestic and agriculture.

To assess the impact of mining on water quality, water samples have been collected from different locations. Concentration of some ions like SO4 and Cl and value of Total Dissolved Solids are relatively high in some ground water and pond water samples. Degradation of groundwater quality is on a localized extent and is because of anthropogenic activities which is linked to seepage of sewage in the aquifers. Groundwater occurrence and storage in study area are mainly controlled by the geological set up of the area. The ability of geological formation to store and transmit water is dependent on its formation parameters, such as porosity and hydraulic conductivity. As greater part of the study area is underlain by Precambrian crystalline rocks, the weathered residual of the hard rocks as well as the fractures, joints, fissures, faults and other zones of discontinuity are the principle repositories of ground water in the area. The Gondwana sediments form the semi-consolidated formations and are better water potential zone. The average water table fluctuation in core and buffer zone varied between 2.50 - 4.29 m (avg. 3.16m) and 2.11 - 5.28 m (avg. 3.72 m) respectively. The average water table fluctuation between pre and post-monsoon season for the study area was observed as 3.53 m. Rainfall is the principal recharge source to groundwater. The ground water recharge potential in the area was estimated by using rainfall-infiltration and water table fluctuation methods. Except, for coal mining and some coal based industries, no major industrial development activity is located in the area. The calculated stage of ground water development is 35% and it falls within the category "white".

**Key Word :** Recharge Potential, Aquifers, Water Table Fluctuation, Ground Water Recharge Potential, Ground Water Development.