

Groundwater Potential Zone Identification in Unconsolidated Aquifer Using Geophysical Techniques around Tarbela Ghazi, District Haripur, Pakistan

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Abstract : Electrical resistivity investigation was conducted in vicinity of Tarbela Ghazi, in order to study the subsurface layer with a view of determining the depth to the aquifer and thickness of groundwater potential zones. Vertical Electrical Sounding (VES) using Schlumberger array was carried out at 16 VES stations. Well logging data at four tube wells have been used to mark the super saturated zones with great discharge rate. The present paper shows a geoelectrical identification of the lithology and an estimate of the relationship between the resistivity and Dar Zarrouk parameters (transverse unit resistance and longitudinal unit conductance). The VES results revealed both homogeneous and heterogeneous nature of the subsurface strata. Aquifer is unconfined to confine in nature, and at few locations though perched aquifer has been identified, groundwater potential zones are developed in unconsolidated deposits layers and more than seven geo-electric layers are observed at some VES locations. Saturated zones thickness ranges from 5 m to 150 m, whereas at few area aquifer is beyond 150 m thick. The average anisotropy, transverse resistance and longitudinal conductance values are 0.86 %, 35750.9821 $\Omega \cdot m^2$, 0.729 Siemens, respectively. The transverse unit resistance values fluctuate all over the aquifer system, whereas below at particular depth high values are observed, that significantly associated with the high transmissivity zones. The groundwater quality in all analyzed samples is below permissible limit according to World Health Standard (WHO).

Keywords : aquifer, Dar Zarrouk parameters, geoelectric layers, Tarbela Ghazi

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