

3. Sub-Stratum Interpretation and Aquifer Potential Identification of Dent Group Sedimentary Rock, Lahad Datu, Sabah by Using Applied Geophysical Methods

Hardianshah Saleh (UMS)

6 June 2014

School of Science & Technology, UMS

Abstract 3: Vertical Electrical Sounding (VES), 2D-Electrical Resistivity Imaging (ERI) and Induced Polarization (IP) survey techniques were carried out to interpret the sub-stratum and to identify the aquifer potential in the sedimentary rocks of Dent Group in Lahad Datu, Sabah. The sedimentary rocks are composed of three formations namely Sebahat, Ganduman and Togopi Formations. 56 VES station was carried out using the ABEM SAS 300C terrameter within the area. A maximum electrode spacing of 500m current electrode spread using the Schlumberger array was adopted for this survey with maximum current penetration of 120 m. ERI and IP surveys were also conducted along 18 profiles by using the ABEM SAS1000 terrameter. Schlumberger array was also applied for this survey with maximum length of 400 m and depth of investigation about 70m. Correlation of the interpreted VES, ERI, and IP with the lithologic logs from the borehole sections in the study area produced seven geo-electrical profiles and labelled as S1 (in Sebahat Formation area), G1, G2, G3, G4, G5 (in Ganduman Formation area) and T1 (in Togopi Formation area). The results suggest that the Sebahat Formation is made of massive and thick layers of mudstone with low resistivity value (2-11 Ω .m). The Ganduman Formation consists of four different lithologic layers with variable thicknesses. The first layer with resistivity values ranging from 10 Ω .m to 400 Ω .m representing topsoil. The second layer has resistivity ranging from 20 Ω .m to 200 Ω .m representing thick sandstone layer partly associated with clay and calcareous lenses. The third layer has resistivity ranging from 1 Ω .m to 20 Ω .m representing mudstone layer. The fourth layer has resistivity ranging from 200 Ω .m to 2000 Ω .m representing sandstone layer. The Togopi Formation consists of topsoil layer, followed by clay (8-20 Ω .m) and sandstone layers (30-100 Ω .m) with fractured limestone blocks (400-4000 Ω .m). Results of the study indicate that the Sebahat Formation dominated by aquitard and aquiclude layers. Good aquifer layers was interpreted was formed in thick sandstone layer in Ganduman Formation and limestone with sandy layer in Togopi Formation.