GENERAL GEOLOGY AND ELECTRICAL IMAGING STUDY AND GROUNDWATER QUALITY IN NORTH LABUAN ISLAND

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PROGRAMME : GEOLOGY
YEAR : 2016

The study area is located at the north of Labuan Island which is about 115km from Kota Kinabalu. The study area covers about 50 square km bounded by latitude of N 05°18'33.67" to N 05°23'37.35" and longitude of E 115°10'16.97 to E 115°15'23.42". The rock units in the study area consists of thick sandstone and mudstone of The Crocker Formation aged Upper Eocene to Lower Mioene followed with The Setap Shale Formation which is mudstone aged Middle Miocene and then the Belait Formation consists of interbedded sandstone with mudstone that covered by Recent alluvium. Electrical resistivity survey was conducted to detect the presence of saltwater intrusion using the ABEM Terrameter LS with Wenner configuration which involved 4 station where 2 station are along the coastal area and 2 station are in the borehole area. Stations that involved were station 1 at Manikar Beach (GPS: 05°23'16" U dan 115°14'17" T), station 2 at Pancur Hitam Beach (GPS: 05°21'20" U dan 115°12'21" T), station 3 at Kampung Ganggarak (GPS: 05°22'08" U dan 115°13'29" T) and station 4 at Bukit Kubong (GPS: 05°22'35" U dan 115°14'07" T). The survey results were processed into 2D resistivity data model by using the Res2DInv software where station 1 and 2 show the depth data 33.8m whereas station 3 and 4 show the depth information until 16.9m. Two dimention image for station 3 and 4 show the presence of major fault with the low resistivity value (4 to 31 ohm-m). Two layer of coal with the resistivity value from 130 to 180 ohm-m showed in the 2 dimension image of Kampung Ganggarak area. All stations show the presence of saltwater intrusion where the presence of brackish water is because the groundwater mix with saltwater. Groundwater quality was determined by the conductivity, total dissolved solid (TDS), salinity, pH and heavy metal analysis. Conductivity, TDS and salinity analysis show the presence of saltwater intrusion where their value are higher. Heavy metal analysis shows the presence of heavy metal as the contaminate material such as aluminium (Al), manganese (Mn), iron (Fe), plumbum (Pb), nickel (Ni), natrium (Na), calsium (Ca) and magnesium (Mg) were exceed the drinking water quality standard. Therefore, the groundwater in the study area are not suitable and not safe to use as the drinking water source.