INTISARI

KAJIAN KONDISI KETERSEDIAAN AIR TANAH BERDASARKAN ANALISIS DATA TAHANAN JENIS KONFIGURASI SCHLUMBERGER DAN NERACA AIR DI LAPANGAN "X", KABUPATEN ASAHAN, PROVINSI SUMATERA UTARA

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Air merupakan salah satu kebutuhan vital bagi kelangsungan makhluk hidup. Pertumbuhan penduduk dan perkembangan industri meningkatkan kebutuhan akan air, begitu pula di Kabupaten Asahan. Oleh karena itu, penelitian yang berkaitan dengan ketersediaan air tanah telah dilakukan di Lapangan "X", Kabupaten Asahan yang terletak pada koordinat 2°03'- 3°26' Lintang Utara, 99°1'-100°0' Bujur Timur.

Penelitian ini dilakukan dengan memanfaatkan 2 data, yaitu data tahanan jenis konfigurasi *schlumberger* dan neraca air. Jumlah titik pengukuran dalam pengukuran tahanan jenis adalah 27 titik. Data neraca air merupakan data perhitungan curah hujan dan evapotranspirasi yang dapat diakses melalui BMKG. Pengolahan data tahanan jenis meliputi pengolahan inversi 1D, korelasi antar titik untuk melihat kemenerusan akuifer, pembuatan peta ketebalan, kedalaman dan zonasi akuifer, pemodelan 3D akuifer serta perhitungan neraca air (*water balance*) untuk menentukan kondisi air di permukaan.

Berdasarkan analisis dan interpretasi terhadap hasil pengolahan, nilai resistivitas akuifer pada lokasi penelitian cukup variatif, yaitu antara 20 Ω.m hingga 100 Ω.m dimana lapisan yang berperan menjadi akuifer adalah lapisan pasir, pasir lempungan, pasir kerikilan dan breksi tufaan. Ketebalan minimal dari akuifer adalah 10 meter dan ketebalan maksimal adalah 165 meter. Kedalaman akuifer juga tergolong cukup beragam, antara 7 m hingga 200 m. Model 3D menunjukkan bahwa akuifer pada daerah penelitian menebal ke arah tenggara. Potensi akuifer di daerah penelitian cukup baik karena ketebalan dari masing-masing akuifer yang cukup besar, yaitu 10 m hingga 165 m . Sementara itu, ditinjau dari hasil perhitungan neraca air, selama periode 2010 hingga 2015 terjadi kondisi defisit (kekurangan air), sedangkan pada tahun 2016 terjadi kondisi *surplus* (kelebihan air). Analisis dari dua jenis data yang digunakan, data tahanan jenis dan neraca air, memberikan kesimpulan bahwa walaupun potensi akuifer di daerah penelitian baik, namun ketersediaan air tanah belum tentu baik dikarenakan kondisi air permukaan yang berperan sebagai *supply* bagi akuifer sering kali defisit.

Kata kunci: Air tanah, Tahanan jenis, *Schlumberger*, Neraca air.

ABSTRACT

STUDY OF GROUNDWATER AVAILABILITY CONDITIONS BASED ON ANALYSIS OF RESISTIVITY DATA OF SCHLUMBERGER CONFIGURATION AND WATER BALANCE IN "X" FIELD, ASAHAN REGENCY, NORTH SUMATERA PROVINCE

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Water is one of the vital needs for the survival of living things. Population growth and industrial development increase the need for water, as well as in Asahan District. Therefore, research related to groundwater availability has been carried out at "X" Field, Asahan Regency exactly at coordinate 2°03'- 3°26' North Latitude, 99°1'-100°0' East Longitude .

This research was conducted by utilizing 2 data, namely data resistance type schlumberger configuration and water balance. The number of measurement points in the type of resistance measurement is 27 points. The water balance data is a calculation of rainfall and evapotranspiration data that can be accessed through BMKG. Type resistance data processing includes 1D inversion processing, correlation between points to see aquifer continuity, thickness map thickness, aquifer depth and zoning, 3D aquifer modeling and water balance calculation to determine surface water conditions.

Based on the analysis and interpretation of the processing results, the resistivity value of the aquifer in the study location is quite varied, ie between 20 Ω.m to 100 Ω.m where the layers that play the role of aquifer are layers of sand, clay sand, gravel sand and tuffaceous breccia. The minimum thickness of the aquifer is 10 meters and the maximum thickness is 165 meters. The depth of the aquifer is also quite varied, between 7 m to 200 m. The 3D model shows that aquifers in the study area thicken to the southeast. The potential of aquifers in the study area is quite good because the thickness of each aquifer is quite large, 10m to 165 m. Meanwhile, in terms of the calculation of the water balance, during the period of 2010 to 2015 deficit conditions occurred (lack of water), while in 2016 there was a surplus condition (excess water). Analysis of the two types of data used, data on type and water balance, gives the conclusion that although aquifer potential in the study area is good, groundwater availability is not necessarily good because the surface water conditions that act as a supply for aquifers are often deficit.

Keywords: Groundwater, resistivity, Schlumberger, water balance.