

Delineasi zona permeable dengan menggunakan metode gravitasi dan audio magnetotellurik di daerah prospek geothermal "X" = Delineation of permeable zone by using audio magnetotelluric and gravity methodes in "X" geothermal prospect area / Ahmad Fitra Ritonga

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Abstrak

ABSTRAK

Penelitian di daerah prospek geothermal "X" bertujuan untuk mendelineasi zona permeable berdasarkan data audio magnetotellurik dan gravitasi yang dipadu dengan data geologi dan geokimia. Analisis data geologi dengan teknik remote sensing diidentifikasi dua struktur utama yang mengarah dari Utara - Selatan dan Barat Laut ndash; Tenggara dan terdapat satu lokasi alterasi yang berkorelasi dengan kemunculan manifestasi permukaan. Analisis data geokimia menunjukkan bahwa manifestasi fumarol merupakan manifestasi tipe upflow dan manifestasi air panas AP X1 dan AP X2 merupakan tipe manifestasi outflow. Geotermometer gas menunjukkan temperatur reservoir adalah sekitar 290 C. Analisis data geofisika menggunakan 35 data titik ukur audio magnetotellurik dan 194 titik ukur gravitasi. Berdasarkan inversi 3D data AMT dan forward modelling gravitasi terdapat lapisan penudung cap rock dengan nilai resistivitas rendah le; 10 m dan densitas 2.1 gr/cc yang diduga merupakan batuan produk Gunung BA Muda yang mengalami alterasi. Batuan cap rock sudah terlihat mulai dari permukaan dan menebal ke arah manifestasi AP X1 dengan kedalaman sekitar 500 meter dengan ketebalan 500 meter hingga 1000 meter Di bawah batuan cap rock terdapat batuan reservoir dengan nilai resistivitas sedang >10 s.d 65 m dan densitas 2,6 gr/cc. Batuan ini diinterpretasikan sebagai respon dari batuan Lava BU. Lapisan heat source berada di bawah reservoir dengan nilai resistivitas >100 m yang diduga merupakan satuan batuan aktivitas vulkanik Gunung BA. Top of Reservoir TOR diperkirakan berada pada kedalaman 500 m dari permukaan yang teridentifikasi pada elevasi 0 meter. Analisis kurva splitting diperoleh bahwa zona permeable kemungkinan berada di sebelah Timur Gunung BA dikarenakan area tersebut cenderung naik dibandingkan dengan area sekitarnya. Analisis kurva splitting ini memberi penguatan terhadap interpretasi struktur terpadu interpretasi struktur berdasarkan Geologi, FHD, peta resistivitas 3D AMT per elevasi . Luas zona prospek sebesar 1.5 km2 yang berada disebelah Timur Gunung BA.

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ABSTRACT

The research in "X" geothermal prospect area aimed to delineate permeable zone based on audio magnetotelluric and gravity data integrated with geology and geochemistry data. Geological analysis with remote sensing technique identified two main structures that lead from North ndash South and Northwest ndash Southeast and found one altered location which correlate with the appearance of surface manifestation. Geochemical analysis shows that fumarole is the upflow zone and manifestations which appear in AP X1 and AP X2 are the outflow zone. Gas geothermometer shows that the reservoir temperature is about 290 C. The analysis of geophysics data used 35 audio magnetotelluric points and 194 gravity points. Based on 3D AMT data inversion and gravity forward modelling, there is cap rock layer with low resistivity le 10 m and density 2.1 gr cc expected as product rocks of young AB Mountain that altered. Cap rock finds

in the surface and thickened toward AP X1 manifestation with depth about 500 meters with thickness 500 meters up to 1000 meters. Under cap rock layer, there is reservoir rock layer with medium resistivity 10 s.d 65 m and density 2,6 gr cc. This rock is interpreted as the response from Lava BU rocks. Heat source layer is located underneath reservoir rock layer with resistivity value 100 m which is interpreted as BA volcanic rock. Top of Reservoir TOR is estimated in depth of 500 m from the surface and identified at elevation 0 meter. Analysis of curve splitting is obtained that permeable zone possibly located at East BA Mountain because the area were tending to increase compared with the surrounding area. Analysis of curve splitting strengthen integrated interpretation structure interpretation structure based on Geology, FHD, Map of 3D AMT resistivity per elevation . The prospect area is about 1.5 km² which located in East BA Mountain.