INTISARI

Metode MT, CSAMT, dan TDEM Terintegrasi untuk Mendesain Model Konseptual Panasbumi Lapangan Wayang Windu, Jawa Barat

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Magnetotelluric (MT), *Control Source Audio-Frequency Magnetotelluirc* (CSAMT), dan *Time Domain Electromagnetic* (TDEM) merupakan metode geofisika elektromagnetik yang efektif dalam eksplorasi panasbumi. Penelitian ini dilakukan di lapangan Wayang Windu, Jawa Barat dengan tujuan untuk menentukan model konseptual panasbumi berdasarkan kontras nilai resistivitas batuan. Batuan reservoar, batuan penudung, dan batuan sumber panas memiliki resistivitas berbeda sehingga dapat ditentukan kedalamanya di bawah permukaan.

Daerah penelitian memiliki topografi curam dan heterogenitas medium di dekat permukaan, sehingga menyebabkan efek pergeseran statik pada kurva resistivitas semu. Salah satu teknik yang dilakukan adalah koreksi statik memanfaatkan metode *Time Domain Electromagnetic* (TDEM). Proses inversi 1D untuk nilai resistivitas semu menggunakan metode *Bostick* dan *Occam* sehingga memperoleh model lapisan di bawah permukaan. Interpretasi menambahkan informasi geologi berupa struktur sesar dan variasi litologi serta informasi suhu, kedalaman reservoar dan kondisi litologi bawah permukaan dari data lubang bor. Hubungan antara *slope* resistivitas, gradien resistivitas (*RG*), serta gradien suhu dapat digunakan memprediksi klasifikasi potensi sumur dari produksi sangat tinggi sampai sangat rendah.

Interpretasi model resistivitas bawah permukaan menunjukan nilai resistivitas *overburden layer* >40 ohm.m, batuan penudung <5 ohm.m, reservoar >5 – 40 ohm.m, dan sumber panas >100 ohm.m. Kedalaman *top of reservoir* bervariasi dari 750 – 900 meter di bawah permukaan. Integrasi data geofisika, geologi, dan sumur menghasilkan model konseptual panasbumi lapangan Wayang Windu yang merepresentasikan zona *up flow*, *out flow*, *primary recharge*, *secondary recharge*, patahan, rekahan, dan sebaran litologi bawah permukaan.

Kata Kunci : MT, CSAMT, TDEM, *slope* resistivitas, gradien resistivitas, gradien suhu, panasbumi

ABSTRACT

Integrated MT, CSAMT, and TDEM Methods to Design Conceptual Models of Wayang Windu Geothermal Field, West Java

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Magnetotelluric (MT), Control Source Audio-Frequency Magnetotelluric (CSAMT),and Time Domain Electromagnetic (TDEM) are electromagnetic geophysical methods that are effective in geothermal exploration. This research was conducted in the Wayang Windu field, West Java in order to determine the conceptual model of geothermal based on the contrast of rock resistivity. Reservoir, the clay cap, and heat source have different resistivities which can be used to determine the depth of subsurface

The research area has a steep topography and heterogeneity of medium near the surface, that causing static shift effect on the apparent resistivity curve. One technique to reduced the static shift uses Time Domain Electromagnetic (TDEM) method. 1D inversion process for apparent resistivity values using methods Bostick and Occam so as to obtain model of subsurface layers. Interpretation was done by adding information such as geological fault structure and lithological variations and temperature information, the depth of reservoir and subsurface lithological conditions of the borehole data. Relationship between the resistivity slope, resistivity gradient (RG), and temperature gradient can be predicted well the potential classification of production is very high to very low.

The interpretation of the subsurface reisistivity models show resistivity values of overburden layer >40 ohm.m, clay cap <5 ohm.m, reservoir >5-40 ohm.m, and the heat source >100 ohm.m. The depth of top of reservoir varies from 750-900 meters below the surface. The overall integration of geophysical, geological, and well data produced the conceptual models of Wayang Windu geothermal field to represent up flow , out flow, primary recharge, secondary recharge, fault, fracture, and estimates of the subsurface lithology.

Keyword : MT, CSAMT, TDEM, resistivity slope, resistivity gradient, temperature gradient, geothermal