

Prospek zona permeabilitas sekunder lapangan geothermal hn berdasarkan analisis terpadu penginderaan jauh, data geologi dan magnetotellurik = Prospect of secondary permeability zone of hn geothermal field using integrated analysis of remote sensing geology and magnetotelluric data

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Abstrak

Penentuan prospek zona permeabilitas sekunder ditentukan melalui analisis terpadu penginderaan jauh, data geologi, magnetotellurik dan gravitasi. Berdasarkan analisis penginderaan jauh, kelurusan yang berkembang berarah dominan Baratlaut-Tenggara dan Timurlaut-Baratdaya dengan kerapatan 2.5-3.2 km/km², berkorelasi dengan kemunculan manifestasi dan alterasi yang berkembang didaerah penelitian. Perkiraan zona alterasi dan manifestasi menggunakan Metoda Direct Principal Component DPC pada citra Landsat 7 ETM menghasilkan area terduga seluas 73 km² dari 160 km² luasan area penelitian yang terkonfirmasi berdasarkan peta sebaran alterasi dan manifestasi yang berada didalam area terduga. Berdasarkan pemodelan inversi 3D MT dan forward modelling 2D data gravitasi, lapisan claycap bernilai resistivitas < 10 ?m dengan densitas 1.7-1.9 gr/cc merupakan alterasi argilik pada formasi Aimere dan Siutoro. Top of Reservoir TOR ditandai dengan keberadaan alterasi propilitik pada sumur MT-02 berada pada kisaran kedalaman 400-600 mdpl dengan ketebalan reservoir berkisar 800-1000 m dengan nilai resistivitas 10-100 ?m dan densitas 2.1-2.6 gr/cc yang diperkirakan berada pada formasi vulkanik tua. Heatsource diperkirakan merupakan tubuh intrusi formasi Bajawa dibagian Timurlaut dan pluton formasi kompleks kerucut breksi vulkanik dibagian Baratdaya dengan nilai resistivitas >150 ?m dan densitas 2.7-3.1 gr/cc. Manifestasi berupa mataair panas ML1 dan ML2, fumarol dan kolam lumpur panas diperkirakan merupakan upflow dari sistem geothermal berasosiasi dengan Tinggian Vulkanik dengan karakter Fluida 2 Fasa yang berada diatas heatsource dibagian Timurlaut. Perkiraan temperatur reservoir berkisar 200-300°C berdasarkan profil temperatur sumur MT-02 dan geotermometer gas. Delineasi daerah prospek reservoir ditentukan seluas 1.6 km² berdasarkan hasil depth slice elevasi 400m pemodelan inversi 3D MT. Rekomendasi sumur pemboran trajectory menargetkan sesar F08 Sesar Waeluja mengacu kepada hasil analisis curve splitting, FHD, SVD yang mengkonfirmasi keberadaan struktur bawah permukaan diperkirakan merupakan prospek zona permeabilitas sekunder dengan temperatur dan permeabilitas tinggi.

.....Prospect identification of secondary permeability zone determined by using integrated analysis of remote sensing, geological, magnetotelluric and gravity data. Lineament pattern characterized the geological structural development dominates on NW SE and SW NE direction with lineament density reach 2.5-3.2 km km² correlates with the appearance of surface manifestation and alteration zone within research area. Prediction of alteration and manifestation by using Direct Principal Component DPC technique from Landsat 7 ETM image resulting predicted area of 73 km² out of 160 km² research area and confirmed by comparing with the alteration and manifestation map from the previous research. 3D MT inversion model and 2D forward modelling gravity resulting geophysical characterization of the geothermal system. Claycap characterize as resistivity value 10 m with density 1.7 1.9 gr cc refer to Aimere and Siutoro argillic altered formation. Top of Reservoir TOR identifies in comparison with log description MT 02 well with the

appearance of prophylic alteration found at elevation of depth 400-600 msl with thickness of reservoir 800-1000m below characterized as resistivity value 10-100 m with density 2.1-2.6 gr/cc interpreted as old volcanic formation. Heat source interpreted as intrusive body of Bajawa formation found on the Northeastern part while at the Southwestern part related with the pluton of the breccia volcanic cone complex with the resistivity value 150 m and the density value 2.7-3.1 gr/cc. Surface manifestation lies above the heat source at Northeastern identified as the upflow zone of the typical Volcanic Associated Geothermal System on High Terrain with the 2 Phase Fluid characteristic. Reservoir temperature predicted 200-300°C based on temperature profile from well MT 02 and gas geothermometer. Delineation of the reservoir prospect area determined 1.6 km² wide based on depth slice of 3D MT inversion at elevation 400 msl. Recommended trajectory drilling well, targeting F08 fault Waeluja Fault based on the result of confirmation of the occurrence subsurface geological structure using curve splitting, FHD, SVD predicted as the prospect of secondary high permeability zone and high temperature.