

# Rekonstruksi sistem geothermal berdasarkan hasil korelasi inversi 3D data MT dan data pemboran di lapangan geothermal Lumut Balai = Reconstruction of geothermal system based on result of correlation of inversion 3D data and drilling data in Lumut Balai geothermal field / Sibarani, Martha Relitha

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## Abstrak

[Kegiatan eksplorasi geothermal bertujuan mengetahui sistem geothermal daerah penyelidikan yang meliputi model dan batas prospek, karakteristik dan potensial reservoir dan hidrogeologi, untuk penentuan target pemboran, dilanjutkan dengan pemboran eksplorasi. Hasil inversi 3-dimensi data MT akan menyajikan distribusi struktur resistivitas bawah permukaan.

Pemboran eksplorasi geothermal bertujuan untuk membuktikan adanya sumber daya geothermal dan menguji model sistem geothermal yang telah dibuat. Kriteria target pemboran adalah area yang memiliki temperature dan permeabilitas yang tinggi. Pada waktu pemboran sumur panas bumi ditembusnya zona bertemperatur tinggi yang disertai atau diikuti dengan terjadinya loss of circulation sangat diharapkan (permeabilitas tinggi), karena merupakan suatu indikasi telah ditembusnya rekahan-rekahan yang diharapkan merupakan zona produksi (feed zone).

Untuk menguji model sistem yang dibuat dilakukan korelasi antara data hasil pemboran dengan inverse 3D data MT, khususnya nilai resistivity lapisan dengan data temperatur, kandungan mineral alterasi, geokimia dari data pemboran.

Dari hubungan antar parameter akan terlihat karakteristik sistem geothermal di daerah penyelidikan, yang memperlihatkan zona prospek yang berhubungan dengan temperature dan permeabilitas yang tinggi. Dari hasil evaluasi akan dilakukan rekonstruksi sistem geothermal daerah penyelidikan, yang lebih mendekati kondisi bawah permukaan dan dapat dipergunakan untuk membuat rekomendasi pemboran selanjutnya dan arah pengembangan di masa yang akan datang; Geothermal exploration activities aimed at knowing the geothermal system that includes model and boundary the prospects, potential and reservoir characteristics and also hydrological system. By using 3D inversion of MT data, subsurface resistivity distribution structure can be obtained and with the addition of other geosciences data, Lumut Balai geothermal system can be constructed. Furthermore, drilling targets zone can be identified from geothermal system which then followed by exploration drilling .

Geothermal exploration drilling is carried out to verify the existence of geothermal resources and test the geothermal systems which previously has been made. Drilling target criteria is the area which consist of high temperature and permeability. During geothermal drilling, it is expected that high temperature zone shall be encountered. It will be followed by loss circulation zone which indicates that fractures have already been penetrated and confirm that feed zone has been discovered.

In order to test constructed model, correlation between drilling data and 3D MT inverse is carried out, particularly values of resistivity layer with temperature data, alteration mineral composition, and geochemical data derived from drilling.

Parameter correlation will explain geothermal system characteristics in study area which delineates prospect

zones and its association with high temperature and permeability. The evaluation results of this study will reconstruction geothermal system the investigation area, which can be used to develop a recommendation of subsequent drilling and further development direction; Geothermal exploration activities aimed at knowing the geothermal system that includes model and boundary the prospects, potential and reservoir characteristics and also hydrological system. By using 3D inversion of MT data, subsurface resistivity distribution structure can be obtained and with the addition of other geosciences data, LumutBalai geothermal system can be constructed. Futhermore, drilling targets zone can be identified from geothermal system which then followed by exploration drilling .

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