

RINGKASAN

Lapangan panas bumi NDM letak lokasinya berada di Kabupaten Tanggamus, Provinsi Lampung. Pada area yang berdekatan dengan lapangan panas bumi NDM sebelumnya telah dilakukan pemboran sumur eksplorasi SRA-001, SRA-002 dengan kedalaman 1160 m dan 570 m. Pada area lapangan panas bumi NDM akan dilakukan perencanaan kapasitas rig untuk pemboran eksplorasi disumur SWR-001 dengan tipe “*big hole*” pada kedalaman akhir 2500 m untuk mencapai target reservoir panas bumi yang memiliki suhu 275°C. dimana jenis reservoir pada sumur SWR-001 berupa batu andesit.

Metodologi dalam pemilihan kapasitas rig pemboran sumur SWR-001 lapangan panas bumi NDM meliputi pengumpulan data pemboran berupa data profil sumur, data *casing*, dan data densitas lumpur. Komponen utama yang berpengaruh pada perhitungan besarnya *horse power* yang dibutuhkan rig yaitu sistem angkat, sistem putar dan sistem sirkulasi. Pada sistem angkat besarnya *horse power* yang dibutuhkan dipengaruhi oleh kecepatan pengangkatan *travelling block*, beban *hook* dan faktor efisiensi dari *drilling line*. Pada sistem putar besarnya *horse power* dipengaruhi oleh besarnya rpm, besarnya torsi maksimum dan kedalaman target. Pada sistem sirkulasi besarnya *horse power* yang dibutuhkan dipengaruhi oleh kecepatan pemompaan dan *pressure loss* sepanjang sistem sirkulasi. Total *horse power* didapatkan dari menjumlahkan *horse power* dari sistem angkat, sistem putar, sistem sirkulasi dan *safety factor*. Besarnya biaya sewa rig didapatkan dari biaya sewa rig per hari dengan rencana lamanya waktu pemboran.

Hasil dari perhitungan pada beban total menara didapatkan nilai sebesar 331.549 lb. Hasil perhitungan pada sistem angkat didapatkan nilai *horse power drawwork* sebesar 452 hp dan *horse power prime mover* sebesar 502 hp. Pada sistem putar didapatkan nilai rpm kritis sebesar 242, *yield strenght* sebesar 82731 psi, torsi sebesar 38.100 lb/ft, *drawwork* sebesar 290 hp dan *horse power prime mover* sebesar 322 hp. Pada sistem sirkulasi didapatkan nilai *horse power* sebesar 453 hp. *Safety factor* rig sebesar 100 Hp. Berdasarkan hasil analisis beban, didapatkan nilai kapasitas rig sebesar 1.377 hp. Namun rig yang tersedia dipasar 1500 hp. Waktu pemboran selama 28 hari dan biaya sewa rig per hari US\$ 20.00 sehingga biaya sewa rig sebesar US\$ 841,250.00. Biaya mobilisasi dan demobilisasi sebesar US\$ 630,938.00. Biaya *rig up* dan *rig down* sebesar US\$ 240,000.00. Total biaya yang harus dikeluarkan sebesar US\$ 1,712,188.00.

Kata kunci: *Hoisting System, Rotating System, Circulating System*, Kapasitas rig, Biaya sewa rig.

ABSTRAK

The NDM geothermal field is located in Tanggamus Regency, Lampung Province. In the area adjacent to the NDM geothermal field, exploration wells SRA-001 and SRA-002 were previously drilled with depths of 1160 m and 570 m. In the NDM geothermal field area, capacity planning for the rig for exploratory drilling in the SWR-001 well with the “big hole” type at a final depth of 2500 m will be carried out to reach the target geothermal reservoir which has a temperature of 275 °C. where the type of reservoir in the SWR-001 well is andesite.

The methodology for selecting the capacity of the SWR-001 geothermal field drill rig SWR-001 includes the collection of drilling data in the form of well profile data, casing data, and mud density data. The main components that affect the calculation of the amount of horse power needed by the rig are the lift system, rotary system and circulation system. In the lifting system, the amount of horse power required is influenced by the lifting speed of the traveling block, the hook load and the efficiency factor of the drilling line. In the rotary system, the amount of horse power is affected by the amount of rpm, the amount of maximum torque and the depth of the target. In a circulating system, the amount of horse power required is influenced by the pumping speed and pressure loss along the circulation system. Total horse power is obtained from adding up the horse power of the lifting system, rotary system, circulation system and safety factor. The amount of the rig rental fee is obtained from the rig rental fee per day with the planned drilling time.

The results of the calculation on the total tower load obtained a value of 331.595 lb. The results of calculations on the lifting system obtained a horse power drawwork value of 452 hp and a prime mover horse power of 502 hp. The rotary system obtained a critical rpm value of 242, yield strength of 82731 psi, torque of 38.100 lb/ft, drawwork of 290 hp and horse power prime mover of 322 hp. In the circulation system, the horse power value is 453 hp. Rig safety factor of 100 Hp. Based on the results of the load analysis, the rig capacity value is 1.377 hp. But the rigs available in the market are 1500 hp. The drilling time is 28 days and the rig rental fee is US\$ 20.00 per day, so the rig rental fee is US\$ 841,250.00. The mobilization and demobilization costs were US\$ 630,938.00. Rig up and rig down costs US\$ 240,000.00. The total cost that must be incurred is US \$ 1,712,188.00.

Key words: Hoisting System, Rotating System, Circulating System, Rig capacity, Rig cost.