

## RINGKASAN

Struktur KAS merupakan salah satu struktur penghasil minyak di Lapangan ATR dengan jumlah sumur penghasil minyak sebanyak 67 sumur dimana sebanyak 48 sumur diproduksi menggunakan *artificial lift* berupa *Progressive Cavity Pump* (PCP). Data hasil perawatan sumur selama periode tahun 2019 menunjukkan bahwa dari 48 sumur PCP di Struktur KAS yang memiliki *lifetime* kurang dari 6 bulan sebanyak 25 %, memiliki *lifetime* 6-12 bulan sebanyak 23 % dan memiliki *lifetime* diatas 12 bulan sebanyak 52 % populasi. Sumur ATR-17 diproduksi dari layer b/400 dan memiliki *lifetime* hanya 5 hari yang disebabkan oleh kerusakan elastomer yang merupakan salah satu komponen utama pompa PCP. Sumur ATR-19 diproduksi dari layer d/320 dengan *lifetime* rata-rata 46 hari yang disebabkan oleh permasalahan berulang berupa tubing bocor. Rendahnya *lifetime* sumur berdampak pada proses pengurusan minyak dan timbulnya biaya tambahan untuk pekerjaan perawatan sumur. Oleh karena itu untuk menjawab permasalahan tersebut dengan tetap memperhatikan kaidah keteknikan yang baik (*good engineering practices*) diperlukan perancangan ulang pompa PCP di Struktur KAS Lapangan ATR.

Untuk mengetahui penyebab rendahnya *lifetime* sumur digunakan metodologi penelitian dengan terlebih dahulu melakukan pengumpulan data berupa data reservoir, data sifat fisik fluida, data teknis sumur, data test sumur dan data perawatan sumur. Kemudian data tersebut dianalisa dan diolah untuk mengetahui *lifetime* sumur PCP yang ada di Struktur KAS. Setelah itu dilakukan evaluasi pompa eksisting dan dilakukan perancangan ulang berdasarkan data terbaru. Hasil perancangan ulang diaplikasikan ke sumur ATR-17 dan ATR-19 kemudian dilakukan perbandingan *lifetime* sumur.

Hasil dari penelitian ini diperoleh bahwa perancangan ulang pompa yang dilakukan di sumur ATR-17 dengan kombinasi metode dengan mengurangi potensi gesekan antara *sucker rod* dan tubing dan mengganti material tubing dengan bahan yang lebih tahan dengan gesekan mekanis mampu mengatasi permasalahan tubing bocor dimana hal ini terlihat dari *lifetime* sumur ATR-17 meningkat dari rata-rata 46 hari menjadi 15 bulan dengan total penghematan biaya sebesar Rp. 1.511.697.012. Sementara perancangan ulang yang dilakukan di Sumur ATR-19 dengan pemilihan elastomer yang tepat sesuai dengan rekomendasi *elastomer compatibility test* mampu mengatasi permasalahan kerusakan dini elastomer dimana hal ini terlihat dari *lifetime* sumur ATR-19 meningkat dari 5 hari menjadi lebih dari 13 bulan dengan total penghematan biaya sebesar Rp. 4.124.249.222.

Kata kunci: *progressive cavity pump*, PCP, *lifetime*, perancangan ulang, *pump stuck*, elastomer.

## ABSTRACT

The KAS structure is one of the oil-producing structures in the ATR Field with a total of 67 oil-producing wells of which 48 wells are produced using an artificial lift Progressive Cavity Pump (PCP). The data on the results of well service during the 2019 period show that of the 48 PCP wells in the KAS Structure that have a lifetime of fewer than 6 months as much as 25%, have a lifetime of 6-12 months as much as 23% and have a lifetime above 12 months as much as 52% of the population. The ATR-17 well is produced from layer b/400 and has a lifetime of only 5 days caused by damage to the elastomer which is one of the main components of the PCP pump. The ATR-19 well is produced from layer d/320 with an average lifetime of 46 days caused by repeated problems in the form of leaking tubing. The low life of the well has an impact on the oil draining process and the emergence of additional costs for well maintenance work. Therefore, to answer these problems while still taking into account good engineering practices, it is necessary to redesign the PCP pump in the ATR Field KAS Structure

To find out the cause of the low life of the well, a research methodology was used by first collecting data in the form of reservoir data, fluid physical properties data, well technical data, well test data, and well service data. Then the data is analyzed and processed to determine the lifetime of the PCP wells in the KAS Structure. After that, an evaluation of the existing pump was carried out and a redesign was carried out based on the latest data. The results of the redesign were applied to the ATR-17 and ATR-19 wells and then a comparison of the lifetime of the wells was carried out.

The results of this study obtained that the pump redesign carried out in the ATR-17 well with a combination of methods by reducing the potential for friction between the sucker rod and tubing and replacing the tubing material with a material that is more resistant to mechanical friction can overcome the problem of leaking tubing where this can be seen from the lifetime ATR-17 wells increased from an average of 46 days to 15 months with a total cost savings of Rp. 1,511,697,012. While the redesign carried out at the ATR-19 well with the selection of the right elastomer following the elastomer compatibility test recommendations was able to overcome the problem of premature elastomer damage where this can be seen from the lifetime of the ATR-19 well which increased from 5 days to more than 13 months with total cost savings. of Rp. 4,124,249,222.

Keywords: progressive cavity pump, PCP, lifetime, redesign, pump stuck, elastomer.