

ABSTRAK

ANALISIS *PROBLEM SUCKER ROD PUMP* (SRP) BERDASARKAN BEBAN *SUCKER ROD* DAN KARAKTERISTIK AIR FORMASI PADA SUMUR “TAM-27” LAPANGAN “BUNAN”

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Sumur TAM-27 menggunakan sistem angkat buatan berupa *Sucker Rod Pump* (SRP) dan terletak di Lapangan Bunan. Sumur ini diproduksi dengan SRP yang terpasang pada kedalaman 2041 ft, dengan kedalaman total sumur mencapai 2428 ft. Pompa dioperasikan dengan panjang langkah sebesar 100 inci dan kecepatan 7.5 spm, dalam kondisi *water cut* sebesar 97%. Produksi total sumur mencapai 447 blpd, produksi minyak 9.5 bopd, dan produksi air 437.6 bwpd. Sumur TAM-27 memiliki *problem* berupa patahnya *plunger*. Maka perlu dilakukan analisis penyebab patahnya *plunger*.

Analisis terhadap Sumur TAM-27 dilakukan melalui dua pendekatan utama, yaitu analisis beban *sucker rod* dan analisis karakteristik air formasi. Analisis beban *sucker rod* didasarkan pada data *dynagraph* melalui interpretasi grafik beban langkah, serta dilakukan perbandingan terhadap nilai *Peak Polished Rod Load* (PPRL) untuk menilai performa sistem angkat buatan. Sementara itu, analisis air formasi dilakukan dengan menentukan nilai pH serta menggunakan diagram Stiff untuk membandingkan konsentrasi anion dan kation dominan, guna mengidentifikasi senyawa kimia yang paling berpengaruh.

Berdasarkan hasil evaluasi pompa, nilai beban pada *sucker rod* dengan PPRL sebesar 7459.6 lb tidak menjadi penyebab utama kerusakan pada *plunger*. Sebaliknya, hasil analisis air formasi dengan nilai pH 6 yang menunjukkan sifat asam, serta konsentrasi ion klorida (Cl^-) sebesar 303 me/l dan natrium (Na^+) sebesar 350 me/l yang berpotensi membentuk senyawa NaCl dengan tingkat salinitas yang tinggi. Hal ini menyebabkan lingkungan sumur bersifat sangat korosif. Diperkuat dengan perhitungan laju korosi yang mencapai 5 mm/tahun, yang menunjukkan tingkat ketahanan korosi tergolong buruk (*poor*). Berdasarkan analisis didapatkan penyebab patahnya *plunger* dikarenakan korosi. Oleh karena itu, disarankan penerapan solusi mitigasi korosi untuk mengatasi permasalahan yang terjadi.

Kata kunci: Air Formasi, Analisis Beban, Korosi, *Sucker Rod Pump*

ABSTRACT

ANALYSIS OF SUCKER ROD PUMP (SRP) PROBLEMS BASED ON SUCKER ROD LOAD AND FORMATION WATER CHARACTERISTICS AT WELL “TAM-27” “BUNAN” FIELD

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The TAM-27 well utilizes a Sucker Rod Pump (SRP) artificial lift system and is located in the Bunan Field. The well was produced with the SRP installed at a depth of 2041 ft, with a total well depth of 2428 ft. The pump operated with a stroke length of 100 inches and a speed of 7.5 spm, under water cut conditions of 97%. Total well production reached 447 blpd, oil production 9.5 bopd, and water production 437.6 bwpd. The TAM-27 well has a problem in the form of a broken plunger. It is necessary to analyze the cause of the broken plunger.

The analysis of the TAM-27 Well was conducted through two main approaches, namely sucker rod load analysis and formation water characteristics analysis. The sucker rod load analysis was based on dynagraph data through interpretation of the step load graph, and a comparison was made to the Peak Polished Rod Load (PPRL) value to assess the performance of the artificial lift system. Meanwhile, formation water analysis was conducted by determining pH values and using Stiff diagrams to compare dominant anion and cation concentrations, in order to identify the most influential chemical compounds.

Based on the pump evaluation results, the load value on the sucker rod with PPRL of 7459.6 lb is not the main cause of damage to the plunger. On the contrary, the results of formation water analysis with a pH value of 6 which indicates acidic properties, as well as a concentration of chloride ions (Cl-) of 303 me/l and sodium (Na⁺) of 350 me/l which has the potential to form NaCl compounds with high salinity levels. This causes the well environment to be highly corrosive. Reinforced by the calculation of the corrosion rate reaching 5 mm / year, which shows the level of corrosion resistance is classified as poor. Based on the analysis, it was found that the cause of the plunger fracture was due to corrosion. Therefore, it is recommended to implement corrosion mitigation solutions to overcome the problems that occur.

Keywords: Formation Water, Load Analysis, Corrosion, Sucker Rod Pump