

Pemodelan deposisi wax pada pipa minyak bawah laut dan strategi mitigasinya = Wax deposition modeling in subsea oil pipeline and its mitigation strategy

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Abstrak

[ABSTRAK

Minyak mentah yang memiliki kandungan wax tinggi dapat menyebabkan timbulnya permasalahan selama proses transportasi berlangsung. Jika titik awal pembentukan deposisi dapat diprediksi dengan baik dan laju pengendapan dapat dihitung secara akurat maka strategi penanganannya akan tepat sasaran.

Dalam penelitian ini, pembentukan deposisi wax diprediksi dengan menggunakan simulasi OLGA. Uji laboratorium atas sampel dari sumur Bravo dilakukan terlebih dahulu untuk mengetahui komposisi fluida, nilai WAT, jumlah fraksi wax dan viskositas. Karakterisasi dan tuning dilakukan dengan bantuan perangkat lunak PVTsim menggunakan hasil pengujian laboratorium. Hasil karakterisasi ini selanjutnya digunakan sebagai input bagi OLGA untuk memprediksi titik awal deposisi serta menghitung laju pengendapannya. Simulasi dilakukan pada laju alir 80000 bpd pada beberapa periode waktu. Kemudian dilakukan juga beberapa variasi laju alir untuk melihat pengaruhnya terhadap titik awal deposisi wax serta tingkat ketebalannya.

Untuk kasus lapangan Charlie-Bravo dengan laju alir 80000 bpd, titik awal deposisi wax terbentuk pada jarak 4 km pada temperatur 31,1 oC. Laju pengendapan akan terus meningkat seiring berjalannya waktu dan akan mencapai ketebalan 1 mm pada jarak 6,87 km setelah 82 hari. Rekomendasi untuk melakukan pigging dikeluarkan apabila ketebalan wax pada dinding pipa mencapai 1 mm agar peningkatan laju pengendapan dapat dikurangi.

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ABSTRACT

The presence of wax in crude oil can lead to the formation of wax deposit on the wall of pipelines. If we can predict the starting point for the formation of wax deposition and calculate the rate accurately then the appropriate mitigation can be well developed.

In this study, the wax deposition was predicted using OLGA simulation. Laboratory test from Bravo wells to determine the fluid composition, WAT, amount of wax fraction and viscosity shall be done first. This laboratory test result was then characterized and tuned using the PVTsim. The result was used as an input for OLGA to calculate the rate of wax deposition in pipelines. Simulation was conducted at a flow rate of 80000 bpd with the time of 1-60 days. The same thing was also done at several flow rates to see the effect of wax formation and its

level of thickness.

In the case of Charlie-Bravo field that produce 80000 bpd of liquid, wax began to precipitate at a distance of 4 km and temperature 31.1 oC. The deposition rate will continue to increase over the time and will get a thickness of 1 mm at the distance of 6.87 km after flowing for about 82 days Pigging is recommended if the wax thickness in the pipe achieves 1 mm. This is as a preventive maintenance to reduce an escalation of rate deposition.;The presence of wax in crude oil can lead to the formation of wax deposit on the wall of pipelines. If we can predict the starting point for the formation of wax deposition and calculate the rate accurately then the appropriate mitigation can be well developed.

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