

/ Expro Excellence

Fluids

Fluid Sampling & Analysis

Expro overcomes heavy oil challenges in Santos Basin, Brazil: industry-leading expertise and reliability; saved time and money; avoided environmental issues; 100% sampling success rate



Objectives

- Working with **Queiroz Galvão** for the first time, Expro (in a joint alliance with Baker Hughes) were commissioned to provide full well test services, including downhole sampling of reservoir fluids, specially programmed for heavy oil
- Two wells were drilled and tested back-to-back, which had anticipated challenges, specifically heavy oil with high viscosity and tight emulsified foaming, therefore Expro had to overcome real difficulties to capture representative hydrocarbon samples

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- Downhole and surface hydrocarbon fluid sampling during the DST operation
- Expro run in hole (RIH) 10 bottom hole samplers (PCS) using 5 Petrotech 15K TCS carriers on each well

- 10 out of 10 successfully sampled and transferred – industry-leading expertise
- 100% success rate achieved on both wells tested and sampled – reliability of tools and capability of personnel involved in difficult conditions
- Fluid analysis took place at Expro's laboratory in Macaé

Value to client

- Expro tools successfully captured representative samples, despite of the difficult hydrocarbon fluid type i.e. low API (14 °API) and high viscosity
- 100% success rate saved valuable time and money, as well as avoiding environmental dangers
- "Impeccable success in such stringent conditions"

Downhole and surface fluid sample acquisition demand customised sampling methods to overcome the following issues:

- Low oil mobility
- Sand production from unconsolidated formations
- High asphaltene content and resulting high gradients
- Formation of water-in-oil emulsion and formation during production of the well

The high viscosity oils exhibit slower gas liberation below the bubble point and therefore delayed gas-phase formation, posing a huge problem to maintain equilibrium in the separator, thus making "true" oil property measurements a challenge. Difficulties associated with fluid modelling include characterising apparent bubble point behaviour, large viscosity changes with pressure and temperature, and high asphaltene content.

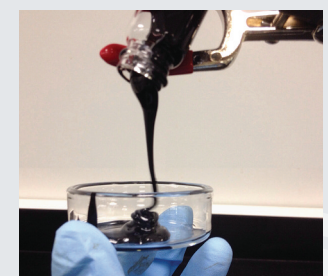
Additionally, Queiroz Galvão required a substantial volume of reservoir hydrocarbon fluid for reservoir fluid characterisation and process design. This provided them with good fluids property knowledge to pre-empt any flow assurance issues they experienced with the well and minimised problems with the completion string components.

Gostaria de destacar a performance das ferramentas de DST nas avaliações (TFR) nos dois poços localizados na Bacia de Santos: (BMS-4), de óleo pesado (14 API) e com lamina de agua de 1550m, como também a performance dos porta Amostradores e Registradores utilizados.

I would like to highlight the performance of DST tools in evaluations (TFR) in the two wells located in the Santos Basin: (BMS-4), heavy oil (14 API) and water proof 1550m, and also the performance of samplers and gauges used.

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