

Rosneft Tests 347 Wells Using Dual-Leg Diligens Spectra Mobile Multiphase Production Testing Unit

Mobile, fit-for-purpose unit accurately and efficiently supports three multiphase well tests per day, despite extreme flow rate variability

CHALLENGE

Conduct a four-month mobile campaign to test multiphase production for multiple wells with extreme flowrate variability.

SOLUTION

Deploy the Diligens Spectra* mobile multiphase production testing unit, which features two Vx Spectra* surface multiphase flowmeters — 19-mm and 40-mm venturi throat sizes — for an expanded operating envelope with superior metrology.

RESULTS

Successfully tested 347 wells, meeting campaign objectives with no HSE or quality issues.

“The Diligens Spectra unit allowed us to test up to three wells per day during our four month well test campaign. We achieved superior metrology, meeting our objectives, without HSE or quality issues.”

Rosneft



Extensive production well test campaign conducted across a large, remote oilfield

Since 2004, the Russian national oil company, Rosneft, has been developing the Vankor oil field, located in the northern part of Eastern Siberia. Since initial production, Rosneft has extracted more than 100 million tons of oil from the field. Maintaining the high production level requires continuous monitoring because of the complexity of the multilayered sandstone reservoir, which has known permeability and fluid property heterogeneity.

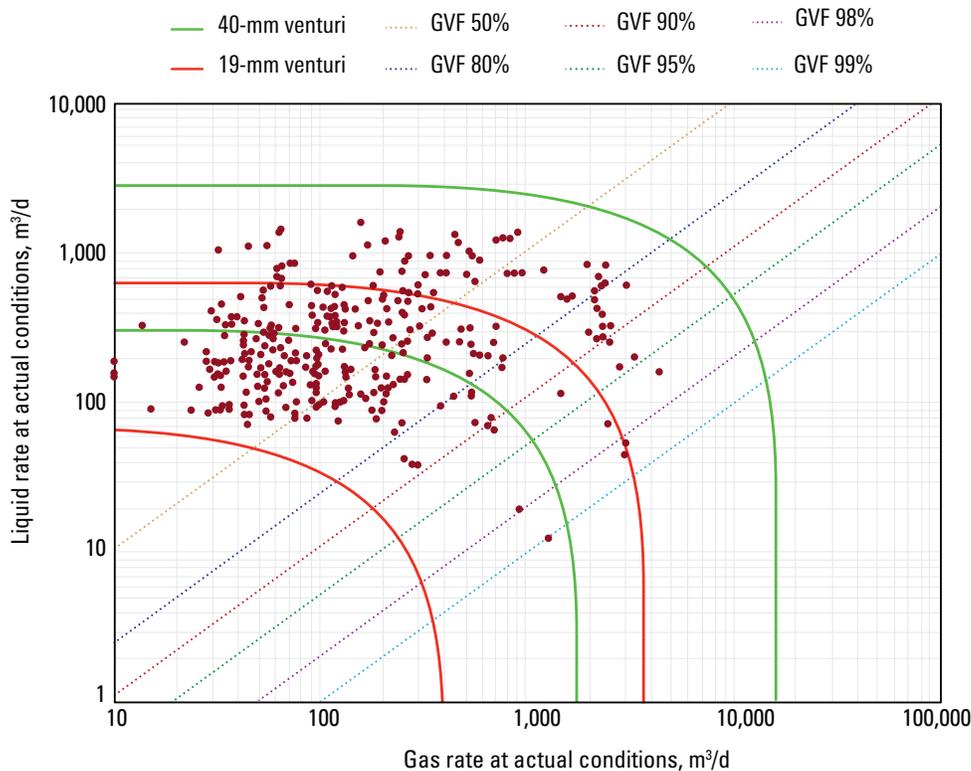
Each well in the field has to be periodically tested for gas, oil, and water flow rates, which range from 70 to 10,000 bbl/d. This requires advanced technology, ruggedized equipment, and experienced personnel to ensure accurate measurement of the complex fluid and flow regimes in the remote environment while maintaining safety and cost efficiency. Conventional mobile production testing technologies fail to accommodate the variability in production rates, deliver the required operational turnaround, and achieve superior metrology under the following conditions:

- High gas volume fraction (GVF) spanning from 10% to 98%
- Low effluent temperature up to -20 degC [-4 degF]
- Foaming, emulsion, and wax formation tendencies as well as 0 to 95% water cut.

Many of the wells have strategic importance for the field's production, and periodic monitoring is required to optimize production. Stringent production rate reporting requirements combined with the remote location and climate present many logistical implications for the team. The Vankor oil field is accessible by driving only 5 months of the year. During the remainder of the year, the oil field can be reached only by helicopter.



The Diligens Spectra unit in operation.



The expanded operating envelope with dual 19-mm and 40-mm venturi throat sizes made it possible to successfully test a wide range of flow rates and GVFs in meeting Rosneft's objectives during a 347-well test campaign.

Diligens Spectra unit provided superior metrology and efficiency

Based on the operational and environmental factors, Rosneft deployed the Diligens Spectra unit, which incorporates two multiphase flowmeters mounted on the same skid to expand the operating envelope with speed and accuracy. The two Vx Spectra multiphase flowmeters — 19-mm and 40-mm venturi throat sizes — provide repeatable flow rate measurements in any multiphase flow regime and in production fluids ranging from heavy oil to wet gas. The optimal venturi size is easily applied based on the flow rate of the specific well.

The Diligens Spectra units are suitable for off-road conditions and can work in full autonomy at the wellsite, without requiring an onsite forklift or crane and reducing the number of crew members needed on location. The mobility and agility of the Diligens Spectra units enable quick rig-up and rig-down — requiring no stabilization time and allowing the initiation of well tests within three hours of arriving on location. For real-time support, the Schlumberger Operations Support Center in Moscow was available through the InterACT* global connectivity, collaboration, and information service.

Three wells tested per day during four-month campaign

During the four-month Vankor oil field production metering campaign, 347 wells were tested using the Diligens Spectra unit. With two multiphase flow meters on the same trailer, Rosneft was able to choose the optimal venturi throat size for each well. This enabled three wells — with very different flow rates and flow regimes — to be tested per day.

With a smaller footprint at the wellsite, Rosneft spent less time and resources on logistics, reduced NPT for rig-up, and incurred fewer maintenance-related issues. During the campaign, the Diligens Spectra unit was driven 4,300 km [2,670 miles]. No HSE or quality issues were experienced, and Schlumberger successfully achieved Rosneft's testing objectives.

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