

PTTEP Obtains Continuous, Real-Time, High-Quality Testing Data in HPHT Conditions and Wirelessly Controls the Well in Heavy Mud

Live downhole reservoir testing enabled by wireless telemetry efficiently acquires BHP closer to the reservoir, enabling accurate interpretation

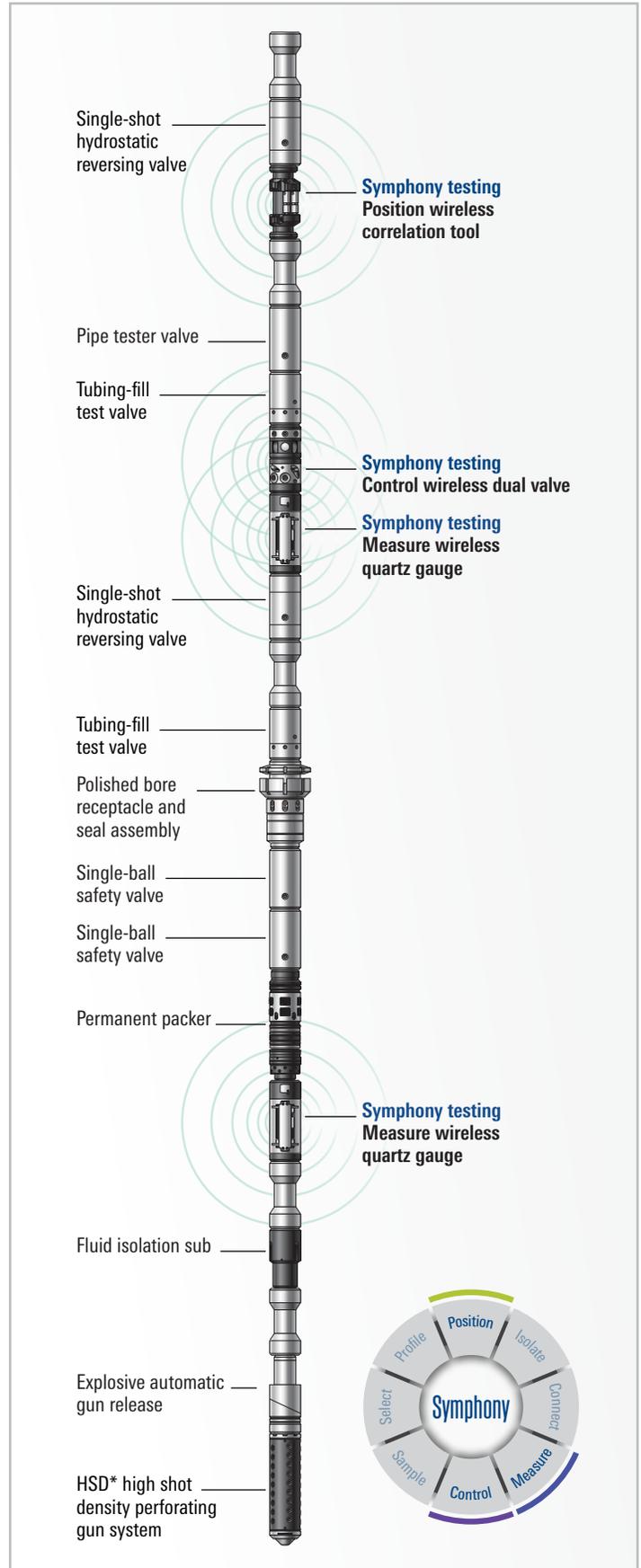
PTT Exploration and Production Public Company Limited (PTTEP) used the modular Symphony* live downhole reservoir testing string united by Muzic Aeon* premium-performance wireless telemetry to obtain critical downhole data in real time. PTTEP used the high-quality data to resolve complex testing challenges in the HPHT, heavyweight mud environment, eliminating the need for additional wireline runs.

Perform drillstem test in complex HPHT environment with heavyweight mud

The Lang Lebah Field offshore Malaysia is a thick carbonate buildup saturated with sour gas content. PTTEP wanted to perform drillstem testing (DST) in an appraisal well in the field to prove hydrocarbon in place, determine both the vertical and lateral extent of the reservoir, and obtain reservoir information to define the development plan.

Testing the well would be a complex operation. In addition to expected high-gas flow rates, well testing required downhole tools capable of operating in high-temperature environments and heavyweight mud, with a temperature rating of 175 degC [347 degF] and mud weight of 17.6 ppg. Heavyweight mud makes conventional mechanically and hydraulically operated DST tools—which rely on overpressure in the annulus or the tubing to cycle—difficult to operate.

PTTEP also needed a solution that would enable accurate downhole data acquisition. In highly productive wells such as this one, the distance between the gauges and reservoir results in nonisothermal temperature effects, causing DST string movement during buildup that can lead to significant errors in well test interpretation or even uninterpretable data.



Modular Symphony testing string enabled by Muzic Aeon premium-performance wireless telemetry.

Case study: PTTEP obtains continuous, real-time data in HPHT conditions and heavy mud, offshore Malaysia

Wirelessly obtain real-time bottomhole gauge data while controlling nonisothermal effects

Using the modular Symphony testing string united by the bidirectional communication of Muzic Aeon telemetry, PTTEP retrieved accurate, real-time critical downhole data.

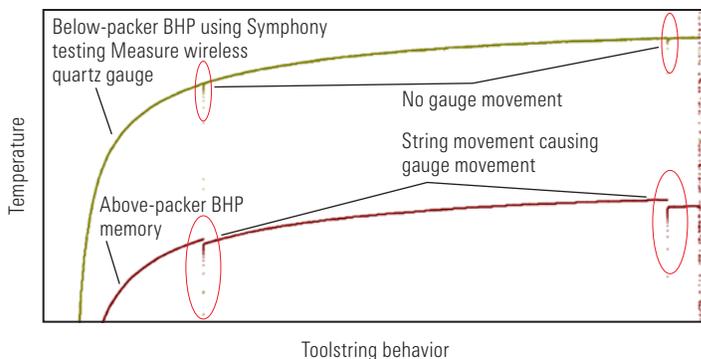
The design consisted of a permanent packer and Symphony testing Measure wireless quartz gauges below the packer to obtain pressure transient analysis, minimize nonisothermal temperature effects, and eliminate gauge movement during the test. With real-time bottomhole gauge data, PTTEP evaluated well productivity as it happened. This helped to reconstruct the flow rate history for quick interpretation and fill in gaps when the separator was bypassed.

Implement hydraulic pressure commands in heavyweight mud

Insensitive to pressure fluctuations and mud debris, the Symphony testing Control wireless dual valve provided independent dual-valve operation using wireless commands and the hydrostatic pressure in the annulus. In conventional downhole testing, these commands are typically dependent on the rig pump and annulus fluid transmissibility, a major concern due to the heavy mud density used. The Control wireless dual valve, however, is fully operable in heavyweight mud because of its fast and reliable wireless telemetry commands and can be rapidly adjusted for both anticipated and unexpected operational maneuvers. The real-time bottomhole pressure (BHP) measurements enabled quickly understanding the impact of pressure transmissibility in the heavyweight mud. Engineers were able to recalculate the necessary pressure to apply at surface to rupture the disc of each DST tool and assess the status of each tool.

Position the toolstring in less time

The Symphony testing Position wireless correlation tool provided real-time depth correlation to a radioactive pip tag. Traditionally, operators run wireline logging tools to position the toolstring in the well; however, the Position correlation tool eliminated additional wireline runs, saving PTTEP 8 hours of rig time.



Due to cooling temperatures during the final buildup, the toolstring contracts, causing upward movement of the gauges as seen on the gauges above the packer, while gauges below the packer, enabled by Muzic Aeon telemetry real-time measurement, remain stationary.

“We obtained some of the best data quality in PTTEP well test operations.”

Nitipong Kongpat
Senior Manager, Drilling Project
PTTEP

The capability of Symphony live downhole reservoir testing to retrieve high-quality data in this complex HPHT environment demonstrates its operational flexibility, enabling PTTEP to improve the efficiency of future well test operations.

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