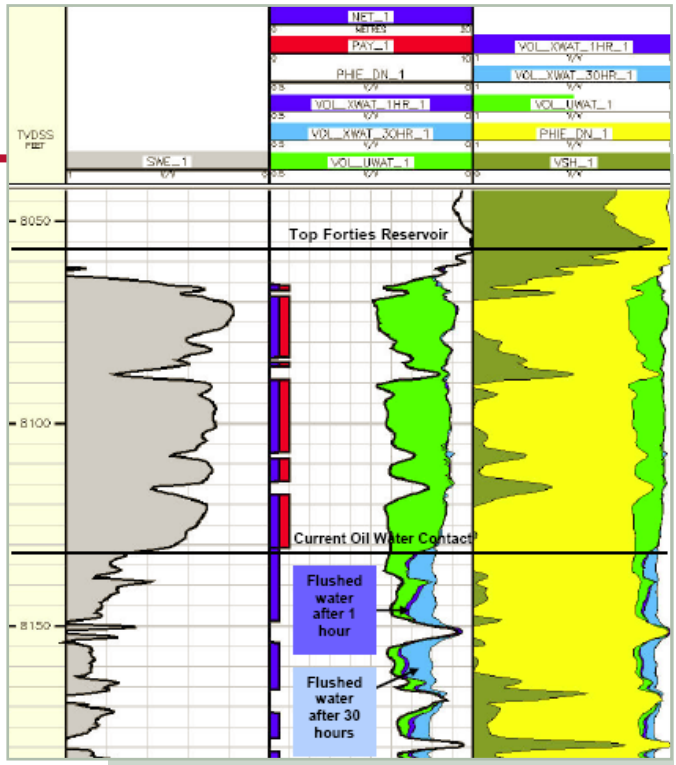
Weatherford®

REAL RESULTS

Compact℠ and PrecisionLWD℠ Services Offer Space-Saving Formation Evaluation Solutions for Small Offshore Platform, Produce Big Rewards



Data values, depletion, and swept zones. The main objective of this job was to evaluate reservoir petrophysical parameters and oil/water contact. This log computed saturation profiles in the virgin zone and volumes of flushed formation water at 1 hr and 30 hr after drilling.

Objectives

- Conduct comprehensive formation evaluation for the operator's infill development well, intended to penetrate bypassed oil reservoirs within the eastern limb of the Montrose field.
- Overcome significant limitations to acquire necessary formation evaluation data on a small offshore platform, without mobilizing a wireline logging unit.
- Save rig time, reduce the personnel and footprint required for logging, and avoid downtime.
- Minimize the risk of tools becoming stuck in the 6-in. (152-mm) well with 62° trajectory.

Results

- Weatherford took a two-pronged approach to minimize equipment, crew size, and footprint and permit efficient operations within the space constraints: 1) The PrecisionLWD™ logging-while-drilling (LWD) triple-combo system was used to record multiple passes with remote real-time monitoring of the offshore operations from Aberdeen. 2) The Compact™ (2 3/4-in. OD) repeat formation pressure tester (MFT) was run, using an existing slickline unit fitted with monocore cable. This arrangement also reduced the risk of differential pressure sticking.

Location
Montrose field, UK North Sea

Well Type
Infill development

Hole Size
6 in.

Angle
62°

Formation
Forties sandstone

Depth
11,200 ft (3,414 m)

Products/Services
- *PrecisionLWD* triple-combo logging service and system
- *Compact* logging and evaluation service and repeat formation tester

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Results *(continued)*

- Multiple passes of LWD data were recorded, data of excellent quality were gathered, and time-lapse analysis was performed. Significant rig time was saved with the use of the *PrecisionLWD* system, and all data were recorded safely, quickly, and efficiently.
- Eleven pressure tests were recorded with 100% seals and no differential sticking.
- Petrophysical analysis of the data was performed, and the data were integrated into the reservoir model. The analysis identified a major hydrocarbon column, the current oil/water contact, the top of the reservoir, and depletion of the reservoir's oil and water legs.

Value to Client

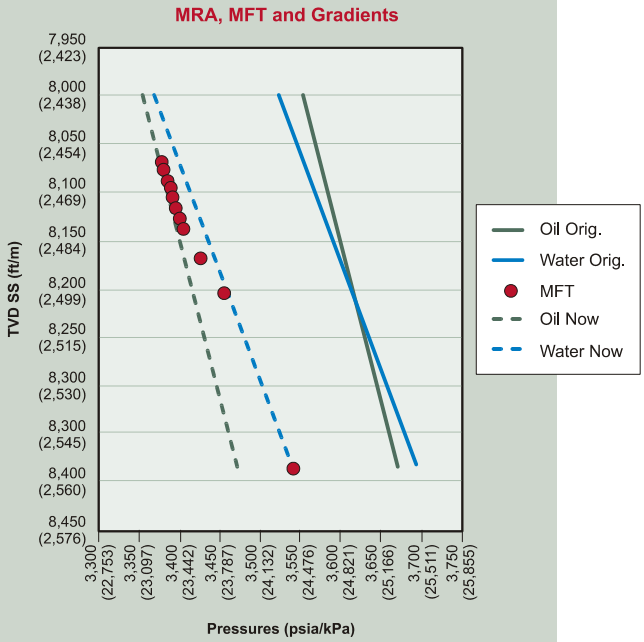
- Using the comprehensive formation evaluation data, the operator completed and perforated the well to yield a significant oil production rate.
- Fast, safe, trouble-free, and lower-cost logging operations were achieved in a highly permeable depleted reservoir with 1,500-psi (10.34-MPa) overbalance from the weighted mud system.
- Because of its slim diameter (2-3/4 in.) and self-centralizing ability, the *Compact* MFT delivered high-quality pressure data without becoming stuck in the slim hole, thus avoiding costly rig downtime.

Comparison of log interpretation and MFT interpretation:

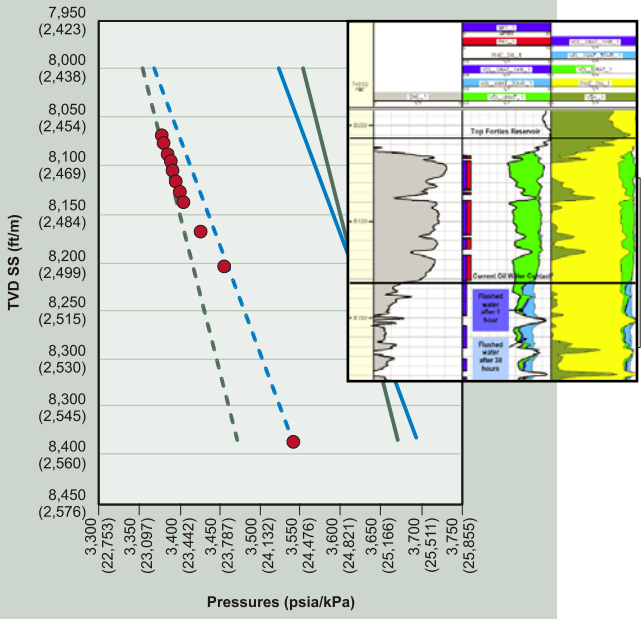
The oil/water contact is 8,132 ft (2,479 m).

Differential depletion occurs above and below the shale layers at 8,180 ft (2,493 m) and 8,190 ft (2,496 m).

The interval between 8,235 ft (2,510 m)—the original oil/water contact—and 8,131 ft (2,478 m) represents swept zone from field production and water flooding.



Original water and oil gradients (0.45 and 0.30 psi/ft) were shifted to match measurements. This log shows reservoir depletion of 155 psi (1,069 kPa) in the water leg and 200 psi (1,379 kPa) in the oil leg. Shales within the water leg are barriers to vertical equilibrium. No steps in pressure within the oil leg are shown.



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