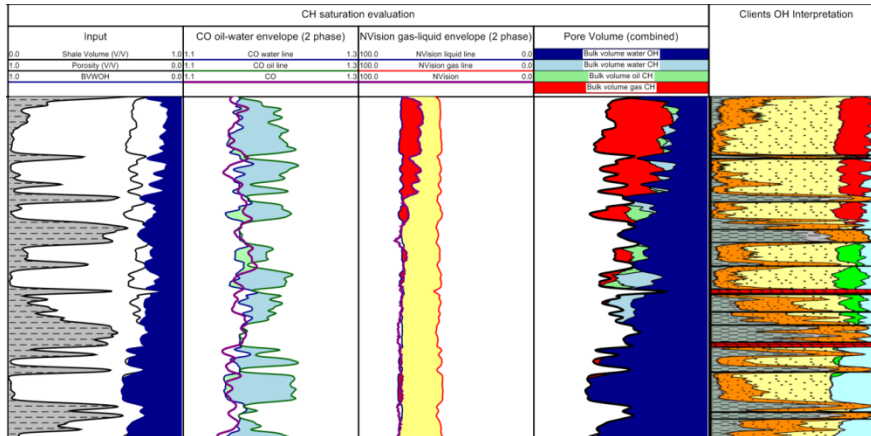


Raptor™ Cased-Hole Evaluation System

Informs Production Strategy For a Field With Large Boreholes and Multiple-Tubing Completions



The Raptor cased-hole evaluation system identified fluids and determined through-casing gas-oil and oil-water contact points in a complex, multistring completion.

Objectives

- Determine gas-oil and oil-water contact points in an oil-producing reservoir consisting of stacked shaly sands deposited in a deltaic environment and compartmentalized by faults. The operator targeted two oil-rim reservoirs with wells typically completed using large casing and produced through single or dual tubing.
- Evaluate shallower sands for hydrocarbon type. Openhole logs in the play had presented inconclusive results.
- Inform production and infill drilling strategies to improve reservoir sweep and overall oil production.

Our Approach

- Following a thorough pre-job analysis, a Weatherford wireline and petrophysical team recommended using the Raptor cased-hole evaluation system in five wells. Data for each well would be acquired in both the advanced carbon-oxygen mode, or C/O, and in the proprietary N-Vision mode.
- The team deployed the Raptor tool in all five wells. The tool logged through a range of fluids in the tubing and annuli—including gas, water, oil, and completion fluid—and produced accurate response modeling even in the wells with dual-tubing completions. The team logged a cumulative 35,597 ft (10,850 m) with more than 148 pulsed-neutron generator operating hours and no lost-time incidents.

LOCATION

Malaysia

WELL TYPE

Offshore, directional oil and gas

NUMBER OF WELLS

5

HOLE SIZE AND ANGLE

12 1/4-in. cased hole, up to 42° deviation

CASING AND TUBING TYPE

9 5/8-in. casing with single 4 1/2-in. tubing or dual 3 1/2-in. tubing

PRODUCTS/SERVICES

- Wireline services
- Raptor cased-hole evaluation system
- Interpretation and evaluation services



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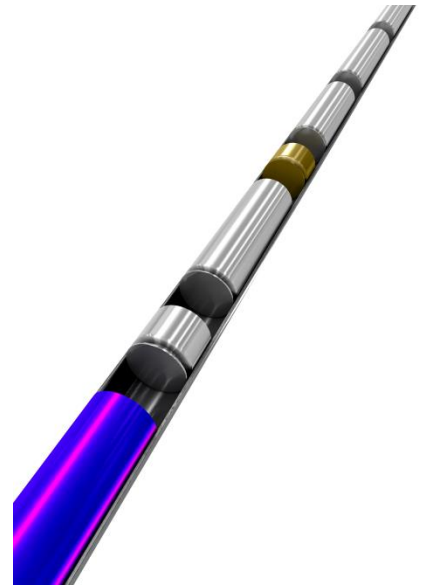
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Our Approach (continued)

- The petrophysical team processed the data from all wells and created a complete saturation analysis for the field. The N-Vision technique identified the gas-liquid contacts and quantified hydrocarbon gas saturation through the dual-string completions, even with gas in the tubing and annulus. The multidetector C/O measurement provided accurate oil-saturation data.

Value to Customer

- Weatherford petrophysicists used the Raptor cased-hole evaluation system to determine gas-oil contact and oil-water contact points in a series of large-wellbore, dual-string completion.
- The Raptor system correctly identified shallow sand as oil bearing rather than gas bearing, which added to the oil reserve estimates.
- By evaluating five select wells in the field, the Raptor system provided a detailed model of unproduced reserves to inform customer production and infill drilling strategies.



The Raptor cased-hole evaluation system collected accurate oil-saturation data for five wells.

