Underbalanced Drilling Services
Enables Client To Save $2 Million and To Double the Expected Gas Production

Weatherford provided the full UBD package, including UBD choke manifold, four-phase separator, emergency shutdown, 120-ft (37-m) flare stack, and data-acquisition system.

Objectives

- Drill a 2,165-ft (660-m) reservoir section in underbalanced conditions to prevent fluid losses and formation damage to a low-pressure gas formation.
- Acquire logging data, pressure data, and formation fluid samples to optimize reservoir management.
- Test the section to establish productivity from gas-bearing fractures, and determine the maximum flow rate.

Our Approach

- Weatherford deployed underbalanced drilling (UBD) technology and the downhole deployment valve (DDV®) system, the latter selected for its capability to isolate critical wells in underbalanced conditions.
- The team achieved underbalanced conditions and began drilling the 2,165-ft (660-m) section.
- While drilling, the team used the UBD system to enable isochronal testing, logging the well, and collecting formation and fluid samples.

LOCATION
Thailand

WELL TYPE
Onshore, deviated, development, gas

HOLE SIZE
6 in.

SECTION LENGTH
581 ft (177 m)

DEPTH
10,289 ft (3,136 m) MD

PRODUCTS/SERVICES
- Underbalanced drilling services
  - UBD choke manifold
  - Four-phase separator
  - Data acquisition system (DAQ)
- Downhole deployment valve (DDV)
- SafeShield® Model 7100 rotating control device
- Wireline services
  - Compact well shuttle (CWS) messenger
  - Compact gamma ray (MCG) tool
  - Compact dual neutron (MDN) tool
  - Compact dual laterolog (MDL) tool
  - Compact microresistivity (MMR) tool
  - Compact array induction (MAI) tool
  - Compact photodensity tool

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Our Approach (continued)

- The Weatherford Compact™ well shuttle (CWS) messenger system enabled the delivery of formation evaluation data, which would have been impossible using logging-while-drilling (LWD) technology alone. The data was recorded during flowing conditions.
- After drilling 581 ft (177 m), the team used the UBD package to enable multirate flow testing for accurate information about reservoir performance.
- The team intersected the first target zone at 10,289 ft (3,136 m) MD. At this point, the operator had expected a gas production rate of 15 MMscf/D (424,753 std m^3/d); however, the actual production rate measured 30 MMscf/D (849,505 std m^3/d).
- Because the actual gas production rates exceeded expectations, the operator stopped the drilling operation and proceeded with the completion and cleanup phases.
- The DDV system enabled safe and efficient tripping operations, which included trips during drilling, logging runs, and running the lower completion. The system eliminated the need to kill the well during tripping, which avoided reservoir damage and wellbore pressures that could force the drillstring out of the well.

Value to Client

- Using Weatherford UBD techniques enabled the operator to obtain real-time reservoir characterization data and to ascertain gas production levels twice the expected rate.
- The operator decided to stop drilling early because of the high productivity rates achieved by the UBD method and saved US $2 million in drilling time and costs.

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