

# Compact™ Well Shuttle Safely Logs a Live Gas Well While Maintaining Underbalanced Pressure Conditions



The Weatherford Wireline Services team successfully captured logging data in a live gas well while maintaining underbalanced well conditions, enhancing safety, maintaining well and formation integrity, and reducing rig time.

## Objectives

- Perform formation evaluation in the openhole section of a live well with gas flow and a wellhead pressure as high as 3,000 psi (20.7 MPa). The openhole section began at a depth of 9,787 ft (2,983 m) and ended at the total depth of 10,377 ft (3,163 m).
- Maintain underbalanced conditions between 900 and 1,800 psi (6.2 to 12.4 MPa) at the surface to avoid killing the well and damaging the formation.
- Limit the run-in-hole speed to no more than 49 ft/min (15 m/min) to prevent the seal on the rotating control device (RCD) from leaking.

## Our Approach

- As an alternative to conventional wireline-conveyed logging methods, Weatherford deployed the Compact well shuttle (CWS) through the RCD, casing string, and downhole deployment valve (DDV). The CWS carried several logging tools downhole to record formation data while underbalanced well conditions were maintained to avoid damaging the formation or killing the well.
- The bottomhole assembly (BHA) of the CWS incorporated an additional shuttle flapper valve (SFV), which provided a secondary wellbore barrier while the team installed the RCD adaptor and opened the DDV. The SFV enhanced well control and operational safety.
- The CWS and logging tools ran downhole at a speed of 49 ft/min (15 m/min), which was within the client's requirements.

### LOCATION

Thailand

### WELL TYPE

Onshore, gas, underbalanced

### FORMATION

Carbonate

### HOLE SIZE AND ANGLE

6 in., 52°

### MAXIMUM WELLHEAD PRESSURE

3,000 psi (20.7 MPa)

### PRESSURE OPERATING WINDOW

900 to 1,800 psi (6.2 to 12.4 MPa)

### RUN-IN-HOLE SPEED

49 ft/min (15 m/min)

### LENGTH OF OPENHOLE INTERVAL

590 ft (180 m)

### TOTAL DEPTH

10,377 ft (3,163 m)

### PRODUCTS/SERVICES

- Compact well shuttle
- Shuttle flapper valve
- Shuttle messenger tool
- Compact gamma ray tool (MCG)
- Compact dual neutron tool (MDN)
- Compact photo density tool (MPD)
- Compact sonic tool (MSS)
- Compact array induction tool (MAI)



# Compact™ Well Shuttle Safely Logs a Live Gas Well While Maintaining Underbalanced Pressure Conditions

## Our Approach

- A highly viscous pill—placed on top of the shuttle messenger tool (SMT)—enhanced the seal between the SMT and the inside of the drillstring. This enhanced seal improved control over the landing speed of the SMT and helped to prevent damage to the logging tools upon their release from the BHA of the CWS.
- The team logged the entire openhole interval in a single run with no tool failures.
- The logging tools recorded the required formation data in memory mode. This data was available to the client upon the return of the tools to the surface.
- An extended-life battery and firmware sleep mode helped to manage power consumption during the entire 44-hour trip.

## Value to Client

- By using the CWS, the client was able to capture logging data in an environment that would otherwise be extremely challenging, if not impossible, to successfully run logging tools.
- The client was able to avoid more costly, time-consuming, and less safe logging methods. Conventional wireline-conveyed logging methods offered two options. First, the client would have had to pump heavy-weight fluid downhole to stop hydrocarbon flow—also known as killing the well—which could damage the formation or negatively impact production. Alternatively, the client could have not killed the well, but would have had to use specialized equipment—including a snubbing unit with a grease injector and lubricator—to maintain underbalanced well conditions. This would have resulted in higher costs, loss of rig space, and increased logging time. Additionally, this option is inherently less safe because it lacks the barrier provided by the SFV as the DDV is opened to enable passage of wireline tools. Using the CWS helped to save significant rig time while maintaining the integrity of the well and formation, and enhancing safety.
- The CWS mitigated the risk of wireline-conveyed logging tools differentially sticking in a fracture zone.
- The CWS eliminated the risks associated with fishing out wireline-conveyed logging tools in an underbalanced well.

