## **Compact<sup>™</sup> Logging Services** Enable Full Openhole Logging of Extremely Slim Exploratory Well

## **Objectives**

- Drill the reservoir section of an extremely slim, exploratory well through a fractured, organically rich, bituminous shale formation using a 2 3/4-in. (70-mm) bit in underbalanced conditions.
- Log the well while avoiding becoming stuck in the 2 3/4-in. hole, where fishing operations are typically ineffective if not impossible.

## **Our Approach**

- Before tool deployment, Weatherford carefully modeled each run using downhole tension software and taking into account all available job parameters.
- The uniquely small 2 1/4-in. (57 mm) Compact tools were used to provide the following logs:
  - Acoustic sonic waveforms, compressional and shear travel times, and fracture analysis
  - High-resolution nuclear logs: gamma ray, dual neutron, and photodensity
  - Array induction log, dual laterolog, shallow-focused electric, and microlaterolog
  - Deviation survey
  - The well was successfully logged in an underbalanced condition, with pressure-control equipment able to hold up to 10,000 psi (68.9 MPa) at the surface

## Value to Client

- The Compact logging service enabled the operator to obtain valuable formation data from an extremely small borehole—an impossible task with conventional logging tools.
- The operator was able to drill the exploratory well on a tight budget with smaller downhole equipment and a coil tubing drilling rig.
- The ability to perform logging services in an underbalanced condition provided the operator with quality measurement of formation parameters, minimizing the total cost of the operation.
- The ability to drill a smaller rathole below the zone of interest reduced the risk of water inflow from the lower formation.



A water zone below the zone of interest and a limited rathole complicated this logging operation. To acquire a compete set of data, the operator needed all first readings to be under 19 ft (6 m).

LOCATION Tumen Region, Western Siberia

WELL TYPE Underbalanced exploratory

**FORMATION** Fractured, organically rich, bituminous shale

**RIG** Coiled tubing

**BOTTOMHOLE TEMPERATURE** Actual 282°F (139°C)

**EXPECTED SURFACE PRESSURE** 8,000 psi (55.2 MPa)

**CASING SIZE** 7 in. (177.8 mm)

**TUBING SIZE** 3-1/2 in. (89 mm)

HOLE SIZE/ANGLE 2-3/4 in. (70 mm)/21°

LOG DEPTH 9,606 to 9,377 ft (2,928 to 2,858 m) MD

PRODUCTS/SERVICES Compact logging services and tools



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