



# Weatherford®

## REAL RESULTS

### Multiphase Performance Drilling<sup>SM</sup> Enhances Hole Cleaning, Leads to Tripling of Drilling Rates in Canadian Wells

#### Objectives

- Enhance the rate of penetration (ROP) of wells in the Kelly Lake project by reducing the equivalent circulating density (ECD) through the vertical, intermediate, and horizontal pay zone sections.

#### Results

- Working with the operator, Weatherford helped design a patent-pending, nitrified-invert *Multiphase Performance Drilling* system that would exceed minimum velocity requirements for hole cleaning while reducing drilling time.
- The intermediate section of these wells was drilled from approximately 1,640 ft (500 m) measured depth (MD) to approximately 9,186 ft (2,800 m) MD.
- Weatherford's Model 7000 rotating control device (RCD) was used to provide precise control of the wellbore pressure profile.

#### Value to Client

- This process helped to increase ROP by reducing ECD to less than 600 kg/m<sup>3</sup> as compared to the 950 kg/m<sup>3</sup> mud weight and ECD recorded during conventional drilling operations.
- Distances drilled per day were approximately three-times greater than those recorded using conventional methods, saving four-to-seven days of drilling time for the entire intermediate section, and seven-to-ten days for the horizontal section.
- Weatherford's Model 7000 RCD provided additional safety by enabling ECD to be increased in the event of a kick or during gas migration into the wellbore, thereby permitting drilling to continue uninterrupted.



Weatherford's patent-pending *Multiphase Performance Drilling* system helped increase ROP by enabling nitrogen to be effectively injected into the well's intermediate section and lowering ECD. With lower ECD while drilling, ROP and total distance drilled per day tripled in comparison to conventionally drilled wells in the area.

#### Location

Western Alberta, Canada

#### Formations

Cardium, Paddy, Falher,  
and Cadomin

#### Hole Size

8 3/4-in. (222 mm) intermediate  
and 6 1/4-in. (156 mm) horizontal

#### Products/Services

- *Multiphase Performance Drilling*
- Model 7000 RCD with nitrogen units, choke manifold, separator, flare stack, and associated piping and valving