



# ROCKIT®



## ROCKIT® DIRECTIONAL DRILLING AUTOMATION PLATFORM

ROCKIT®, CANRIG Drilling Technology Ltd.'s surface rotary steerable system, has demonstrated the ability to save rig time by:

- Increased Rate of Penetration while sliding
- Faster toolface setting
- Improved toolface control

These result from three unique functions: oscillation control, tool face orientation and bearing offset control, all contributing to safer and more efficient drilling operations.

In addition, two unique automation products are now delivered on the ROCKIT® platform:

### ROCKIT® HUD Heads Up Display

- MWD Toolface Data — integrates steering information on same screen.
- Advisory Sector — shows driller where to maintain toolface on dial.
- Driller's Scorecard — provides a quality metric on toolface control and efficiency of slide.

### ROCKIT® PILOT

- Toolface Steering Logic — computer controls toolface to maintain within Advisory Sector.

- Toolface Correction Frequency Control — system reacts on user defined toolface timing.
- Toolface Correction Aggressiveness Control — bearing adjustment control left and right.

## IMPROVING SLIDE DRILLING EFFICIENCY THROUGH AUTOMATION

**The Problem:** Managing a slide over extended periods by a directional driller is labor intensive and can introduce human error, reducing slide drilling performance.

**The Solution:** ROCKIT® PILOT

The new ROCKIT® PILOT is the driller's and directional driller's buddy. It allows the top drive PLC to take over toolface steering, providing predictable bearing offset corrections which are repeatable and based on directional drilling logic.

## SETTING TOOL FACE

**The Problem:** Accurately setting a specific toolface orientation

While performing directional drilling operations, one of the challenges is to orientate the "downhole" tool to "steer" the wellbore in a desired direction.

At present, this can only be done manually by feel, timing, experience and estimation because a certain amount of rotation at the surface may not necessarily result in equal rotation at the downhole tool.

**The Solution:** Accurate rotation at the surface

ROCKIT® removes the guesswork and eliminates the need for precise timing and "just the right amount of throttle" because the computer controls the amount of rotation. Integrated with the standard Canrig top drive controls, ROCKIT® provides a valuable aid for the directional driller to orientate downhole tools.

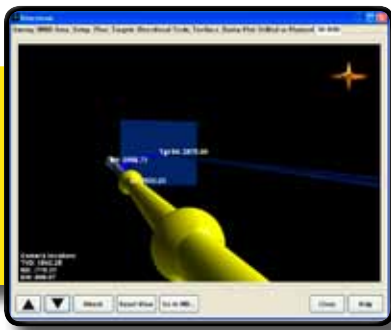
## CONTROLLING TOOL FACE

**The Problem:** Accurately maintaining a toolface orientation while sliding

During slide drilling operations, the toolface orientation will be altered by formation changes, variations in drilling parameters, or reactive torque, causing unwanted deviations from the planned wellbore path.

**The Solution:** Fine Control of toolface while on bottom

Bearing offset control, built into ROCKIT®, allows the operator to nudge the toolface left or right while drilling, thus providing fine control of the toolface orientation. These



The Toolface Advisory on the ROCKIT® screen is used to guide the driller into the directional target or back to the planned wellpath.

adjustments can be made while drillstring oscillation is in progress.

## REDUCING FRICTION AND IMPROVING ROP

**The Problem:** *Reduced weight on bit due to wellbore friction while sliding*

During slide drilling operations, wellbore friction reduces the amount of weight that can be put on the drill bit, resulting in a reduced rate of penetration.

**The Solution:** *Oscillation Control*

Using ROCKIT®, we can oscillate the drill string from the surface to dramatically reduce friction. The oscillation or rocking can be programmed from a fraction to several revolutions. The amount of oscillation left and right is adjusted by the operator to provide maximum drill string rocking without affecting tool face orientation.

## GIVING THE DRILLER THE DATA NEEDED FOR DIRECTIONAL CONTROL

**The Problem:** *Data needed to control drilling is on separate screens*

A driller will typically have to look a number of screens to gather the information he needs to make a drilling control decision.

**The Solution:** *ROCKIT® Heads Up Display*

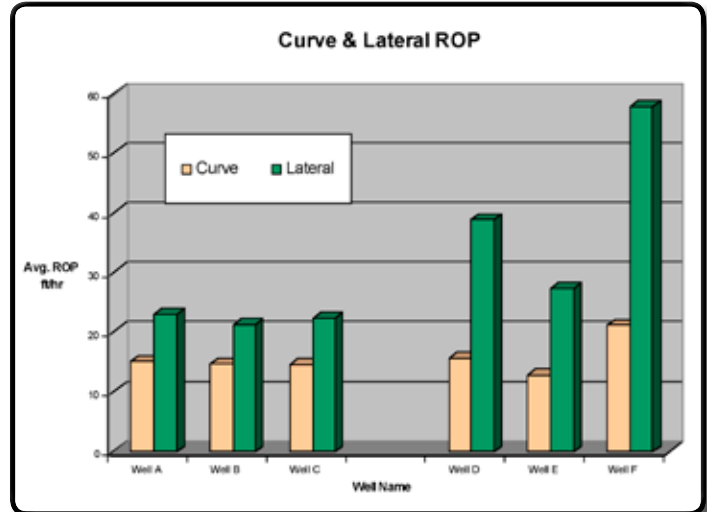
The new ROCKIT® Heads Up Display integrates the critical information needed for directional control on one screen. This includes MWD toolface data, MWD Inclination and Azimuth, Toolface Advisory, Resultant Toolface, Pump Pressure and Delta Pressure.

This makes it easier to steer while sliding and makes the entire directional drilling process more efficient. This reduces the chance for a costly error and allows drilling personnel to react faster to changing downhole conditions.

## CALCULATE THE BENEFITS

ROCKIT® can save you thousands of dollars on your next drilling project. Toolface savings alone can approach \$100,000 and the savings in rig time can exceed \$1 million per year. That number can be increased dramatically if you replace a rotary steerable product even for a portion of the well.

The ROCKIT® Calculator can also help you identify the characteristics of a well impacted by ROCKIT®. By completing the input section, the ROCKIT® Calculator will automatically identify the potential savings.



The drop in slide ROP versus rotating ROP, coupled with the amount of slide drilling, is the easiest way to measure the cost of sliding. ROCKIT® has been demonstrated to improve slide ROP from 5 to 70 percent.

In many cases ROCKIT® may not eliminate the need for a rotary steerable product but it can reduce the amount of time that tool is required. In addition ROCKIT® requires no capital investment, no long term commitment and no risk. If you don't like it, turn it off. There is also nothing to lose downhole.

## ROCKIT® TECHNOLOGY CASE STUDY BARNETT SHALE, CENTRAL TEXAS

The study analyzed six wells located in the Barnett Shale in the Fort Worth area of Texas. These wells were all medium radius horizontal wells with a pay zone around 5,500-6,000 feet (true vertical depth) and each had lateral sections of between 1,500 and 2,000 feet with total measured depths of approximately 9,500-10,000 feet. In the first three wells, slide drilling and toolface control were carried out in a conventional manner for the curve and lateral sections. In the following three wells the ROCKIT® technology was used in drilling the curve and lateral section. The study showed significant improvements in ROP and drilling efficiency when the ROCKIT® system was utilized.

The drilling performance with the ROCKIT® system showed a marked improvement in ROP numbers from the previous three wells drilled in the same area and formations. The operator analyzed the performance data in-house and arrived at the conclusion, based on their own analysis, that ROCKIT® technology significantly reduced drilling time by improved ROPs in the curve and lateral sections. The operator's objective of cutting at least a day from the drilling time for curve and the lateral was achieved.

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