

## Case Study: Marcellus Extended Reach Lateral

### Challenge

An operator drilling in the Marcellus shale wanted to drill an 10,000ft lateral in a single run while maximising ROP and reducing wellbore tortuosity.

### Solution

The D-Tech RST675 tool was deployed in conjunction with a PDC bit, MWD tool and positive displacement motor. The RST675 was configured with advanced inclination and azimuth control software specifically designed for drilling long laterals.

In order to increase ROP and reduce stick-slip a 7/8 3.0 stage 0.14 rev/gal motor was run above the MWD tool. In this configuration the bit to directional sensor package was 26ft.

Through experience of drilling other shale plays a 5 blade, short gauge bit with a TFA of  $0.85\text{ in}^2$  was recommended and picked up by the operator.

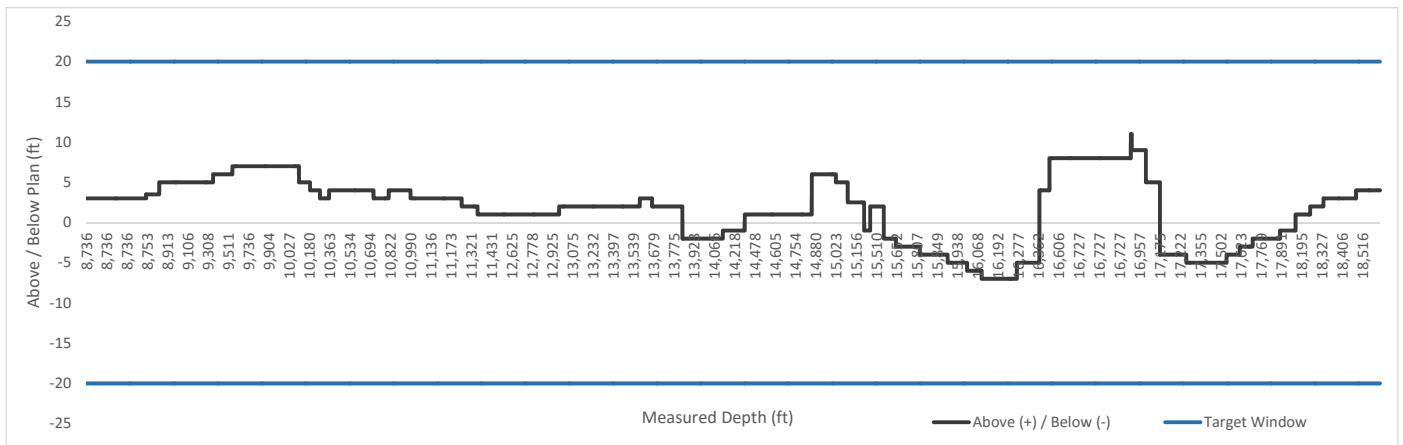
### Results

The entire section of 10,029 ft was completed in a single run of 112 hours (drilling and circulating). The inclination was maintained within 0.5 degrees of target at all times with an average vertical departure from the planned line of only 3.75ft.

Azimuth corrections were made while maintaining inclination in order to counteract formation push and the BHA walk tendency. The result was a wellbore with doglegs averaging 0.9 degrees / 100ft.

The smooth, straight wellbore reduced torque and drag and the BHA was tripped out of hole with no issues.

On surface the RST was in a good condition and would have drilled further if required.



For more information contact your local D-Tech representative

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# D-Tech Rotary Steerable Solutions



## Accurate, Reliable, Adding Value

### Overview

The D-Tech rotary steerable tool is based on the 'Push the bit' principle of steering. Six hydraulically operated pistons are deployed against the wellbore to push the drill bit in the required direction. The pistons use the fluid within the drill string as a source of hydraulic power.

An electronic control unit which contains a six-axis sensor package is used to provide accurate tool-face control for all types of well profile. The tool is able to kick-off in the required direction in a magnetic steering mode and with an inclination over 5 degrees the tool can be steered in a gravity tool-face mode or a closed loop inclination hold mode.

When drilling laterals inclination hold can be used to control the inclination to within  $\pm 0.1$  degrees of target. Similarly when in vertical hold the inclination can typically be held to less than 0.5 degrees.

### Steering

Once in the hole the tool is programmed by the directional driller by a down-linking process which involves variation of the mud pumps over a timed sequence. The down-linking process is simple and intuitive with a confirmation that the correct down-link sequence was sent being displayed on the directional drillers or MWD hand's laptop.

### Reliability

The D-Tech RST is proving to be very reliable with a 95.5% success rate. This reliability together with a targeted functionality is adding value for operators across a range of drilling applications.



Tool Specification	RST475	RST675	RST900
<b>Tool Size</b>	4 ¾"	6 ¾"	9"
<b>Hole Size</b>	6" – 6 ¾"	8 ½" - 8 ¾"	12 ¼"
<b>Flow rate</b>	200 - 400 gpm	275 – 675 gpm	600—1000 gpm
<b>Rotation rate</b>	40 – 180* RPM	40 – 180* RPM	40 – 180* RPM
<b>Max operating temp</b>	302°F (150°C)	302°F (150°C)	302°F (150°C)
<b>Max operating pressure</b>	15,000 psi	15,000 psi	15,000 psi
<b>Max WOB</b>	30,000 lbf	50,000 lbf	75,000 lbf
<b>Max torque at bit</b>	6,000 ft lbf	16,000 ft lbf	40,000 ft lbf
<b>Tool length</b>	13 ft	13 ft	13 ft
<b>Bit pressure drop</b>	350—550 psi	350—550 psi	350—550 psi
<b>Connection up hole</b>	3 ½ IF Box	4 ½ IF Box	6 5/8 Reg Box
<b>Connection down hole</b>	3 ½ Reg Box	4 ½ Reg Box	6 5/8 Reg Box
<b>Max dog leg</b>	8 degrees / 100ft	8 degrees / 100ft	4 degrees / 100ft
<b>Down-linking</b>	25% flow rate variations	25% flow rate variations	25% flow rate variations

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