**CHALLENGE**
Improve performance while drilling long laterals up to 10,000 ft in a shale environment.

**SOLUTION**
Use PowerDrive Orbit vorteX motorized rotary steerable system (RSS) to perform at increased speeds for longer durations.

**RESULTS**
- Saved operator 2.9 days of drilling, decreasing cost by 11%.
- Increased average daily footage by 65%.

Extend the depths of current drilling capabilities
Noble Energy needed a cost-effective solution for drilling long laterals in the Marcellus shale. The operation consists of 6–12 gas wells on each pad at lateral lengths of 4,000–10,000 ft with lateral spacing set at 750 ft. The dominant lithology of the reservoir is black shale, but the formation also consists of lighter shales and interbedded limestone layers that require wells to be drilled at high ROP. The well also required an RSS that could resist abrasive downhole conditions and withstand a challenging hydraulic design while drilling to TD.

Drill deeper and faster with the PowerDrive Orbit vorteX RSS
To drill faster and for a longer duration in the shale environment, Schlumberger recommended the PowerDrive Orbit vorteX RSS. A simulation provided by IDEAS integrated drillbit design platform confirmed the PowerDrive Orbit vorteX RSS, with handling speeds up to 0.29 rev/gal, would outperform a conventional RSS and downhole motor, which could only handle speeds up to 0.17 rev/gal. The PowerDrive Orbit vorteX RSS maintains precise directional control while perform at rates up to 350 rpm. The enhanced RSS also features a newly developed pad actuation design with metal-to-metal sealing to withstand pressure increases that occur as the well is drilled deeper.

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**CASE STUDY**
Drilling
Noble Energy set a new footage record while drilling the lateral sections of each of the four Marcellus Shale wells.

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The PowerDrive Orbit vorteX RSS set a new footage record while drilling the lateral sections of each of the four Marcellus Shale wells.
CASE STUDY: Noble Energy saves 2.9 days and increases average daily footage by 65% using motorized RSS

Reset footage record and maintain excellent directional control
As a result of being able to successfully rotate the bit faster with optimized hydraulics, Noble Energy reset the field’s footage record four times. The enhanced system improved progressively while drilling the lateral section of each well. In the best and final run, the PowerDrive Orbit vorteX RSS drilled 4,475 ft in 24 hours and increased average daily footage by 65%. This motorized RSS saved Noble Energy 2.9 days of drilling time and decreased cost by 11%, demonstrating its drilling efficiency in the Marcellus Shale.

Plan view of the pad showing the lateral sections drilled with the PowerDrive Orbit vorteX RSS, with Well A being the longest.