

CASE STUDY

MICROGUIDE REVEALS SEVERE WELLBORE TORTUOSITY, ENABLING OPTIMIZED ESP PLACEMENT AT NEW WELL DEPTH

▶ TECHNOLOGY

- MicroGuide™ wellbore tortuosity logs

▶ APPLICATION

- Artificial lift
- ESP placement

▶ LOCATION

- Midland Basin

INDUSTRY CHALLENGE + OBJECTIVE

An operator decided to use an ESP as the method of artificial lift in a horizontal well. The well's kickoff point was at 8,315-ft MD, and it built to horizontal at an average rate of 9° per 100 ft until reaching 17,729 ft MD. The selected pump was 126-ft long and 4 in. in diameter. Based on the DLS values derived from the MWD survey, the suggestion was made to place the pump between 7,760 and 7,886 ft. The pump failed after 5 days with a broken shaft, which had most probably been caused by excessive bending. The operator decided to conduct a tortuosity analysis to better understand the cause of the failure and equip itself with the necessary information to appropriately place a new pump and prevent additional premature failures.

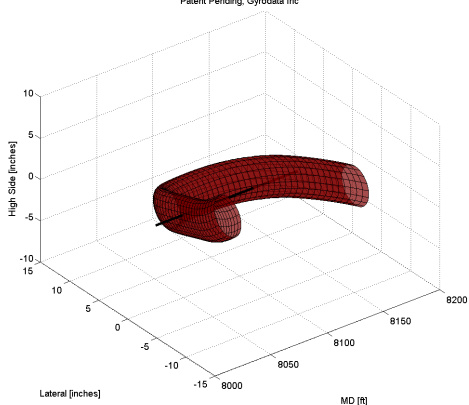
TECHNOLOGY + SERVICE SOLUTION

- We collected high-resolution tortuosity data via a MicroGuide analysis, which displayed tortuosity, total displacement, maximum diameter of the straight device, and 3D wellbore graphics.
- Using the MicroGuide tortuosity analysis, we determined that the optimal location for the new pump was between 7,610 and 7,732 ft based on the effective diameter.
- At an MD of 7,670 ft, the maximum diameter that would allow a uniform bend was 4.00 in. at a device bend of 1.637°/100 ft.

RESULTS + VALUE DELIVERED

- The new pump was placed at the recommended depth based on the tortuosity analysis and lasted 4 months, with failure analysis showing that high vibration caused by excessive gas production was the cause of failure.
- After correcting the vibration, a new ESP was installed at the same depth, where it worked without issue for 6 months before being replaced by a beam pump due to production declines in the well.

3D representation of transversal displacement. Color temperature is proportional to the maximum diameter of device in inches. At a Measured Depth of 8088.0 ft, the maximum diameter of a device is 0.00 inches, at a device bend of 0.000 degrees / 100 ft. For a device of diameter 4.00 inches, a uniform bend below the allowed maximum was not found. Patent Pending, Gyrodata Inc.



3D representation of transversal displacement. Color temperature is proportional to the maximum diameter of device in inches. At a Measured Depth of 7670.0 ft, the maximum diameter of a device is 4.01 inches, at a device bend of 1.637 degrees / 100 ft. A device of diameter 4.00 inches will undergo a uniform bend of 1.637 degrees / 100 ft. Patent Pending, Gyrodata Inc.

