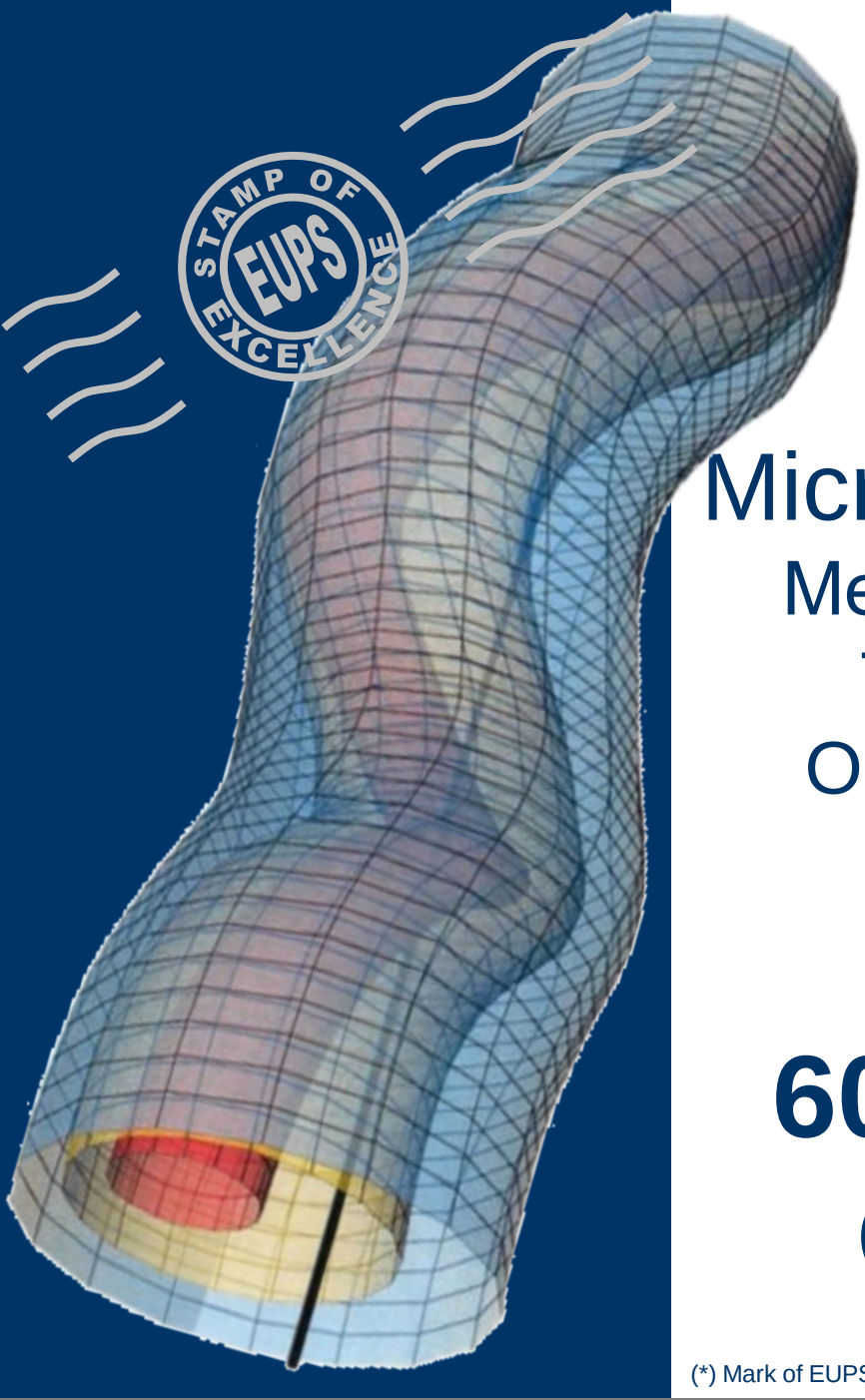


MGL*

Micro-Guide Log

Measures Wells' Tortuosity & Optimizes ESP Placement Resulted in

600 BOPD Gained

(*) Mark of EUPS.

SUCCESS STORY

Kuwait Oil Company

Eastern United Petroleum Services

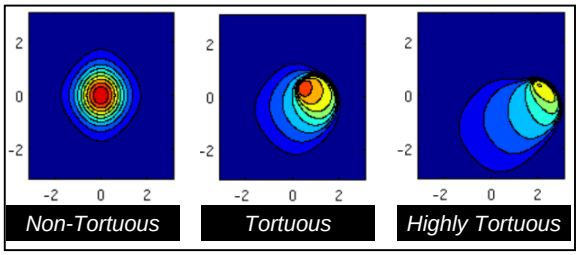
Are you experiencing premature & inexplicable mechanical failures of your ESPs?

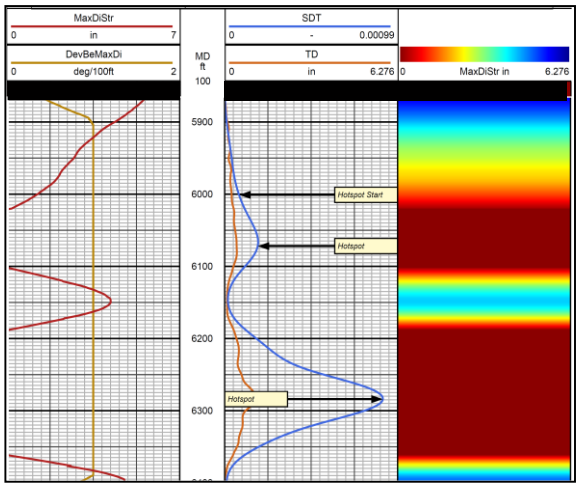
Are you doubtful of optimum ESP running procedures and setting depth?

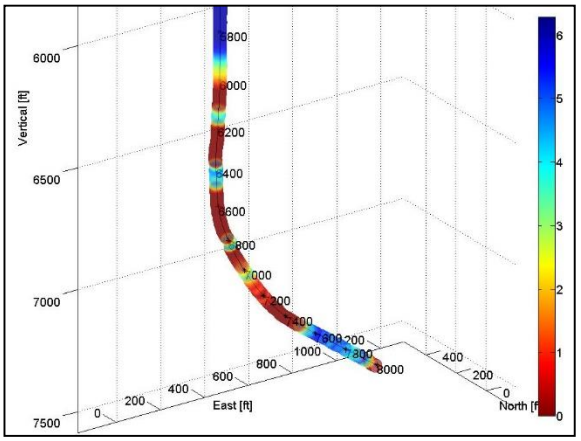
KOC & EUPS has found the answer!!

Looking at wells directional surveys, inclinations and dogleg severity is widely and commonly used as the main data input for the determination of ESPs running procedures and setting depth. This not only lacks the accuracy (vertical resolution of 100 ft), but entirely overlooks the main factor that should be considered;

TORTUOSITY!!







Two intervals for possible ESP placement:
5,700 ft – 5,900 ft & 7,570 ft – 7,770 ft. Setting depth of 7,650 ft was selected.
High Tortuosity (hot spots):
6,000 ft – 7,500 ft. Caution is advised passing through to avoid pre mature damage on the ESP.

DEFINITION

Tortuosity is defined as "the property of a curve to be twisted or have multiple turns". By measuring tortuosity at very high vertical resolution (every 1.2 inch) of an oil well, EUPS is able to evaluate the stresses (bending moments) that are likely to occur on a long rigid object (e.g. ESP string) while running through such tortuous conditions or at a certain setting depth and the likelihood of such stresses to impact the ESP integrity and run-life.

MCRO-GUIDE LOG (MGL*)

Micro-Guide Log (MGL*) is a real-time log run by EUPS on e-line to measure and evaluate well tortuosity. Intervals of high risk (hot spots) are alerted to be cautioned while RIH and recommendation is made of best interval for the setting of the ESP. MGL has a vertical resolution of 1.2 inch.

KOC SUCCESS STORY: WELL XX-09

After drilling side track, ESP was installed at depth 5,800 ft. MD. The ESP produced only intermittently after producing for 3-4 days. ESP had to be shut in for 3-4 weeks before starting again.
Root Cause: The poor production rate was attributed to the insufficient submergence of the ESP and to the low productivity of the reservoir. ESP was set at 5,800' due to the severe doglegs below this depth and absence of confidence of KOC department to run ESP in such conditions.
Solution proposal: Run EUPS MGL* and set the pump deeper if recommended by MGL.
Execution: MGL was run successfully, and based on MGL recommendations ESP was successfully run and set on January 31st, 2016 at 7,650 ft.
Evaluation: To date, pump has been running uninterruptedly since it was started and well production rate is continuously increasing. At the date of this publication well is producing 524BOPD and counting.

Eastern United
PETROLEUM SERVICES