

# OILFIELD TECHNOLOGY

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# ROTATIONABILITY

*(rō-'tā-shən-ə-'bi-lə-tē)*

Coined by Rubicon Oilfield International, the concept of **RotationABILITY™** combines state-of-the-art downhole technologies with advanced applications engineering analysis, two Rubicon core competencies.

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# DOWNHOLE TOOLS REVIEW

## Upwing Energy

In unconventional gas wells, liquid loading can significantly reduce production and lead to premature abandonment. Upwing Energy has developed a high-speed Subsurface Compressor System™ (SCS) on magnetic technologies that maximises gas and condensate production, recoverable reserves, gas-in-place recovery efficiency and liquid unloading at the same time.

Upwing deployed its first commercial SCS in an unconventional shale well in Indiana during 4Q19. The trial results demonstrated that the SCS increased gas production by 62% and liquid production by 50% over the steady-state performance with the rod pump prior to the SCS installation.

The well had a vertical wellbore of 2000 ft and a horizontal wellbore of 5000 ft, where liquid had accumulated. To provide sufficient velocity to carry liquids, the compressor was installed at the bottom of the vertical section with a tail pipe extending approximately 1000 ft into the horizontal section.

The well's gas production was approximately 185 000 ft<sup>3</sup>/d prior to installing the SCS, and its liquid

production via rod pump was 5 – 7 bpd. The well choked in a few hours without the rod pump. With the SCS, the well stabilised at a production rate of 300 000 ft<sup>3</sup>/d (+62%) with the help of nitrogen injection to kick off the well. At 30 000 rpm, the liquid production increased to over 9 bpd (+50%), which can be attributed to the gas velocity increasing to 29 ft/sec.

Following the successful unconventional field trial, Upwing is scaling up the SCS for higher flowing wells and is building and testing a more powerful version in preparation for a trial later this year. With higher pressure ratio and mass flow capabilities, the new SCS tool will offer a more environmentally friendly way for E&Ps to increase gas production from their existing assets vs undertaking additional drilling and fracking. Some other features of the new SCS tool include:

- ▶ Design point pressure ratio of up to 2:1 at 50 000 RPM.
- ▶ Ability to perform up to 12 000 ft below the ground.
- ▶ Ability to handle over 2 million ft<sup>3</sup>/d with over 150 bbl/1000 ft<sup>3</sup> of liquids.
- ▶ Ability to address over 60% of conventional gas wells globally. ■

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