**Matrix Acidizing in Russian Gas and Condensate Field**

Diall Alliance uses acid diversion systems to increase production and reduce water cut.

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**CHALLENGE**
Stimulate gas and condensate formation with matrix acidizing approach. Increase production and reduce water cut.

**SOLUTION**
Apply VDA* viscoelastic diverting acid to bypass matrix damage and OilSEEKER* selective diverter to direct flow away from water zone.

**RESULTS**
Reduced water cut and increased productivity index (PI) by an average of 5 for gas wells and 16 for oil wells.

"After effective implementation of Schlumberger stimulation technologies, a significant enhancement of formation-wellbore communication was achieved, as well as skin factor decrease and production increase."

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**Matrix acidizing needed for high skin factor**
The Karpenskoe field in Saratov Oblast, Russia, was discovered in 1967 and preserved. Exploration began in 2002, revealing gas and condensate production from a Permian dolomite formation at 1,630-m [5,348-ft] TVD. Permeabilities are typically higher than 3.5 mD, formation pressures range from 150 to 180 atm [2,200 to 2,645 psi], and temperatures average between 39 and 45 degC [102 and 113 degF].

The field’s Bortovoye area is licensed by Diall Alliance, LLC, a subsidiary of Vostok Energy, LLC, and has reserves estimated at approximately 19 billion m³ [671 Bcf] of gas and 2.2 million t [4.9 billion lbm] of condensate. Before stimulation design, well tests were performed on a small number of wells. Results showed significant skin factor between 4.5 and 44, suggesting the possibility of stimulating water zones, which would increase water cut.

To bypass damage, reduce skin factor, and uniformly stimulate the whole zone of interest (including low- and high-permeability sections), a matrix acidizing approach with effective diversion technologies needed to be applied.

**Wells stimulated with acid diversion systems**
Diall Alliance selected three trial wells for stimulation treatment. VDA self-diverting acid system was chosen for one well to maximize wormhole penetration and create an alternative path for petroleum to bypass critical matrix damage. OilSEEKER water-base system was used on the remaining two wells to establish selective zonal diversion from a water zone, leaving it unstimulated before and during the acidizing treatment to reduce water cut after treatment.
**CASE STUDY:** Diall Alliance uses acid diversion systems to increase production and reduce water cut

Successful strategy implemented on six more wells

After treatment, production increased on all three wells. The well treated with VDA acid saw a PI increase of 5.3. And the two that used OilSEEKER diverter not only experienced a PI increase of 3.8, they also showed an improvement in water cut control—from 33% water cut to 0%.

These results so exceeded Diall Alliance’s expectations that the company decided to conduct a second stimulation campaign, treating six more wells using VDA and OilSEEKER services. This application averaged a PI increase of 5 for gas wells and 16 for oil wells. Water cut was again reduced after stimulation.

In total, the stimulation activities of OilSEEKER and VDA systems for Diall Alliance provided an incremental PI increase of 5 for gas wells and 16 for oil wells, numbers never reached with conventional acid stimulation treatments.

The diversion systems created an alternative path for bypassing matrix damage and directed flow away from a water zone.