

ACTive Coiled Tubing Services Enable Real-Time MaxCO₃ Acid Stimulation Treatment

Middle East Operator achieves uniform diversion, higher production in heterogeneous carbonate reservoir

CHALLENGE

Enhance well productivity by stimulating higher-permeability intervals in naturally fractured, high-temperature carbonate reservoir.

SOLUTION

Combine ACTive* live downhole coiled tubing (CT) with Jet Blaster* jetting scale removal service and MaxCO₃* degradable diversion acid to optimize stimulation treatment in real time.

RESULTS

Used real-time monitoring capabilities to optimize diversion and stimulation in a well where diversion treatments were previously impossible.



Operator needed to enhance stimulation in challenging carbonate wells

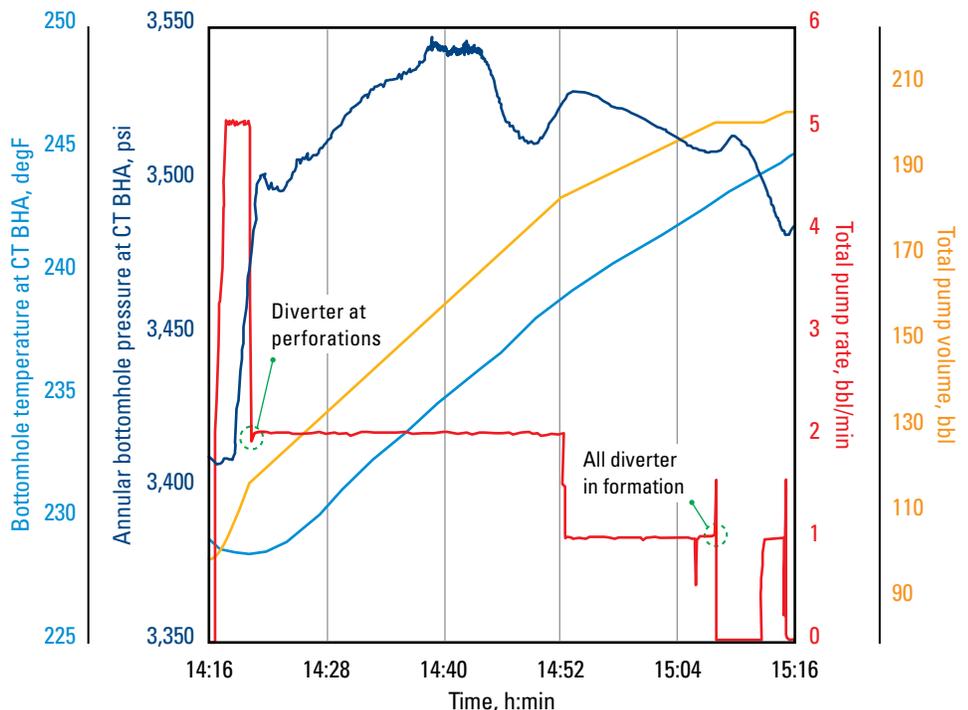
Wells in this Middle East field are prone to high temperature, uneven zone pressures, and scale deposition. In addition, wells are located in highly fractured carbonate reservoirs that require matrix acid stimulation for economic viability. Conventional hydrochloric acid treatments increased productivity, but only marginally. Much of the fluid leaks into massive thief zones instead of creating deep, conductive wormholes. The operator turned to Schlumberger to ensure proper acid placement in difficult-to-reach zones.

Real-time CT enabled accurate, effective diversion and stimulation

Schlumberger bullheaded fiber-laden MaxCO₃ Acid system through the annulus to form a temporary barrier against tight zones. Hydrochloric acid was pumped through an ACTive coiled tubing string. Real-time pressure and temperature measurements from the ACTive service enabled the team to monitor job parameters, such as downhole pressure response, and evaluate the effectiveness of the treatment as it was being performed. The Jet Blaster scale removal service treated scale buildup and allowing the acid to enter understimulated sections.

Even fluid distribution increased production

When MaxCO₃ Acid stages reached the formation, bottomhole treating pressure increased, indicating excellent leakoff control and diversion. Production logging showed higher production rates than offset wells stimulated with conventional matrix treatments.



The downhole pressure trace (green) indicates the diversion process occurring in the matrix during acid injection as MaxCO₃ system reaches the perforations. Diverter accumulates in one zone and drops off as another zone breaks down.