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Kinetix Stimulation-to-Production Software Increases Production by 40% in Eagle Ford Shale

Operator reduces completion costs by 11% with integrated stimulation design and modeling

CHALLENGE

Maintain completion costs and improve well productivity and economics in infill areas.

SOLUTION

Optimize multiwell completion and hydraulic fracturing program with the integrated workflow in the Kinetix* reservoir-centric stimulation-to-production software for unconventional wells.

RESULTS

- Reduced completion costs by up to 11%.
- Increased well productivity by an average of 40%.
- Established a robust workflow to be applied in future wells for maximized productivity.

Limited hydraulic fracture growth and productivity in unconventional wells

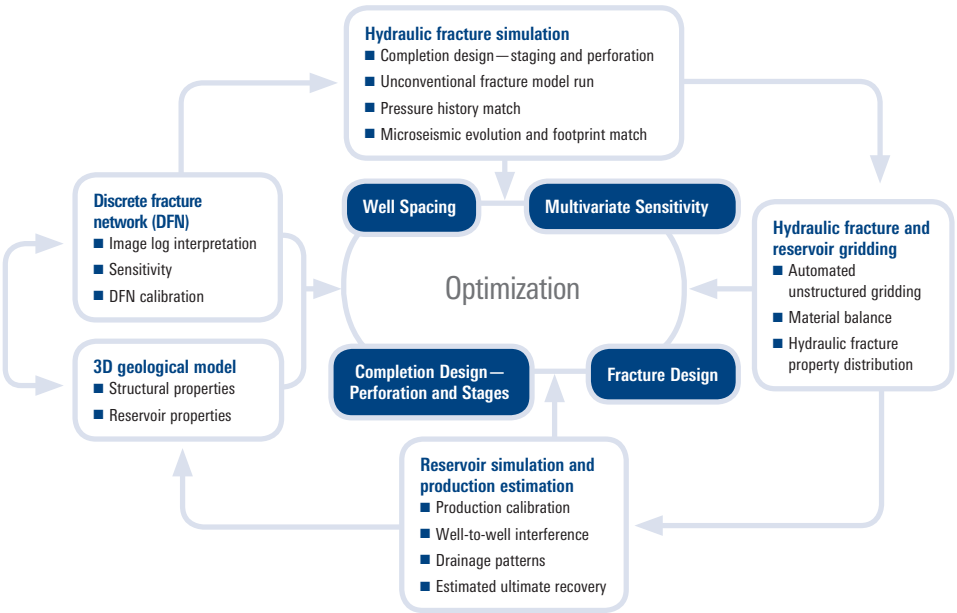
An operator with wells in an oil-rich sector of the Eagle Ford Shale experienced variability in production results, which is typical in unconventional plays. The natural fracture pattern and density in the rock fabric limited hydraulic fracture growth and well productivity.

Slickwater and hybrid hydraulic fracturing techniques have been historically used on these wells to stimulate hydrocarbon production, but these techniques were unsuccessful in this environment. To improve productivity and reduce costs in this challenging reservoir, the operator sought to apply an integrated reservoir characterization and well completion study to develop an engineered approach.

Integrated reservoir characterization and multiwell completion workflow design

Two pads with three and five horizontal wells, respectively, were chosen to be studied in the area of interest in the Eagle Ford Shale. The Kinetix software's workflow was used to evaluate and develop the optimal completion strategies for the candidate wells—all in the Petrel* E&P software platform. A 3D geological model with seismic data; structural definition; reservoir, petrophysical, and geomechanical properties; image logs; and fracturing history with microseismic data served as inputs for creating a robust model for the integrated study.

The stimulation designs were created using a state-of-the-art UFM* unconventional fracture model in the Kinetix software. The microseismic data collected during hydraulic fracturing treatments was used to further calibrate the fracture geometry and footprint.



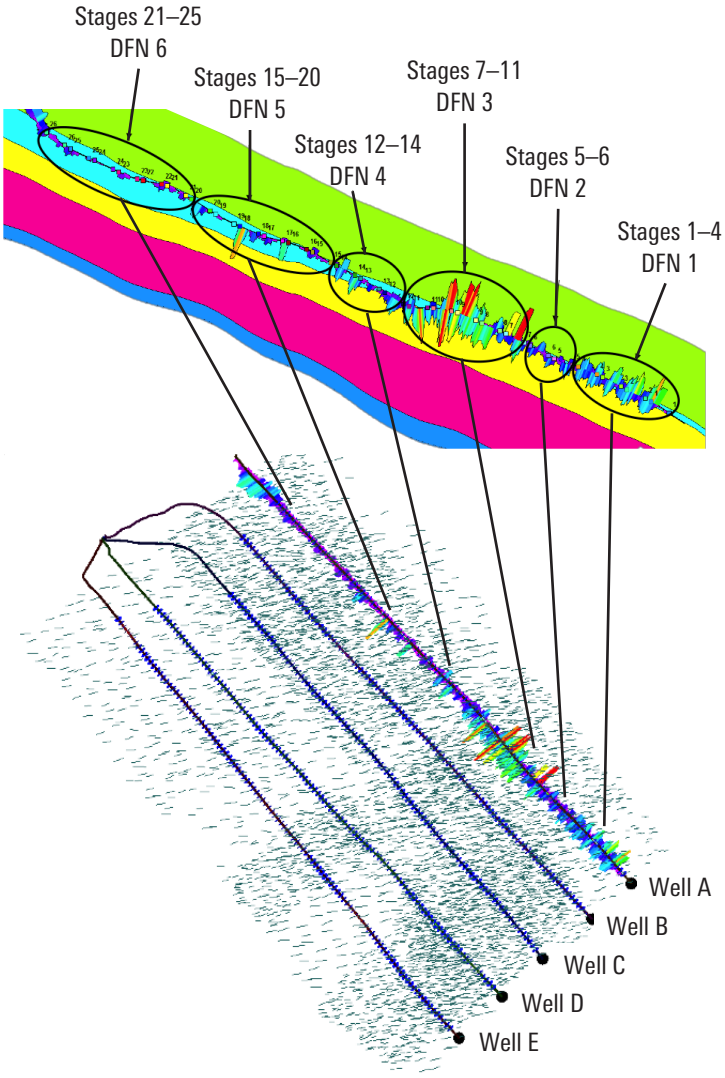
Integrated multiwell completion workflow using Kinetix Shale software.

An important final step in the workflow was to couple the complex hydraulic fracture design to production simulation in the Kinetix software. Automated unstructured gridding was used to capture the granularity of the complex hydraulic fractures from all the wells. This provided a rigorous model to predict the production response from the tridimensional fracture network. Well-to-well interference and overall reservoir depletion from the induced hydraulic fractures could then be precisely simulated.

After the model was calibrated and matched to the observed production behavior, optimized completion strategies were designed based on the multiwell pad completion scenario. Parametric studies were run on different completions, fracture treatment variables, and well spacing scenarios.

Optimized design and well spacing

After applying the optimized treatment designs on a dozen wells in the field, the operator increased production by 40% and reduced completion costs by 11% on an average. The robust workflow in the Kinetix software also provided a building block for future optimization of hydraulic fracture design treatments.



Discrete fracture network model sets for characterizing reservoir heterogeneity along the lateral complex hydraulic fracture geometry using the UFM model.

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