

AIIFRAC Alternate Path Screens Ensure 100% Gravel Packing in Highly Permeable Zones Offshore Angola

Sand screens with shunt tubes and scale-inhibitor–based frac-pack fluid ensure complete gravel packing of screen-to-casing annulus

CHALLENGE

Ensure long-term sandface completion reliability and prevent scale deposition in cased hole, frac-packed wells.

SOLUTION

Use AIIFRAC[†] Alternate Path[†] frac-pack screens to improve gravel and frac packing and prevent screenouts with a fit-for-purpose fluid, including scale inhibitor.

RESULTS

Achieved 100% gravel placement around screens and improved production from both wells.



High-permeability layers complicate gravel packing

An operator had ongoing developments in an area offshore Angola. The producing zone was long, with layers varying from low-permeability shale to multi-Darcy sands, and the area was susceptible to sand production.

Previous wells in this block that were frac packed had established the need for complete screen coverage with the proppant after frac packing. Otherwise, bridging in the high-permeability layers could leave voids in the annular pack. The voids could create conductivity channels and allow the produced oil and formation particles to be focused on certain areas of the screen. Screen erosion and plugging would require that production be curtailed or stopped.

Frac-pack screens, scale inhibitor, and pumping services enhance gravel-pack results

AIIFRAC Alternate Path screens ensure complete gravel placement. The operator collaborated with Schlumberger and elected to incorporate AIIFRAC Alternate Path frac-pack screens in its fracturing treatment to ensure that the gravel packs would be 100% complete. Alternate Path shunt-tube technology uses shunt tubes along the screen joints to provide alternative pathways that enable slurry to fill all the spaces around the screen. If a bridge forms, the slurry flows through the tubes below or past the bridge, reaching and filling any voids. This process continues until the gravel pack is complete.

Custom inhibitor prevents scale deposition. Most formations in this block were susceptible to scale formation, so the frac-pack fluid needed a scale inhibitor that would prevent scale deposition without affecting the fracture treatment. An existing Schlumberger frac-pack fluid was modified to include a large concentration of scale inhibitor and to retain all the required properties needed for the fracturing. The customized fluid design met stringent environmental and technical standards and country-specific guidelines.



AIIFRAC sand screens feature one or more shunt tubes attached either concentrically or eccentrically to the screen joint, with exit nozzles spaced out on each shunt tube for optimum performance. Treatment rates can be up to 8 bbl/min for each shunt tube, depending on the screen, the blank length, and the type of carrier fluid. The shunt tubes are made of stainless steel, and the nozzles are erosion resistant. Timed premium threads are available for simultaneous torquing of the screen joints and aligning of the shunt tubes.

CASE STUDY: Sand screens with shunt tubes ensure complete gravel packing of screen-to-casing annulus

Deepwater vessel with advanced safety systems supports stimulation operations. The Schlumberger DeepSTIM* stimulation vessel pumped the frac-pack fluids. This vessel provides a wide range of services in deep water, including matrix acidizing, acid fracturing, proppant fracturing, sand control, and scale control. A central vessel management system and the ship's engineering, manufacturing, and sustaining organization support the stimulation operations and help overcome the technical, logistical, and operational challenges of deep water.

Schlumberger service facilitates collaboration among teams. The Schlumberger InterACT* global connectivity, collaborating, and information service enabled the operator and Schlumberger engineers to share information about the wells and reservoir in real time across multiple locations, enabling them to make decisions more quickly with input from multiple sources.

Successful gravel placement enhances production

In the two wells completed to date, the slurry placement was 100% successful, and excellent fracture parameters were recorded. A radioactive tracer log run after the gravel pack showed complete gravel placement around the screens and better-than-expected production from both wells. Production continued trouble free for nearly 6 months, convincing the operator to continue using AllFRAC Alternate Path frac-pack sand screens in its future frac-pack operations.

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