Schlumberger

Engineered OptiPac Service Saves 48 Hours of Rig Time and Over USD 1 Million, Deepwater Gulf of Mexico

10K antiswab service tool with MudSOLV service module eliminates extra trip to remove filtercake in openhole gravel-pack completion

CHALLENGE

Perform an openhole gravel-pack completion at a record depth in the deepwater Gulf of Mexico.

SOLUTION

Use OptiPac* openhole Alternate Path† gravel-pack service with a QUANTUM MAX* HPHT gravel- and frac-pack packer, 10K openhole antiswab service tool (ASST), and MudSOLV* filtercake removal service module.

RESULTS

- Saved 48 hours of rig time and more than USD 1 million by eliminating an extra trip to remove the filtercake.
- Achieved better than expected production.
- Delivered the deepest OptiPac service gravel-pack completion extending to 19,350-ft TVD.

Formation composition and well depth pose challenges for gravel-pack completion

An operator had drilled a deepwater well to 19,350-ft TVD in the Gulf of Mexico. The well passed through two long, low-permeability sands separated by a shale section, making it a good candidate for an openhole gravel-pack completion.

Achieving a full annular pack, however, would be difficult because of the likelihood of bridges forming along the heterogeneous reservoir. In addition, deep reservoirs pose a challenge to openhole completions because of the threat of hole instability; trip times are very long, and the hole is open for several days before the gravel pack. Tool manipulation can also be difficult at depth because of buoyancy, well deviation, and torque and drag effects.

Engineers design a comprehensive completion and service plan

Schlumberger recommended an integrated OptiPac service designed with a QUANTUM MAX packer, ClearPAC XD* polymer-free VES gravel-pack fluid, and Alternate Path screens with transport and packing tubes to enable a complete annular pack even if bridging occurs. Engineers used proprietary state-of-the-art modeling software to choose optimal completion tools, fluids, and pumping schedules to ensure full, uniform gravel packing across the entire interval.

The multifunction 10K ASST set the gravel-pack packer and eliminated unwanted swabbing effects as well as a separate trip for filtercake removal.

The hydraulically set QUANTUM MAX packer uses a barrel slip design, enabling high tensile and compressive loading without deformation of the packer. It is set with the 10K ASST, which is equipped with an annular check valve that ensures hydrostatic pressure is continuously applied to the open hole even after the gravel pack is complete. This eliminates tool-movement-induced swabbing effects, which can damage the integrity of the openhole filtercake. A damaged filtercake allows fluid loss, compromising gravel placement and well control.

ClearPAC XD fluid generates low friction pressure while transporting gravel through the shunt tubes and into the annulus; this minimizes the circulation pressure and avoids fracturing the formation in long wells.

After the gravel pack is complete, the filtercake must be completely removed to improve reservoir access across the open hole. The 10K ASST features a MudSOLV service module, which enables pumping of specialty chemicals to dissolve the filtercake without pulling the service tool from the well, eliminating the extra trip that is conventionally required to remove the filtercake.

Service and tools save time while delivering well that exceeds production target

The technology combination engineered in the OptiPac service enabled a complete annular pack. The comprehensive service also saved 48 hours of rig time—valued at more than USD 1 million—by eliminating the filtercake removal trip.

The openhole gravel pack maximized wellbore access to the formation, resulting in production that exceeded the operator's expectations. This completion represented a record depth for the OptiPac openhole gravel-pack service.

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Completions

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