FlexPac™ Service
Water-Based System Compatible with Oil-Based Drilling Fluid for Completions Across Water-Sensitive Shale Layers

New FlexPac™ service enables drilling with oil-based fluid and then completing with water-based fluid. This capability is very important when an openhole screen is to be placed across a pay zone containing water-sensitive shale layers.

Swelling and sloughing of active, unstable shale can cause gravel pack screen assemblies to become stuck so that part or all of the payzone cannot be completed. Or, the screen may be installed but partial hole collapse may cause the gravel pack to be incomplete, leaving bare screen exposed during production. Resulting problems may not be visible until the producing well starts losing production rate or starts producing sand.

FlexPac Service Helps Meet the Sensitive Shale Challenge

FlexPac service includes coordinated service tools and fluids that enable efficient displacement of oil-based fluid from the openhole pay interval without fluid compatibility upsets or screen plugging. This provides important benefits:

- Low skin completions to enable better long-term production.
- Improves the success rate of installing screens to total depth (TD) and achieving a complete gravel pack.
- Facilitates use of oil-based drill-in fluid that can reduce rig time, increase penetration rate and lower drilling cost.
- More efficient drill-in fluid displacement.
- Reduces exposure time of shales to water-based fluid.
- Reduces hole collapse problems.
- Maintains oil-based fluid wall cake to enable return circulation for gravel packing.
- Tool assembly does not require mud to be pumped through the screen during the transition process.
- Lower fluid associated costs.
  - Reduced number of fluids required.
  - Improved fluid logistics – reduced rig tankage required.
  - Reduced contaminated fluid disposal costs.
  - Reduced fluid waste and disposal.

FlexPac Service Additives

The FlexPac service additive package is designed for compatibility with the oil-based drill-in fluid, the formation fluids and formation mineralogy. Formulations can accommodate fresh water, sea water, sodium chloride (NaCl), potassium chloride (KCl), sodium bromide (NaBr) or combinations of salts to meet fluid density and formation compatibility requirements.

Usable at reservoir temperatures of 115 to 230°F (46 to 110°C).

Testing with formation cores from a deep water reservoir showed over 80% retained permeability.
**The FlexPac Service Process**

Run in hole, set and test packer in mud.

A. Shift service tool to the reverse position and spot FlexPac service fluid on the annulus.

B. Shift service tool to the circulating position and pump down the annulus to displace the open hole gravel pack interval with FlexPac service fluid.

C. Shift tool to the reverse position and reverse out excess FlexPac service fluid.

D. Spot gravel pack fluid stages. Displace sweeps and spacers with gravel pack slurry.

E. Shift tool to the circulating position and start gravel packing, taking returns at surface.

F. Pump gravel pack slurry and displace with completion fluid to screen out.

After gravel pack is complete, shift service tool to activate reversing ball check. Pump cleaning sweep stages followed by completion fluid down the casing-by-workstring annulus to reverse out excess gravel slurry. Continue pumping to displace well full with completion.

**Case History**

Offshore West Africa where operators struggle to get screens to depth in wellbores with reactive shales, FlexPac service has been used to maintain hole conditions to enable successful completions in over 90 wells.

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For more information about how FlexPac™ service can help make your sand control screen completions more efficient, contact your local Halliburton representative or email sandcontrol@Halliburton.com.