

High-Pressure Debris Filtration Unit (HPDU) captured 100.5 lb of solid debris at standpipe

Deepwater, multizone completions require complicated downhole equipment. Downhole tools must be shifted to open and close individual zones as needed. If a tool fails to open or close a zone, the operator may lose the entire production potential from that zone. The worst-case scenario is loss of an entire well. A common cause of downhole tool failure is solid debris that becomes lodged inside it. Debris management becomes a critical part of drilling operations

An operator was completing a multizone job offshore in deepwater Gulf of Mexico. The directional well had a water depth of 7,000 ft (2,133 m) and a total depth of 24,485 ft (7,463 m). The operator needed to remove as much debris as possible, protect downhole equipment, optimize flow rates, and mitigate nonproductive time (NPT).

Baker Hughes, a GE company (BHGE), recommended the **High-Pressure Debris Filtration Unit™** (HPDU). The HPDU unit is the last line of defense from solids entering the wellbore. Used with diatomaceous earth (DE) and cartridge filtration, the system removes small or large solids from pits, valves, pumps, and other equipment before they enter the wellbore. The HPDU unit connects directly to the rig standpipe downstream of rig tanks and high-pressure pumps. It is ideal for both land and offshore,

and can operate in 10,000-psi (690-bar) environments. In deepwater operations, an additional filter can be connected to the boost line to remove debris before it enters through the flow path.

The operator installed an HPDU unit at the standpipe and on the boost line. After the drilling fluid was displaced from the well, all completion fluid was filtered to 2 µm with the DE filtration unit. As it was being pumped downhole, it was filtered through the HPDU. Both units were equipped with eight gauge screens for a filtration cut of ~200 µm.

During the completion process, a total of 57,033 bbl of calcium chloride/calcium bromide were passed through the HPDUs in 15 filtration cycles. A total of 100.5 lb (45.5 kg) of solids were removed. The HPDU on the boost line processed 7,914 bbl, capturing 11 lb (4.9 kg) of solids. The HPDU at the standpipe processed 48,119 bbl, capturing 89.5 lb (40.6 kg) of solids.



Challenges

- Wellbore clogged by downhole debris
- Downhole solids-sensitive tools needed protection
- Optimal flow rates needed to be maintained, with no shut down
- Nonproductive time (NPT) had to be mitigated

Results

- Removed 100.5 lb of solid debris
- Maintained and protected downhole tools
- Optimized required flow rates, without shut down
- Eliminated NPT

X-ray diffraction (XRD) lab analysis indicated that most of the debris consisted of barite, sand, calcium carbonate, and cement. Several larger pieces of iron-rich scale and cement scale were also captured. In one sample, a piece of boot string was found. The nature of the solids captured indicated the material came from the interior of rig piping.

As a result of using the HPDU unit, the operator was able to remove debris, protect downhole tools, and optimize flow rates with no NPT.

