How a more efficient Halliburton cleanout approach helped operators save days of deepwater rig time

Halliburton’s single-trip CleanWell® system technology saved millions and removed four times more debris than conventional dual-trip cleanouts

OVERVIEW
Debris left in a well can complicate and delay completions, damage blowout preventer (BOP) stacks and compromise well productivity. Typically, cleanout involves two separate trips: one dedicated trip for drill-out operations and the other for cleanout/displacement. However, two trips in deepwater wells can cost millions of dollars.

Halliburton’s CleanWell® system technology provides a single-trip solution for drill outs, cleanouts and displacements. The CleanWell system helps reduce mechanical risk and rig time while promoting both technical and operational efficiencies. Halliburton helped two operators drill out and cleanout two deepwater wells – both in single trips – saving each operator at least a full day of rig time. In one of the wells, Halliburton collected four times more debris than a competitor had in an offset well using dual-trip technology. Total cost savings for the operators of the two wells was more than $3,000,000.

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<th>CHALLENGE</th>
<th>SOLUTION</th>
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<td>Meeting drilling demands</td>
<td>Robust, innovative tool design exceeds demands</td>
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<td>To establish depth, tools must have the torsional and tensile capacity to reach bottom, an outer diameter (OD) that ensures passage through the inner diameter (ID) of casing while enabling flow of debris around the tools, and a tool ID that provides effective circulation.</td>
<td>CleanWell system’s innovative, robust design meets all those demands. Tools have torsional and tensile capacities greater than the rig-end connection. The OD has large geometric passage to enable circulation around the tool. The ID allows for optimal flow rates without resorting to higher pressures.</td>
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<td>Ensuring integrity of inner diameter</td>
<td>Drillable, rotational system</td>
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<td>Operators also must stay within drift to establish depth – usually at least one-eighth inch less than the casing ID. However, debris and cement clinging to the walls of casing can reduce this clearance and impair the cleaning ability of traditional non-rotating cleaning tools.</td>
<td>CleanWell system was designed to ensure and even restore drift accomplished by the rotational components. When debris clings to the walls of casing, the blades of the tools break it up – restoring drift without damaging the casing. Debris can then be removed hydraulically or mechanically.</td>
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<td>Mechanical extraction of debris</td>
<td>More efficient, reliable tools</td>
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<td>Operators need to filter and mechanically extract debris not transported to surface through fluid circulation. The design of most debris-removal tools can’t always handle the downhole drilling forces, and sometimes require additional runs for cleanout or to fish damaged tools.</td>
<td>CleanWell system’s debris-extraction tools effectively remove debris from maximum well depths. These tools incorporate unique and reliable design features – including a downhole mechanical filter with a robust steel filter tube – that support deploying to bottom in challenging conditions.</td>
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CleanWell® system is a drillable, rotational system that enables the tools to rotate with the drill pipe. Unlike other systems, it can conduct drill out, cleanout and displacement in one trip downhole to efficiently collect and remove debris from the well.

CleanWell system’s robust, mechanical extraction tools recover more debris than other systems. For one operator, the CleanWell system recovered 165 pounds in the single-trip drill out, cleanout and displacement run – at least four times more debris than conventional systems. Additional client-required cleaning runs recovered approximately another 115 pounds of debris.

Halliburton conducted drill out, cleanout and displacement for two operators. Without the need for a separate cleanout trip, both operators saved rig time. One operator saved two days of rig time valued at $1.5 million. Another operator in a shallower well saved one day of rig time plus fluids, together valued at approximately $1.6 million.

Halliburton’s Vac Tech® system can lift debris from depths three times greater than other tools. The unique design of the Vac Tech downhole eductor system creates induced flow to achieve lift; enabling packer plug retrieval runs other tools can’t match.

A CASE STUDY: Single-trip drill out, cleanout and displacement

3 TIMES GREATER POST-PERF LIFT

SINGLE-TRIP SAVINGS

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Combined for both operators

$3 MILLION SAVED

HALLIBURTON
Advanced wellbore cleanout minimizes drilling and completion costs
Wellbore cleanout and displacement runs have many requirements that must be achieved to establish bottom and clear the well for additional operations. Halliburton's CleanWell® system technology is designed to be a single-trip, drillable system that achieves the fluid condition and well cleanliness goals of the operator more safely and faster than traditional systems.

CleanWell system technology used for variety of applications
Halliburton designed the CleanWell system technology for all phases of well construction. It performs a variety of different downhole cleaning and debris management applications including drill outs, cleanouts, displacements, fishing and post-perforation runs. With a wide range of designs, all components perform a variety of functions including debris extraction, casing cleaning, riser cleaning, jetting, and bypassing.

CleanWell system technology tools include several unique features. Their design supports single-trip drill outs. The torsional and tensile capacities of the tools exceed those of the workstring, or rig-end connection. The tools have a high flow area around themselves which is designed for optimal geometric passage of fluids and debris. Robust integral mandrels ensure that there are no weak internal connections.

The Drill Tech® scraper and Bristle Tech® brush have abundant flow passage and spring loaded blades that help ensure coverage of the casing ID. The Mag Tech® magnet can collect debris at depths other tools cannot to include withstanding drilling torque and axial loading forces. The unique stainless steel filter sleeve on the Vali Tech® filter screen tool provides consistent, efficient debris extraction. The unique design in the head of the Vac Tech® downhole eductor system creates induced flow to achieve lift for packer plug retrieval runs and can lift debris from depths three times greater than other tools.

Benefits of the CleanWell system
The innovative design of CleanWell system technology tools helps ensure casing integrity. The system cleans casing ID, mechanically removes debris from the wellbore, provides hydraulic boosting to increase fluid velocities and helps reduce mechanical risk. The innovative, robust tools establish bottom and displace mud to brine without need for a separate run.

These wellbore cleanout solutions help save operators rig time and reduce the number of trips downhole, minimizing risk and mitigating damage to the well. CleanWell system technology can deliver valuable benefits, yet not pose a hydraulic or structural limitation downhole.

A CASE STUDY: Single-trip drill out, cleanout and displacement
Halliburton's single-trip CleanWell® system technology saved millions and removed four times more debris than conventional dual-trip cleanouts.
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**New technology saved Gulf of Mexico operator two days of rig time**
Halliburton recently demonstrated the effectiveness of the CleanWell® system technology for an operator with a deepwater well in the Gulf of Mexico. Because of the costs associated with deepwater wells, the operator turned to Halliburton to reduce the number of trips needed for cleanout.

Halliburton used its CleanWell system to drill out and cleanout the deepwater well in a single trip, establishing depth at 18,799 feet and displacing the mud to brine. The job included drilling out more than 110 feet of cement, as well as washing and reaming 1,298 feet. The single-trip drill out, cleanout and displacement run recovered 165 pounds of debris.

The client also required Halliburton to conduct several additional runs. Halliburton used its Vac Tech® downhole eductor system for:
- Crown plug cleanout, recovering 15.5 pounds of debris
- Post-perforation cleanout, recovering 86.3 pounds of debris while successfully pulling the SSP packer.

Altogether, the CleanWell mechanical extraction tools (Vor Tech®, Vali Tech®, Mag Tech® and Vac Tech® systems) recovered more than 280 pounds – at least four times more debris than conventional systems.

The CleanWell system also helped the operator save two days of rig time, a value of at least $1.5 million.

**CleanWell system technology saved West African operator $1.6 million**
Another operator hired Halliburton to conduct a single-trip drill out, negative test, cleanout and displacement for a deepwater well in West Africa. The operator wanted to establish a depth of 11,375 feet and needed a cost-effective and safe method to remove debris.

Halliburton established the desired depth in one run down hole, cleaning the well and the BOPs, performed a negative test ensuring well integrity, and then displaced mud to brine in the well. During the run, the tools successfully drilled through several cement stringers.

Overall, Halliburton collected and removed more than 90 pounds of debris from the well. The debris removal helped mitigate potential well control issues that could have prohibited subsequent completion runs, damaged BOP stacks or compromised well productivity. Halliburton helped the client save approximately $600,000 in rig time costs by conducting the drill out, cleanout and displacement all in a single trip. In addition, by utilizing the Inflow Tech® negative test packer in the same run, the operator realized fluid savings of approximately $1,000,000.