

Integrated Debris Removal and Casing Cleaning Tools

Recover 70.5 lbm of Debris and Eliminate Additional NPT

Integrated technologies optimized operations where conventional equipment failed

CHALLENGE

Remove debris from the wellbore for optimal future operations in Saudi Arabian well.

SOLUTION

Perform a cleanup run using a MAGNOSTAR[†] high-capacity magnet and JUNK MUNCHER[†] wellbore cleanup tool in a BHA; prepare wellbore with a HEAVY-DUTY RAZOR BACK[†] advanced casing cleaning tool (CCT).

RESULTS

- Recovered 71.6 lbm of debris from the wellbore in one run.
- Saved rig costs by eliminating additional nonproductive time (NPT).



Failing to recover debris

A customer needed to remove all debris from the wellbore to ensure optimal horizontal multilateral drilling, well completion, and production. The turnkey project in Saudi Arabia had received two cleanouts using conventional cleanout equipment from a third-party supplier; on both occasions, the strings returned to surface without debris. During the first cleanout operation attempt, three scraper blades remained downhole after the equipment lost external bolts and retention bolts. During the second trip, the backup string tagged high in the well at 3,801-ft [1,158-m] MD and was unable to proceed.

The well plan included a smart completion consisting of two permanent downhole monitoring tubing systems and inflow control valves (ICVs) with dual gauges to monitor and control reservoir performance. Total planned footage was 26,526-ft [8,085-m] MD with 19,126 ft [5,830 m] of 6 $\frac{1}{8}$ -in openhole section.



The JUNK MUNCHER tool recovered larger pieces of debris.

Selecting the proper cleanup technology

The customer asked M-I SWACO to design and run a debris-capture cleanup string to remediate the problems. Specialists designed a string that included a JUNK MUNCHER tool for collecting larger debris and a MAGNOSTAR magnet for extracting larger debris. Both tools recover ferrous and nonferrous debris and have an extensive track record in Saudi Arabia.

A HEAVY-DUTY RAZOR BACK CCT was run ahead of the other tools to equip the BHA with a milling face and scraper to prepare the wellbore ahead of debris recovery and eventual packer setting for the whipstock kickoff point.

Saving money and preventing NPT

The cleanup run using M-I SWACO technology proved to be successful compared with the previous trips with alternative equipment. The MAGNOSTAR magnet recovered 70.5 lbm [32 kg] of ferrous debris averaging 4 to 6 in, and the JUNK MUNCHER tool recovered 1.1 lbm [0.5 kg] of mostly springs and other parts associated with the conventional scraper. The success of the first trip initiated a second trip, which pulled no returns and indicated that the wellbore was free of debris.

The customer allocated 149 hours of NPT for the first two unsuccessful cleanout runs as a direct result of the lost scraper blocks. M-I SWACO technology helped the customer eliminate any additional NPT and prevented an unplanned mechanical sidetrack, allowing the wellbore to be properly completed.



The design of the MAGNOSTAR magnet maintains sufficient flow around the tool during the debris-capture operation.