



Technology in Action

Hard scale removal from production tubing using mechanical means



Torque Action Debris Breaker (TADB)

National Oil Company, Middle East

Technical Objective:

To conduct a trial test to remove hard scale from production tubing using mechanical means thus restoring full bore access.

Well type:

Vertical oil well; 4-1/2" tubing size.

Peak Solution:

Peak Torque Action Debris Breaker (TADB) – 2-1/2" torque mandrel with 3.70" and 3.83" cutter subs.

The Challenge:

During a drift run in 2013, the Customer detected accumulated scale in the production tubing of an oil well. The well had a history of scale build-up and a previous downhole solid sample presented 95% iron compounds – iron oxide, siderite, mackinawite and pyrrhoite as well as calcium carbonate.

Several attempts at acid descaling using 15 per cent and 20 per cent Hydrogen Chloride (HCl) yielded moderate results but it was unable to fully clear the obstructions just below surface.

Scale left in the completion as a bridge was not acceptable to the Customer and a trial test was proposed to attempt to break the hard scale using mechanical means.

Considerations:

The following key requirements and concerns were highlighted:

- A timely and effective intervention was critical
- A mechanical means of descaling was required
- The solution needed to be simple and easy to perform

Summary:

A trial test of Peak's TADB was initiated to remove the hard scale in 4-1/2" production tubing.

A 3.83" TADB was run in hole and tagged an obstruction at 450'kb. The tool was jarred down mechanically in the well using 10' of 1.875" toolstring. With each downward jar, the unique helically split torque sub applied a short duration of rotational torque to the cutter below clearing 30' of obstruction to reach 512'kb. Further jarring cleared this obstruction and continued to 539'kb. A smaller 3.7" OD cutter was then run in hole.

Many areas of tight and hard scale were consistently cleared at a rate of 3,000ft/hr until the crossover was reached at 6,770'kb.

The 3.83" TADB was re-run in hole with 5' of 1.875" additional stem for added weight and continued to clear the scale to 1,350'kb before the trial was ended.

The hard scale was successfully cleared using the TADB where previous acidizing attempts were not as successful.

Value to Customer:

The trial was declared a success by the customer with all operations carried out safely and efficiently.

- The operation demonstrated a future time and cost saving - eliminating the need for additional costs associated with an acidizing operation
- Well accessibility was restored using a simple slickline tool that reduced well intervention time and the costs associated with other mechanical scale removal methods ie CT milling
- Less personnel and equipment were required
- Well potential and integrity was restored quicker than alternative methods

For more information please contact: info@peakwellsystems.com

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