

Abrasive Perforating

Abrasive Perforating Test thru Multiple Strings



HIGHLIGHTS

- Feasibility Confirmed
- Realistic Setup
- Efficient Results
- Consistent Method

DETAILS	Test 1	Test 2
Pump Rate	1 BPM	1.5 BPM
	159 LPM	289 LPM
Perforating Head	1.9 BPM	1.9 BPM
	48.3 MM	48.3 MM
Proppant Size	100 Mesh	100 Mesh
Proppant Concentration	1 PPG	1 PPG
	119.8 kg/m ³	119.8 kg/m ³
Injection Pressure	3000 PSI	6000 PSI
	21 MPa	41.4 MPa
Punch Thru Time - Short Side	2:30	0:26
Punch Thru Time - Long Side	17:44	2:27
Strings Penetrated	3	3
Average Perf Diameter	0.46 In	0.48 In
	11.7 MM	12.2 MM

BACKGROUND

There are several locations, in the Gulf of Mexico, that currently have low volume potential reserves trapped behind multiple casing strings. A test utilizing abrasive perforating technology was undertaken to determine the feasibility of conducting thru tubing re-completions to capture these currently stranded volumes.

TEST PROCEDURE

The test fixture was built by installing 2 7/8" tubing inside of 7 5/8" casing inside of 10 3/4" casing, eccentrically welded to simulate a best and worst case scenario. The Abrasive Perforating BHA was chained with a tool clamp to the top of the fixture with the jets aligned to punch holes along a short and long axis. Perforating began working from bottom up by pumping slurry consisting solely of sand and water. The pump rate varied while prop concentration and prop type was constant with a maximum pump time of 20 minutes.

RESULTS

The results of the test concluded that it is possible to achieve reasonable sized perforations through multiple casing strings. A total of seven individual tests were completed with five independent variables. In one case, one of the perforations was cut in less than 30 seconds.

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